

# A CONCEPTUAL MODEL OF PERFORMANCE AND SATISFACTION FOR MAIN PARTICIPANTS OF CONSTRUCTION PROJECT COALITIONS

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The UK construction industry has long been criticized for engendering adversarial relationships among project participants. The nature of interrelationships ultimately determines overall project performance, in terms of finished product, and levels of performance and satisfaction for the participants. To investigate these interrelationships, the performance and satisfaction of each individual participant must be considered. Better understanding of the interrelationships should help reduce adversarialism and improve the performance and satisfaction of each participant. The possible interrelationships that may exist are discussed based on 'soft knowledge' approaches, i.e. psychology, organizational behaviour and sociology. The paper presents a conceptual model of performance and satisfaction for main participants of the project coalition. The ultimate aim of the research is described, that is development of a predictive model for optimizing the interrelationships. The model will determine participant performance levels that would acquire high levels of satisfaction for each participant. This prediction is based on participant performance attributes (i.e. characteristics of that organization, such as past experience, turnover, references, etc.) and interrelationships. This should provide a basis for participant self-evaluation and problem anticipation, ultimately leading to enhancement of overall project performance.

Keywords: coalition participants, interrelationships, performance, satisfaction.

## INTRODUCTION

The construction project coalition is a unique organization. This uniqueness is characterized in the main by *disintegration*, i.e. separation of product design and production process (Nam and Tatum 1992, Puddicombe 1997), *temporariness of the organization* (Cherns and Bryant 1984, Reve and Levitt 1984, Mohsini 1989, Mohsini and Davidson 1992, Munns 1996), and *interdependence among participants* (Higgin and Jessop 1965, Mohsini 1989). These characteristics influence how participants of the project coalition (PC) conduct their respective activities and interact with each other. This interrelationship ultimately determines overall project performance and individual participant performance.

Close co-ordination and good working relationships among project participants have been found to be the most important factors contributing to perceived project success (Baker *et al.* 1988). Moreover, project performance can be enhanced by a high degree of co-operation between participants (Smith and Wilkins 1996, Egan 1998). In this

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context, success means that certain expectations for a given participant were met, whether this is the client, the contractor, or the designer (Sanvido *et al.* 1992). Unfortunately, 'good' relationships among these participants are rarely found (Smith *et al.* 1998). Participants are often involved in protracted contractual disputes leading to costly settlement, arbitration or legal action. This adversarial nature is, of course, far from the expectation of participants. One of the main reasons why this evolves may be that each participant has his or her own 'agenda' for a particular project, which can conflict with those of other participants (Gardiner and Simmons 1992). Each participant may have goals (or success criteria) that are different from those of others (Cyert and March 1992, Sanvido *et al.* 1992, Naoum 1995). In this case, clients' requirements often become paramount (Barnes 1988). However, failure to appreciate other participants' goals and requirements can result in inter-organizational conflicts and contractual disputes. To satisfy their own objectives and improve overall project performance, each participant should realize the importance of other participants' objectives. This may seem idealistic to some extent, but is a truism all the same.

To investigate the interrelationships between project participants, with respect to overall project performance, the performance and satisfaction of each individual participant must be focussed upon. Within the context of the PC and the interdependence among its participants, this paper considers the relevance and the need for a conceptual model of performance and satisfaction; and the possible performance and satisfaction interrelationships that may exist based on 'soft knowledge' approaches, i.e. psychology, organization behaviour and sociology. The conceptual model of performance and satisfaction for main participants of the PC is also presented. The paper concludes with possible implications of this research for the construction project environment.

## **THE NEED FOR IMPROVEMENT**

The construction industry has long been criticized for engendering adversarial relationships among project participants. Participants are known to focus on achieving their own objectives, with no, or little, regard for the objectives of others (Thompson and Sanders 1998). Sometimes, individual objectives are attained at the expense of others. A participant may gain short-term benefits at the expense of long term benefits derived from harmonious working relationships. This 'short-sightedness' is synonymous with the construction industry. If this situation remains, participants will continue to suffer and clients will continue to be dissatisfied with the service provided by the industry.

The Latham report (1994) encouraged 'win-win solutions' to modern-day construction problems. All participants should strive to improve their performance and acquire goal attainment leading to satisfaction. This will derive long term mutual benefits for participants. Enhanced client satisfaction will encourage more clients to employ the industry in the future. Other participants will benefit from the increased possibility of gaining such work. Ultimately, the construction industry and the UK economy as a whole will benefit through a greater workload, improved quality, improved satisfaction, less waste, etc., i.e. continuous improvement. The recent Egan report (1998) revealed that many clients are still dissatisfied with contractors' and consultants' performance. The construction industry is also continuously criticized due to its failure to meet its own needs and the needs of its clients. The intended research addresses the interrelationships between participants of the construction PC

(that is, in terms of their performance and satisfaction) with the ultimate aim being to reduce adversarialism and improve the performance and satisfaction of each participant. Reducing the current adversarial culture would help improve the performance and satisfaction of each participant. To achieve this aim, performance and satisfaction must be predicted in order to anticipate the final outcome of a particular project. If the performance of each participant is improved, total project performance will be enhanced. Better total project performance should bring higher client satisfaction since client objectives may manifest in project objectives.

The main aim of this research is to examine these interrelationships and determine how performance and satisfaction interact. In this regard two distinct procurement methods are to be considered, these being the traditional procurement method and a 'new' procurement form, namely partnering. The ultimate goal is to develop a predictive model for optimizing these interrelationships. The model will predict the levels of performance and satisfaction of participants before commencement of the project, which may ultimately help enhance overall project performance due to a more co-operative and performance enhancing PC. The underlying theme is one of reducing adversarial relationships. The model may take algorithm or artificial neural network forms. This will be toward development of simple to use tools for use by participants.

The concept that the performance and satisfaction of a participant is not solely independent in a construction project, but dependent upon performance of other participants will be investigated. This is contrary to current knowledge; i.e. that project performance is mainly a function of contractor performance. An initial literature review has revealed a dearth of research in this area.

## **BASIC CONCEPTS UNDERLYING THE MODEL**

### **Definition of project coalition (PC)**

The PC is a temporary multi-organization (Cherns and Bryant 1984, Reve and Levitt 1984, Mohsini 1989, Mohsini and Davidson 1992) that undertakes construction projects for the client organization. Traditionally, main participants of the PC are *the client, the contractor and the architect*. These participants appoint persons / teams to represent their organizations in the PC.

### **Interrelationships between main participants of the PC**

The interrelationships between participants of the PC contribute significantly to overall project performance. Performance evaluation is most effectively measured by levels of satisfaction. Each member has to be satisfied with the performance of the other participants if good working relationships and suitable levels of Cupertino are to be sustained. Here, performance is defined in terms of roles within the PC, while satisfaction is defined in terms of roles in the process. The performance and associated satisfaction of individual participants not related to the PC are outside the scope of this research.

### **Interdependence among participants: a view of organizational sociology**

While relationships among participants are temporary, they are highly interdependent in nature (Higgin and Jessop 1965, Mohsini 1989). Coalition participants require certain actions by others in order to enable them to perform their own respective tasks. This is defined by Bates (1960) as a *reciprocal relationship*. Hence the performance of a participant depends to some extent on the performance of others. The relationship between participants can also be partly described as a *conjunctive relationship*. That

is, for a participant to perform their function or accomplish their goal they must conduct their task in conjunction with another (Bates 1960). Bates (*ibid.*) argued that the difference between reciprocal and conjunctive relationships is in terms of goal orientation. In the former, all participants have a common goal. However, in the latter each participant has an individual goal that can be distinguished from other participants' goals. Thus, it can be demonstrated that participants of the PC each have their own goals, but also share the common goal of delivering the final product, i.e. the project under construction, to the client's satisfaction.

According to basic organizational theory, a particular organization is composed of interdependent parts (Thompson 1967, Silverman 1970). Thompson (1967) discovered the types of interdependence and co-ordination between such parts. The nature of interdependence and co-ordination between participants of the PC can be categorized as *reciprocal interdependence* and *co-ordination by mutual adjustment*.

Reciprocal interdependence is where the outputs of a participant become the inputs of others and vice-versa. Thompson (1967) contended that if an organization is involved in reciprocal interdependence then it would also include *pooled* and *sequential interdependence* (considered as lower level types of interdependency). Pooled interdependence occurs when each part of an organization is least dependent on other parts; but each part discretely contributes to the whole organization and is supported by the whole. Sequential interdependence (which is less dependent than reciprocal interdependence but more dependent than pooled interdependence) is where an outcome of one part of the organization becomes an input for another part; but the output of the latter does not become the input for the former.

Each type of interdependency requires a specific type of co-ordination. Pooled interdependence requires co-ordination by standardization. Sequential interdependence needs co-ordination by planning. Co-ordination by mutual adjustment, which is required by reciprocal interdependence, involves effective communication of new information and decisions during the action (i.e. construction processes). Moreover, the more variable and unpredictable the situation, the greater the reliance on co-ordination by mutual adjustment (March and Simon 1958 cited in Thompson 1967). It may be concluded that the more complex the interdependency, the more complex the interactions and the interrelationships between parts of an organization become. An example in the construction project environment would be where the contractor requires drawings from the architect; who in order to keep up to date with conditions on site, requires certain information from the contractor which can then be incorporated into drawings. This example illustrates the reciprocal interdependence and the co-ordination by mutual adjustment, which requires appropriate communication and decision-making.

Moreover, Mohsini (1989) argued that interdependence can be symmetrical or asymmetrical (i.e. both or only one of the two concerned organizations has incentive to co-ordinate), and it can range from high to low. Symmetrical interdependence is where both participants comply with each other's requirements. Contrarily, asymmetrical interdependence occurs where one participant has to comply with another participant, but the latter does not have to comply with the former. Symmetrical interdependence between organizations may promote collaboration while asymmetrical interdependence may lead to conflict.

### **Relationships between performance and satisfaction: a view of psychology and organizational behaviour**

Back in the late 1960s, Locke established the theory of task performance and satisfaction in the field of organizational behaviour and psychology (Locke 1970, Locke *et al.* 1970, Locke and Latham 1990). The theory argues that performance is most effectively determined by the achievement of goals, while satisfaction is a function of the discrepancy between performance achieved and performance targeted. In other words, satisfaction is a function of comparison between an individual's perception of an outcome and their expectation for that outcome (Ilgen and Hamstra 1972).

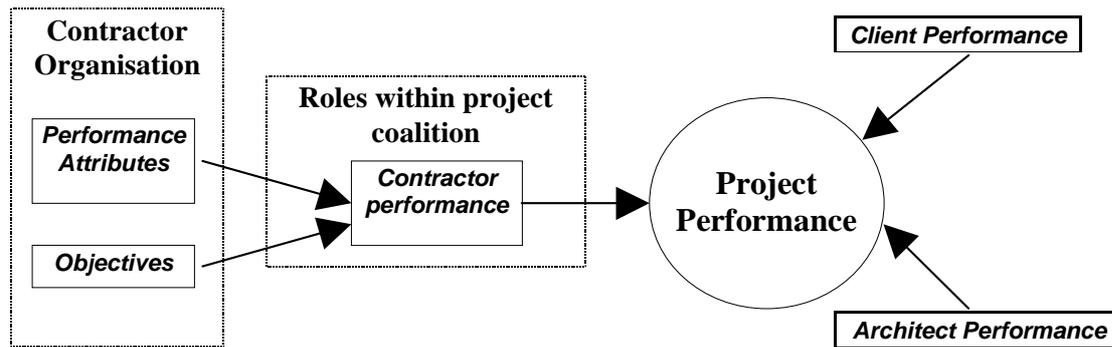
Furthermore, Locke (1969) reported that the emotional responses (i.e. feelings of satisfaction and dissatisfaction) are also dependent on value importance; that is how an individual deems a certain aspect of the task in their value hierarchy. The implications for participants of the PC are now considered. That is, how one participant of the PC values a certain task undertaken by another participant; and how this impacts their own performance and levels of satisfaction. The extent to which the performance of other coalition participants impacts upon the performance of another will determine that participant's perceived importance of the others performance. This is because the satisfactory performance of 'other' coalition participants enables another participant to achieve their own goals and to perform better. From this discussion, two levels of satisfaction may be postulated. First, the satisfaction of a coalition participant upon achieving the goals of their own organization, and secondly, the satisfaction of a participant derived from the performance of other participants.

In construction, performance is an individual's (client, architect, contractor) contribution to the execution of the task required to complete the project (Liu and Walker 1998). Therefore, it can be said that the performance of each participant contributes to overall project performance. The performance of one participant does not necessarily directly bring satisfaction to other participant(s); the linkage is far more complicated. The performance achieved by one participant affects the goal attainment of other participants. The attainment of goals may bring satisfaction to those participants affected by such attainment. Therefore, goal attainment is considered as a first level outcome whereas satisfaction is considered as a second level outcome (Liu and Walker 1998).

Concerning the second level of satisfaction, each participant sets the expected goal levels of others. For instance, the client desires certain levels of performance (goal levels) from the architect and contractor, which affect attainment of the client's goal. If the performance of the architect and contractor exceed the goal level expected, then the client perceives that they have succeeded the tasks assigned to them. This will provide a feeling of satisfaction to the client. However, the client's level of satisfaction may vary based on how much the goal levels have been exceeded. Therefore, criteria or other quantitative measures are needed for comparing goal levels against the performance levels thus giving a goal/performance discrepancy index to show the degree to which the goals have or have not been achieved. Evaluation outcomes represent success or failure and / or subsequent feelings of satisfaction or dissatisfaction (Liu and Walker 1998).

### **The relationship between the performance of PC participants**

The performance of one participant is, to a certain degree, affected by the performance of another. Hamner and Harnett (1974) describe this as a *co-operative-interdependent*



**Figure 1:** Performance model for contractor

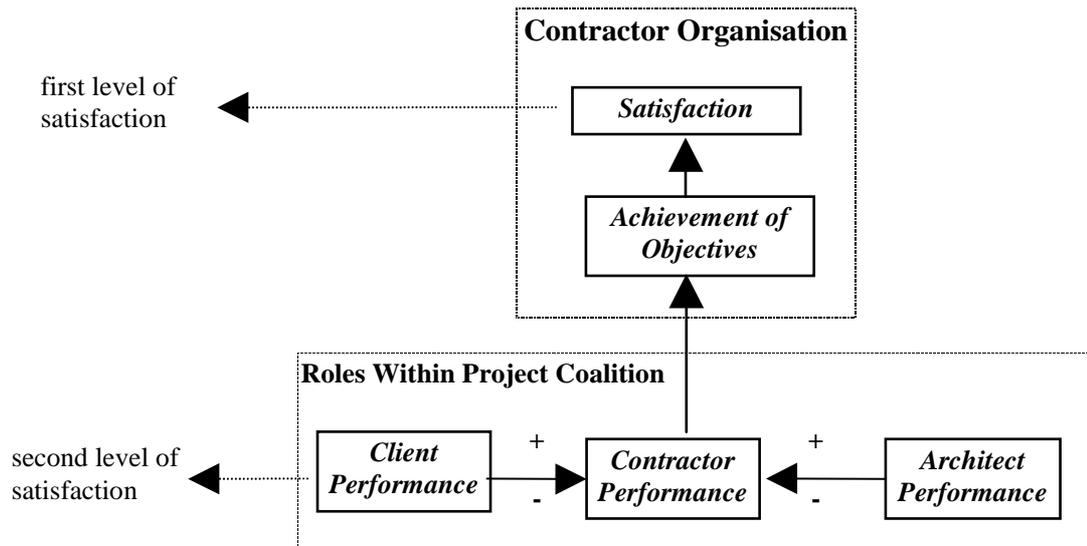
task; i.e. where the performance of an individual is partly determined by how well another perform their tasks. Arge (1995) for example, indicated that architectural quality is determined by client performance. A qualified client is instrumental in securing good architecture (Arge 1995). Kometa *et al.* (1994) argued that certain attributes associated with client organization also affect the consultant’s performance and, hence, construction project performance. Moreover, Tam and Harris (1996) identified external factors affecting contractor performance consisting of other participants’ performance, i.e. architects and clients. These factors included architect/engineer drawings, architect’s or client’s supervision and control of the quality of work, control of work progress, and punctuality of payment by the client.

## A CONCEPTUAL MODEL OF PERFORMANCE AND SATISFACTION IN THE CONSTRUCTION PC

Figure 1 shows the performance model for individual organizations (in this case contractor) of the PC. Performance within the PC is a manifestation of the performance attributes (i.e. characteristics of that organization, such as past experience, turnover, references, etc.), and is driven by performance objectives. In sum, it is shown that the performance of each participant contributes to overall project performance.

Figure 2 illustrates the performance and satisfaction model for individual organizations (e.g. contractor) of the PC. It shows how performance brings satisfaction for one participant (in this case the contractor) through the achievement of their objectives. With regard to the first level of satisfaction, achievement of objectives will bring satisfaction within the contractor organization. However, objective achievement may depend on the satisfactory performance of the other two participants, if and only if, in order to perform well, the contractor needs a certain level of performance from them. It also depicts the interrelationship between the performance of participants. The performance of one participant is not solely dependent on their own performance, but also on the performance of other participants. The performance of other participants when evaluated will create the feeling of satisfaction or dissatisfaction for that participant. This is the second level of satisfaction. The horizontal links shown in Figure 2 indicate how each participant evaluates the performance of other participants.

Figure 3 shows as a whole, the relationships and interrelationships between performance, satisfaction, attributes and objectives of all participants in the project coalition. It is worth noting that the second level of satisfaction, which is derived from the outcome of the evaluation of others’ performance, may *explicitly* bring good



Note: + : satisfactory performance evaluation, - : unsatisfactory performance evaluation

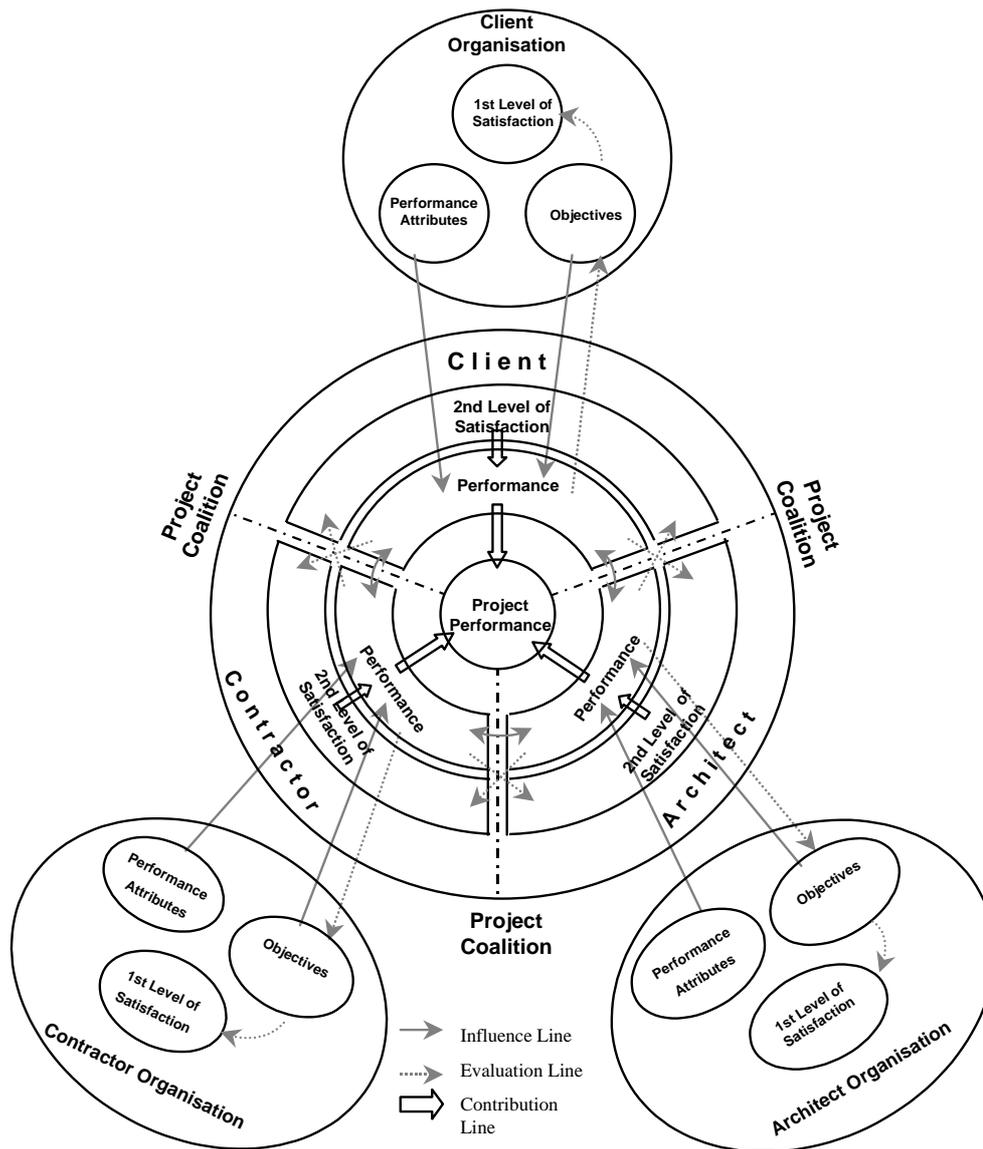
**Figure 2:** Performance and satisfaction model for contractor

working relationships between participants of the PC. However, the first level of satisfaction, which is within the individual organization, is derived from the achievement of organizational objectives. The performance of other participants may enable a participant to perform certain action to achieve these objectives. This is at the core of satisfaction / dissatisfaction feelings which, at certain levels, may *implicitly* bring good working relationships between participants of the PC.

## CONCLUSION AND IMPLICATIONS

Even though good working relationships and co-operation between participants have been recognized as prerequisites for project success and good project performance, the adversarial relationships among project participants still exist. This is partly influenced by the unique nature of the construction PC. However, to reduce adversarialism through investigation of PC interrelationships, the performance and satisfaction of each participant must be considered. In this paper, the possible performance and satisfaction interrelationships between participants have been discussed. This is because to achieve harmonious working relationships and to enhance performance and satisfaction, human factors should be focused upon.

The paper has highlighted the need for research aimed at reducing adversarialism and improving the performance and satisfaction of each participant. As a general hypothesis, if the performance of each participant is improved, total project performance will be enhanced. To help achieve this aim, the performance and satisfaction must be predicted to anticipate the final outcome of a particular project. Only then can appropriate action be implemented to correct / improve the predicted outcome. A conceptual model for predicting the performance and satisfaction of the PC participants has been presented. It is suggested that the performance as well as satisfaction of each participant can be predicted by the performance attributes (i.e. characteristics of that organization, such as past experience, turnover, references, etc.) and interrelationships between participants. The research is intended mostly for



**Figure 3:** Performance and satisfaction model for main participants of PC

application in the traditional procurement route where the three dominant participants are explicit. Partnering, which is considered a more recent procurement method will provide a useful contrast to this.

The implications of the research for coalition participants, that is, clients, contractors, and architects are that:

- They will be enabled to achieve their objectives efficiently and effectively, due to better and less conflicting relationships. This will ultimately enhance the participants' first level of satisfaction.
- Significant performance criteria of each participant will be highlighted, which if properly implemented, will remove the barriers hampering their interrelationships with other participants that may cause conflicts.

- Each participant will be able to focus on specific factors that have significant impact on project performance. These may either be their own performance criteria or other participants' performance criteria.
- The final model will enable participants to understand their own levels of performance and satisfaction in particular projects. This will enable them to take the necessary action in order to enhance their own performance and satisfaction.
- The aim of the research is to develop simple to use tools for use by participants. These tools could be utilized as predictive and / or evaluation tools, which allow participants of the PC to anticipate the final outcome of the project in terms of performance and satisfaction (at the first level and / or second level) for each participant and the project as a whole.

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