Insights into collaboration at project level: complexity, social interaction and procurement mechanisms

Svetlana Cicmil*

Bristol Business School
University of the West of England
Frenchay Campus
Bristol, BS16 1QY
tel: + 44 (0)117 328 3464
fax: + 44 (0) 117 328 2289
Svetlana.Cicmil@uwe.ac.uk

and

David Marshall

Turner & Townsend
Construction and Management Consultants
27-29 Baldwin Street
Bristol, BS1 1LT
david.marshall@turntown.co.uk

* corresponding author

Insights into collaboration at project level: complexity, social interaction and procurement mechanisms

Abstract

Drawing upon relevant concepts in organisational social theory (*becoming* ontology and *processual* view of complexity), and adopting an interpretative approach to studying organisational phenomena, this paper aims to make a contribution to our understanding of social processes in multi-organisational settings defined as 'construction projects'. The study takes a critical view on the claimed advantages of non-conventional, innovative project procurement strategies as integration-enhancing mechanisms at project level. Taking a swimming-pool construction project governed by an innovative procurement procedure known as 'two-stage tender' as a case in point, the paper evaluates the extent to which better project team integration has been achieved in this context. Two major concerns emerged from the case study analysis: 1.two-stage tendering is an incomplete solution to tensions, adversarial culture and lack of genuine cooperation over time; and 2. there is a need for facilitating mechanisms of a different nature to support and sustain collective situated learning and shared understanding of longer-term benefits of collaborative work. On the basis of the theoretical considerations and the interpretation of the empirical accounts, the paper proposes and refines a conceptual framework for understanding complexity of construction projects as social settings. In light of this framework, alternative concepts and skills for enhanced collaborative interaction among participating parties in this kind of social setting are suggested.

Key words: construction project, complexity, interaction, two-stage tender, management skills

Word count: 6700 (excluding references, illustrations and tables)

1. INTRODUCTION

The aim of the paper is to formulate and develop a critical framework for conceptualisation of the complex nature of construction projects as social settings, and to propose alternative trajectories for collaborative action and qualitatively different managerial virtues that correspond to the nature of such arrangements. The researchers hope to make a contribution to our understanding of complex social processes that go on in construction projects by presenting empirical material – interview accounts, participant observations and other case insights - from the study of a single construction project, combining micro (social interaction) and macro (governance) levels of analysis. The point of departure is the widely recognised need for better integration, co-operation and coordination of construction project teams – a topic that has been attracting the attention of practitioners and academic researchers alike, since the late 1980s. Project team integration is inevitably associated with an ongoing concern in the construction industry to overcome, or provide a context to cope with, cultural inconsistencies, distrustful relationships and paradoxes associated with the 'design-construction divide' that have been acknowledged as major obstacles to the successful and more efficient completion of construction projects. A number of authors, including Bresnen (1988, 1990), Bresnen *et al* (2003), Betts and Ofori (1992), Kreiner (1995), Seymour and Rooke (1995), Cicmil and Egan (1996), Bresnen and Marshall (2000a), Suchman, 2000; Walker, 2002, Fernie *et al* (2003), Scarbrough *et al* (2004), Cicmil (2005), have commented on the importance of introducing different research perspectives and new ways of reasoning and practice in the management of construction projects, which is currently characterised by 'strongly entrenched attitudes and loyalties' (Walker, 2002, p.29) that impede the process of change towards greater co-ordination and cooperation among project parties. Bresnen (1990) called for 'the case of construction … to be brought more fully into the mainstream of organisational theory and research' (p.215) in order to explore the full context that governs project dealings and interactions among project parties, and to address those aspects of the complex nature of construction projects that cannot

be captured by statistical and expert system models for estimating, planning, prediction and control.

This paper argues for deeper studies of the intricacies of construction projects as social settings. The intention is to revisit the claim that project team integration can be enhanced through innovative contractual arrangements or procurement strategies, by locating these issues within a framework that emphasises the complexity of construction projects as social settings and which focuses on the experiences of organisational members participating in an on-going building project. The study therefore relies on a combination of practical theoretical conceptualisations and concrete empirical analysis. An important step in the research process has been to conceptualise the notion of 'complexities, uncertainties and interdependencies' (Bresnen, 1990) in the context of construction project procurement, in order to develop the theoretical and methodological aspects of this study. We have drawn upon those concepts from organisational social theory that address the tensions between *unpredictability*, *control* and collaborative *interaction* in multi-party coalitions – the elements that are, in our view, key to understanding the complexity of construction projects. We start the paper with arguing and justifying the above position on complexity and with explaining why it could be a useful interpretative framework for examining the relationship between procurement mechanisms and team collaboration. Insights from the case study are then discussed, and the key issues relevant to enhancing the process of 'project team integration' beyond and above structural interventions in the form of contractual arrangements and procurement methods are identified. On the basis of the findings, we consider alternative concepts and approaches to enhanced collaborative interaction among participating parties in this kind of social setting.

2. UNDERSTANDING COMPLEXITY OF CONSTRUCTION PROJECTS

A significant body of research has focused on innovative contractual mechanisms in procuring construction projects, ranging from 'design and build' forms of contract to the concept of 'partnering', with the aim of evaluating the impact that they have had on cooperation,

collaboration, and successful achievement of project goals in practice (for a comprehensive and critical overview of this body of literature see, for example, Green, 1998; Green and May, 2002; Bresnen and Marshall, 2000a, 2000b; Walker, 2002). The paradox in the relationship between project performance and control on the one hand, and the processes of cooperation, collaboration and learning on the other is often illuminated as the key issue. Despite the proliferation of propositions, prescriptions and 'best practice' recommendations, it has been acknowledged that structural interventions (modifications in contractual forms) are insufficient in dealing with the inherent paradox and complexity of construction projects.

In this paper, we want to further explore this notion of *complexity* of construction projects, by considering a theoretical shift argued for by a number of writers in the broader field of project management (Weick, 1979; Packendorff, 1995; Kreiner, 1995; Stacey 2001; 2003; Lowe and Jones, 2004) towards the very 'organising process' as 'a social interaction occurring between people working together to accomplish a certain, inter-subjectively determined task' (Packendorff, 1995, p.328). The shift we are proposing here departs from more common normative / rational approaches to the nature of project work, to embrace processes of project organising, goal setting, accomplishment of action, operations of power and interaction among project parties, without discarding their complexity and ambiguity in the name of rationality (March, 1989). This essentially means moving away from a traditional focus on effectiveness towards a more developmental approach, by introducing the notion of learning, joint action, reflection and collective sense making in studying projects (Bresnen *et al* 2003; Scarbrough *et al* 2004; Sommer and Loch, 2004). It also means arguing for alternative ontological and theoretical perspectives on project organising, such as political, critical and constructivist approaches to social interaction, conflict, change, and the agency-structure relationship in project settings.

2.1 Theoretical considerations- Towards a conceptual framework of project complexity

When attention is refocused on intersubjective interaction and the agency-structure relationship, alternative qualities of acting and knowing in project settings will surface. A number of authors

(March, 1989; Baier, March and Sætren, 1986; Suchman, 2000; Flyvbjerg 2001; Marshall, 2001; Stacey 2001, 2003; Clegg *et al*, 2002; Alvesson 2002; Linehan and Kavanagh, 2004, among others) have contrasted the conventional notion of control with the inevitable, on-going interpretation of purpose and goals among the parties accomplishing a cooperative activity within a social arrangement where ambiguity is created by multiple and conflicting interests, roles, identities and asymmetries of power. Understanding the nature of interaction among project actors in context, has been identified as an important requirement in making sense of how different actors respond to, and cope with, the complex and ambiguous character of project settings (Engwall, 2003). In exploring the tensions around success / failure attributions and (dis)agreements about project performance criteria, relevant literature emphasises the importance of understanding conflicts and tensions as being located simultaneously at micro- and macro-level of activity, and calls for alternative ways of researching and dealing with such complexity in practice (Holt and Rowe, 2000; Bresnen and Marshall, 2000a; Boddy and Paton, 2004).

Based on the preceding discussion, we have identified three important aspects of construction projects that capture the persisting concerns articulated by both researchers and practitioners: 1) complex processes of communicative and power relating among project actors; 2) Ambiguity and equivocality related to project performance criteria (success / failure) over time; and 3) the consequence of time-flux (change, unpredictability, and the paradox of control). Our intention has been to build on these aspects and develop a concept of project complexity that invokes ambiguity, paradox and the dimensions of time, space and power of the organising processes in project settings. We believe that this approach could potentially enhance both the theorising of, and practical coping with, the complexity of projects as social arrangements. We, therefore, depart from more common, systemic approaches to project complexity (see e.g. Williams, 1999; Hatch, 1997; Baccarini, 1996) characterised by normative definitions of its aspects (e.g. the number and diversity of project participants, hierarchy and interdependency of their activities, and multiplicity of feedback loops).

Ontology of becoming and complex responsive processes

Our theoretical argument behind the three suggested aspects of complexity is broadly informed by 'ontology of becoming' and 'process' theories (Chia, 1995, 2002; Wood 2002, Stacey 2003; Linehan and Kavanagh, 2004), while heavily drawing on Stacey's (2000, 2001) concept of complex responsive processes of relating in organisations. The perspective of 'becoming' ontology (in contrast to 'being') privileges 'activity over substance, process over product, and novelty over continuity' (Chia, 2002, p.866) and emphasises the role of language, the nature of intersubjective conversational and power relating, and emergent properties of organisational arrangements as outcomes of disparate and ambiguous political practices (Linehan and Kavanagh, 2004). Organisations are understood not as 'stabilised objects' but as heterogeneous and *becoming,* as a generic social technology or spatial-temporal framework 'for institutionalising social habits and patterns of behaviour so that it then becomes possible for us to communicate with each other and develop practical norms' (Chia, 2002, p.867) that govern the joint action of organisational members in otherwise chaotic, ambiguous and unpredictable reality. Stacey's take on organisational complexity resonates with this approach, and focuses on the understanding of 'organisation' as an emergent property of many individual human beings interacting together through their complex responsive processes of relating, centred around the role of language that is simultaneously used for conversation and to negotiate social status and power relationships. Central to the theory is the recognition that communication is a complex process of relating – a chain of patterned responses that provide the context for an individual action across space and over time:

> …and it is in such responsive processes of relating that human beings accomplish joint action of any kind. The key feature of all human groups, organisations, institutions and societies is this joint action. (Stacey, 2003, p.389)

Stacey observes that the 'self-organising' nature of communicative interaction among organisational members, that is their joint action, is always 'contextually' mediated by the

participating individuals making reference in their conversations to symbols and artefacts representing the 'situational rationality' (including formal structures, procedures, plans, contract document, etc) which are in turn reflections of the patterns of routines and power relations in the process of organising (Chia, 2002; Frenken, 2002; Stacey, 2001; Weick, 1979). Similarly, Suchman's (2000) study argues for a view of construction projects as 'persuasive performances', illuminating how power operates through conversations and artefacts through which project based work is being organised and performed in real time in a specific context.

Importantly, structure and agency are seen, from this perspective, as forming and being formed by one another. Stacey supports this argument by proposing that conversational and power relating that enables joint action in a context is based on a certain pattern of themes which invoke certain symbols of 'institutionalised' rationality in that context. The process of institutionalisation is influenced by and itself influences, power relations that legitimise relevant knowledge and patterns of behaviour, and thus enable the movement of joint action in a specific direction at a certain point in time. Potential for change, according to Stacey and Chia, is always there, always present, but new knowledge and collaborative learning that are necessary to continue with joint action can emerge only if the patterns of complex processes of relating in the given context become 'unstuck' (Stacey, 2001) and transformed thus creating new patterns of routines and habits and new representation of emerging reality. The outcomes of these relational patterns are unpredictable over longer periods as they influence and are influenced by the micro-diversity of an organisational setting: human intentions, choices, and actions are seen as essential to, and operating within, the dynamic of daily interactions between people (Stacey, 2003) where collaborative learning happens and new knowledge emerges over time.

The notions of long term unpredictability and micro-diversity run counter to the conventional notion of 'ordering' (attempting to regulate patterns of behaviour through structural interventions) in the pursuit of project goals, successful project completion, and an improved planning process which programmes, in advance, the unfolding of project work. From this point

of view, it is necessary to rethink the possibility of predetermined success criteria for a project, controllability of the interconnected project activities to achieve the desired end in advance of them happening, and the kind of governance mechanisms (contracts) promoted as effective guardians of diverse stakeholder interests, planned action and risk strategies. Moreover, such an approach raises a question of what kind of managerial or control intervention is needed if the complexity of organisational arrangements is understood from this perspective and what kind of skills, knowledge and learning processes need to be in place, to cope with an increasingly complex world of projects (Stacey, 2000, 2001, 2003; Lewin and Regine, 1999; Sommer and Loch, 2004). The broader, *becoming* ontology based view of organising offers a richer alternative to the understanding of the phenomenon of organising and its social consequences, and as such is crucial for today's business practitioners (Chia, 2002).

Combined with the three identified aspects of complexity, these theoretical and ontological propositions ('processual' perspective and becoming ontology) constitute our conceptual framework of the complexity of construction projects as social arrangements and of the organising process through which they unfold. The aim was to use it as an interpretative framework in exploring the relationship between procurement mechanisms and successful project team integration while focusing on issues related to cooperation and micro-diversity, control and ambiguity, and trust and uncertainty.

3. THE CASE STUDY – CONTEXT AND INSIGHTS

The case study based, practitioner led collaborative inquiry presented in this paper (c.f. Easterby-Smith et al, 1991), attempted to critically evaluate a procurement procedure known as 'two-stage tender' against this framework of complexity in a specific project setting – a swimming pool building project. We were interested in exploring the potential of such a perspective for broadening our understanding of construction projects as complex social arrangements and of the relationship between procurement strategies and the quality and level of

collaboration. We will briefly explain the procurement process before we expand on the method used in the empirical part of the study.

3.1 The Swimming-Pool Project :The Procurement Procedure

The case study project refers to the building of a local council swimming pool. It is an active, real project, but its name and the names of the actors participating in this research have been changed to ensure anonymity. In June 2002, on deciding to build a swimming pool complex, the Local Council, the Client (**C,** Figure 1)**,** procured an Architect led multi-disciplinary team, comprising the Architect, Structural Engineer and Building Services Engineers **(A, SE, BS**, in Figure 1), to provide design and consultancy services for the project. In November 2002, the Client, in consultation with the appointed Architect, separately appointed a Quantity Surveyor (**QS**, in Figure 1) organisation, also known as Cost Managers, to oversee the control of project costs and to provide other project management and construction advice services. In this way, the Client's Consultants Team was formed.

-Figure 1 about here-

Two-stage Tender

At that point, the Client chose a two-stage tendering process for the design and construction stages of the project rather than the conventional process of a single stage tender for the appointment of the contractor. This was based on advice provided by the appointed QS. Five contractors were invited to tender for the first stage. Each contractor was interviewed to establish the level of their understanding of the project and its objectives. Also, these interviews allowed the project design team to assess if they could build a relationship with the contractor for the second stage tender and the construction stage. With the preferred contractor appointed, the project team, now complete (Figure 1), proceeded to collaboratively work to develop the second stage tender. Second stage tendering involves the collaborative process of decision making in order for the contractor and their sub-contractors to cost the work on site and to agree a

programme for constructing the building. The procurement process under consideration is presented in Figure 2.

-Figure 2 about here-

The conventional approach, it has been argued, allows the least opportunity for integration of the contractor and the design team, because the contractor is appointed to construct the building following the specifications and drawings already developed by the consultants team. In contrast, the 'two-stage tendering' alternative is considered to provide better integration of the consultants team and the contractor, as the contractor is appointed much earlier in the process of design specification and is given an opportunity to fully participate in it. Taking the swimming-pool construction project governed by 'two-stage tender' as a case in point, we set out to evaluate the extent to which better project team integration has been achieved in this context and, in light of the proposed concept of complexity, to offer a deeper understanding of the relationship between procurement mechanisms and project team collaboration.

3.2 The method of empirical study and key insights

The data collection methods included open-ended interviewing of participating organizational members, the practitioner-researcher's personal reflections, documentary analysis, and direct observations. Direct observations by the practitioner-researcher (the co-author of the paper) generated records of team members' actions and conversations as they were working on project tasks, and were analysed together with the interview accounts. Interview questions were open-ended, in order to encourage the participants' reflective thoughts on their own and the team's collaboration, performance and communicating. Individual interviews lasted between 1 and 2 hours. Observations took place from the very beginning of the process, while semi-structured interviews were conducted with the representatives of the key project parties (Figure 1) just when the project was moving from the first stage into the second stage of tender (see ***** in Figure 2).

A number of tensions within the project setting were identified as preventing the benefits of the new tender procedure from being materialised. These are summarised in Table 1. Using the three proposed aspects of complexity (theorised and discussed in Section 2.1) as a lens in the interpretation of the interview accounts and the observations of the daily interactions among the team members, it was possible to identify less obvious aspects of the relationship between the framework of construction project governance and activity at micro-level and to offer an alternative understanding of these tensions and how they are interrelated in a complex way.

Table 1 – Expected advantages of 'two-stage tender' and the remaining tensions

Expected advantages	**Persisting tensions**	**Aspects of complexity** (relevant to understanding the tensions)
Relational: - All project participants including the contractor have a better understanding of the project and its objectives - With the contractor appointed earlier, the project participants have more time to build relationships and develop trust for the second stage tender and construction stages on site.	- Tensions between the QS and the Main Contractor, whom the Main Contractor considers is working outside the project team - Tensions between the Architect and QS over the ability of the Architect to act as Project Manager - Tensions between the Architect and the QS over the QS's relationship with the Client, - Tensions between the Architect and the QS over cost and time issues; - Tensions between the Architect and the Main Contractor over the Main Contractor's ability to create value engineering cost savings - Tensions between the Main Contractor and the Architect as they will not accept value-engineering solutions and with two-stage tender delaying the start of work on site; - Tensions between the Client and the Main Contractor over project time, cost and quality issues	1) complex processes of communicative and power relating among project actors; 2) Ambiguity and equivocality related to project performance criteria (success / failure) over time; and 3) the consequence of time-flux: change, unpredictability, anxiety and how it is lived with.
Performative - The project participants can collaborate in developing together constriction programme and budget and in trying to achieve the highest possible cost certainty for the client -The project participants can collaborate to benefit the design process thereby reducing the need for unnecessary and destructive / expensive rework and changes during the execution stage		

The process of analysis and interpretation of the empirical material is presented in Section 4. We then integrate these insights with our theoretical approach in order to refine the conceptual framework of project complexity, proposed in Section 2, and to provide an alternative, richer picture of complex processes that go on in construction projects as social settings.

4. ANALYSIS AND DISCUSSION

From the interview accounts and observations during the empirical study, the realisation of the expected advantages of the 'two-stage tender' procedure in this specific context (discussed in Section 3.1 and summarised in Table 1) appeared problematic. The perceived failings relate to two kinds of benefit expected to result from the 'two-stage tender' procedure: *Relational* (enhanced collaboration and learning among team members) and *Performative* (successful accomplishment of project objectives).

4.1 Problematic relationships within the team: A view on power, identities, and change

The empirical material captured a number of instances where various parties complained about, or expressed their disappointment with, relationships within the project team. Let us take three key examples (Table 1: the top three 'tensions'). In order to understand the nature of these problems, it is important, in line with a *becoming* ontology, to interpret the interview material and observations with a full appreciation and awareness of the unfolding of this procurement process *over time and space*, including the emergence and development of the Client's Consultants Team. Then it becomes possible to see how complex responsive processes of relating among parties over time form and are being formed by power relations and changing identities, and how the situation becomes constructed by people selectively making reference in these processes of relating to symbols representing their preferred picture of reality. As different preferred representations of the 'two-stage tender' procedures are put forward (or are completely ignored) by different groups of actors, different patterns of behaviour emerge. These patterns reflect the timing and history of the engagement of certain parties in the procurement process and the identity-space they assume to have occupied (see Section 3, and Figures 1 and 2). The practical norms governing joint action are unstable, being continuously negotiated, reinterpreted or abandoned, due to historical differences and on-going renegotiation of identities influencing the process of communicative relating in the local situation at a particular time. The following examples illustrate these observations.

The 'two-stage tender' principally promotes 'closing the gap' between design and construction by which, procedurally and in terms of relationships, the Main Contractor's (MC) role departs from the traditionally 'reactive' to more involved, brought-forward, interactive role in decision making and organising processes (identity-space-time variables, see also Figure 2). The interpretation of the empirical material provided an opportunity to understand how the MC in this context assumed the new role and identity, how they enacted it over time, how others responded to it, and with what kind of consequences for the nature and level of team integration and collaborative work (resulting in the identified tensions). The MC representative explained their understanding of the relationship in an ideal 'two-stage tender' situation (their symbolic representation of reality):

'*There is this trust between the builder and the designer that the builder is actually putting something forward which is a workable solution. .. That is a position we try to get our building teams into*".

The MC perceived the situation within the team at the time of the interviews as satisfactory, apart from *'one member of the team that is a little on the perimeter*." Referring with this statement to the Quantity Surveyor (QS), the MC explained that their own integration and 'voice' during the design process in the second stage was being hampered due to the QS's resistance to accept the 'core idea' of this procurement method and its consequences in terms of openness, willingness to negotiate and to accept different points of view (referring to the MC's own input to the proposed design):

"*We bring to the table things we have had a go at and really haven't worked as well. There is a little bit of disappointment occasionally .....Some people can always slip back into their comfort zone. ....You just need that one person to take a leap of faith….We are trying to build this* [referring to the building] *together and get it right*. ".

The Quantity Surveyor (QS) seems to be central to the tension. According to the Architect, it was a failure of the procurement procedure not to be able to '*bring the QS in'* fully to the team:

'[The QS's organisation] *are appointed and have their own relationship with* [the Client] *and all the time I have the feeling they have more got their eye on their relationship with* [the Client], *they are trying to keep that side and maybe that's what* [the Client] *wanted, but it means there is not as free a dialogue and*

as good an understanding that I am used to experiencing. If we had got the QS I had hoped, we would have got it completely different"

Bearing in mind that the Architect acted as project manager, this kind of concern is not surprising. On the other hand, the QS was not happy with the Architect's managerial performance and claimed that:

"*…the Architect is not the right person to work as Project Manager, as he sees it from one perspective, and you need a person to pull the team together and manage the different parties… he has focused on the Architectural and not on the monitoring and management of the project per se".*

The dominant feeling was that, on this project, there had been little evidence of shared understanding of the philosophy and values of the two-stage tender procedure among the project participants. The participants were continuously making reference to a seemingly irresolvable paradox, created in a conflicting relationship between the proclaimed advantages of the two-stage tender process, its enactment, and the perceived objectives of the project (see Section 4.2 below). It is important to better understand this paradox, which appears to create and to simultaneously be created by, ambiguity and equivocality of the purpose and goals of the project, criteria for success and power relations. The MC representative's account illustrates this:

If your goal is to get you a unit and a finalised building as quickly as possible, two-stage tendering is not the route to go on because it is a protracted process…….it will only be effective if all the parties are listened to, and a common solution reached..

The contractor continues expressing frustration and anxiety over their perception that the 'two-stage tender' principles have been changed and distorted over time through the influence of other parties and that the rules of the game changed:

" This two-stage process that we got has just squeezed and squeezed……. we don't have a chance to review it. We are at a point now where it isn't possible for a package that comes in over budget to be redesigned. You can't do it. We are so desperate to get on to site now".

On the other hand, the lack of trust and the persistence of the 'old' ways of doing things, attitudes and suspicions, are perceived by the project participants to have caused tensions and

problems. From the perspective of complex responsive processes of relating and a *becoming* ontology, these 'negative patterns and norms' influenced the outcomes of the processes of interaction as they were brought into conversations, and for that matter into practical routines and norms of this project, by the parties simultaneously assuming and negotiating their identity and status in relation to the procurement framework and its spatial and time dimensions.

4.2 Problematic performance criteria: A view on ambiguity and change

Linked to problems with the shared understanding of project aims and objectives among the project team, are the remaining four performative tensions in the middle column of Table 1. Despite the intention to ensure the agreement on, and understanding and stability of, project objectives through the two-stages of the tender process, there is evidence that the performance criteria were renegotiated, reconstructed and continuously reinterpreted by the diverse interest groups over time. In this process, anxiety was acknowledged as well as a need for trust, while simultaneously concerns about commitment, moral duty and obligation to 'continuing to go-on together' in cooperatively accomplishing the given task were invoked. Through a particular pattern of communicative processes and power formed prior to the two-stage tender implementation (involving a lack of open dialog about expectations, availability of funding, and key performance objectives), ambiguity and tensions were already built into the very early stages of the procedure. The knock-on effects of this were felt throughout the process, with the Architect suggesting that the QS did not want to collaborate with the contractors on cost, and claiming that the QS did not: "*want to say what the Client's budget is because the contractor will be more aggressive in agreeing target costs*", thus undermining the very potential of 'the two stage tendering' process. When discussing how the Client and the QS started to review the Contractor's costs at the start of the second stage, the Architect said:

The reason why it was an uphill battle was really that the original brief was based on misconceptions about how much these projects cost …There is a surprising ignorance of this type of project in organisations."

The ambiguity and problems with harnessing the opportunities that two-stage tendering could potentially offer were further escalated by the QS being more concerned about the programme for the project and the need to obtain cost certainty for the Client. By influencing the conversational themes through their specific identity and power status in the team, and invoking symbols of rationality different from those associated with the benefits of 'two stage tender', the QS created the situation in which the two-stage process became " *squeezed and squeezed*", as stated by the MC's representative. The QS even suggested that the Contractors did not understand the QS's need to set the firm programme, saying the tendering contractors should have gone "*away and come back with the optimum programme that gives the project the benefit of cost security and not at the expense of time*", which is completely contradictory to the 'philosophy' of the two-stage tender.

Regardless of these tensions, the project activity continued on a day-to-day basis. As the Architect said:

" *I think the scheme doesn't have as much scope for value engineering that people might think. But I think we worked well together in trying to look at different options and costs. I think that has been quite good'.*

Therefore, it was unhelpful to think about performance of the project in terms of a definite, predetermined outcome. Rather, the project's performance as joint action could be understood as always being a process of reinterpretation and renegotiation among the parties of the purpose of their joint action, and of the project's objectives, in order to collaboratively learn and jointly enact the next move. For example, due to the Client's priorities changing, the start-on-site day moved, and the QS said:

" *…we had until summer to get the thing on site. It was May actually. Here we are in November and we are still not on site. We had that as the initial driver, and that determined the timescales to develop the design to get on to site. What we would have had to do to get on to site by the original May date would have compromised cost certainty further than it is now. Once we realised the dates had moved, we relaxed the start on site date, and re-established what we believe is a reasonable start on site date*."

5. CONCLUDING PROPOSITIONS : TOWARDS A REFINED FRAMEWORK OF PROJECT COMPLEXITY

We stated in Section 2 that the aim of our initial theoretical considerations was to introduce an alternative way of looking at the team interaction at project level and, through analysis and discussion of the empirical material, to refine the proposed conceptual framework of project complexity. The proposed perspective on project complexity (Section 2), which focuses researchers' attention on temporal and spatial dimensions of social interaction, including existing and emerging power relations, and on the process of *becoming* related to identities, commitments, expectations and anxiety, has enabled us to reconsider the relations between sociality and objectifications as well as forms of collective engagement in project work, and to understand how agency and structure are interrelated within an on-going process of simultaneous construction and reproduction of one another. This is particularly evident when interpreting participants' commentaries on the tensions that paradoxically result from the process of two-stage tendering itself (Section 4.1 and 4.2). We argue that the tensions in the development of the project team can be understood better if the suggested aspects of project complexity and their space-time dimensions are considered holistically and simultaneously. Figure 3 is a representation of the insights and argument that resulted from our enquiry, based on our particular view on project complexity.

- Figure 3 about here -

It is important at this point to note some (potentially misleading) assumptions about the role of structural interventions in improving the relational aspect of project team integration, that have been unravelled so far by drawing on a *becoming ontology* and the *concept* of *complexity*. The proclaimed advantages of two-stage tendering (Section 3 and Table 1) are a consequence of particular kinds of assumptions made about the linearity of unfolding of human action, time-space finality, rational decision making prior to the structural intervention (two-stage tender implementation) and the nature of power relationships in deciding to implement the particular scheme. Artefacts such as the stage-flow diagram in Figure 2 reinforce these assumptions. As

noted in Section 4, the representation of the innovative procurement process routinely assumes the dimension of 'time'. Firstly, the claim of its advantages centres around it allowing more time to the parties to get to know each other and collaborate on the design and final programme and budget to improve cost-effectiveness and ensure that realistic objectives are set for the execution phase. Its symbolic representation also uses a time-line and the stages that linearly unfold, imply a notion of a progressive accomplishment of joint work by all the parties from the project concept to completion on site. What we discovered through the lens of the complexity framework, the proposed structure does not get enacted in the linear manner and has its spatial and identity consequences. As the situation unfolds, influence spontaneously arises in webs of power relationships within this project, as people interact intensively in order to create meaningful forms of activity that move things on. We note how the reality of 'two-stage tender' is being formed as a pattern of conversational themes in the medium of relevant symbols which simultaneously defines the identities of various actors and reproduces power relations, obligations and expectations. Micro-diversity influences the intended patterns of relating (conversational and power) over time and action in real time becomes quite different from planned. The expected routines of behaviour (prescribed by two-stage tendering) do not necessarily develop over time as planned. Therefore the outcomes of complex relating among parties have an element of unpredictability. This causes conflicting feelings of anxiety, scepticism, moral duty, and commitment which are mediated by power relations, and which can be both encouraging and inhibiting. The following examples illustrate this:

....I don't think we have carried this one through as a two-stage tender project sufficiently. There isn't trust between certain parties…….I think it works much better where we have a close relationship where we trust each other,... when you feel able to talk about mistakes, or things that could have been done better..." (Architect)

Secondly, the observed ambiguity of performance criteria, equivocallity of the project's purpose and objectives, and the 'stuck' patterns of complex processes of interaction, both conversational and power based, seem to be beyond the capacity of the contract to address. Bresnen has pointed out that any type of contractual system, seen as a mechanism employed to co-ordinate project

activity and to integrate project parties performing interdependent work, 'assumes some degree of certainty, finality and independence that is seldom born out in practice' (1990, p.63). The 'interaction' that we have been interested in, in our research, is beyond instrumental interventions for team integration and coordination as implied by the propositions of alternative procurement strategies and delivery arrangements that are 'geared towards accommodating the complexities, uncertainties and interdependencies that occur in the relationship between design and construction activities' (Bresnen, 1990, p.64). We have been interested in the process through which '…parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible.' (Gray, 1989). From the perspective which we adopted in this study, project goals are not seen as entirely deduced or derived from the external environment through a rational selection process, but as negotiated and accomplished within the process of communicative interaction among individuals in the local situation in the living present. These processes are of a 'self-organising' nature as the individuals interact using patterned conversational themes in the medium of symbols and power relating, as new goals are formulated and as new knowledge is created to achieve these goals. To change 'undesirable' patterns of joint action, a new shared thematic framework needs to be enacted thorough processes of communicative and power relating now drawing on new themes and symbols, towards creating and stabilising a new coherent set of practices in the context. (Suchman, 2000) The interview accounts and observations illuminated emotions, anxiety and identity crises associated with the potential novelty in patterns of communication and with an intended innovative framework of joint action (the two-stage tender).

5.1 *Implications for practice – a discussion of interventions and skills*

Following this analysis, the researchers sought an answer to the question: What would be an 'adequate social and managerial intervention' in construction projects as social settings to overcome the limitations of structural interventions? A good deal of literature (such as Stacey

2001, 2003; Flivbjerg 2001; Raelin 2001; Holt and Rowe 2000; Bresnen and Marshall, 2000b; Sydow and Staber 2002; Chia, 2002; Weick, 2002) suggests that, in an unpredictable world where the outcomes of an action cannot be known in advance, *managing* should be seen as a process of continually rearranging the paradoxes of organizational life, through a different type of leadership. Similarly, Flyvbjerg argues for an approach to studying social practice in complex arrangements, by refocusing attention on the need for judgements and decisions made in a manner of virtuoso social and political action. The implied virtues of 'prudence' and 'practical wisdom' are inspired by the themes of politics, power and radical unpredictability. The essential skills from such a perspective seem to be 'much fuzzier and the steps to achieving them more nebulous' (Stacey, 2000, p.412). The suggested skills are: focusing on the quality of participation in the processes of power and conversational relating which are on-going processes of renegotiation and redefinition of goals and future joint action; reflexive understanding of one's own role in these processes; sensitivity to themes that form and are simultaneously being formed by power relating, ability to hold and live with anxiety that emerges as a consequence of radical unpredictability of the outcomes of the responsive processes of power relating, ability to introduce change in the patterns of relating in the medium of symbols to instil novelty and possibility for action if the patterns of relating are 'stuck'; and reflective, intuitive and ethical action while 'thinking on one's feet' in the situation of simultaneously being and not-being in control of the project. Table 2 summarises the perceived type of action and intervention in construction projects viewed as complex social settings from the complexity perspective proposed in Figure 3 and empirically illustrated in section 4, and suggests some specific skills and knowledge that could complement the structural interventions for construction team integration.

Table 2 A view on adequate interventions, knowledge and skills in managing construction projects as complex social settings

Nature of actions and interventions required	**Type of knowledge and skills**
moral and ethical in nature;	local understanding of a project's micro-diversity; Good enough holding of anxiety; persuasive story-telling; virtues of

	prudence and *practical wisdom* (Stacey, 2003; Flyvbjerg, 2001; Suchman, 2000)
Driven by performance enhancing possibilities, participation and future oriented options, rather than by 'explicit rules governing practices'	creates a position from which further actions are possible; facilitating conversations by introducing 'themes' that encourage new patterns of behaviour and relating (Holt and Rowe, 2000, p.543; Stacey, 2001)
Inter-disciplinary knowledge created in real time; project control is not just delegated but socialized	Able to address the causal ambiguities, interest conflicts and legitimacy issues; embrace holistically and simultaneously multiple perspectives of an issue of concern, (Suchman, 2000)
joining the endeavours of otherwise two separate functions: project implementation and project direction when there is no value-equilibrium	capacity of the individual to dialectically cope with and use both rhetoric (participation in complex responsive processes of conversational and power relating) and technical devices (contracts, plans, documents), (Flyvbjerg, 2001; Suchman, 2000; Stacey, 2003)
In dealing with unpredictability and complexity, reflection takes a public form and influences the emergence of collaborative learning practices	create a collective identity as a community of inquiry and encourage the collaborators to reflect together on the quality of their participation (Raelin, 2001)

5.2 Concluding thoughts

Compared with the perceived and 'theorised' ordering effects of this form of contract, the conclusion is that the 'two-stage tender' procedure is insufficient to ensure team integration, collaborative work and efficient achievement of agreed goals in construction projects. The empirical material illuminated tensions that still exist within the project team. The paper has provided some insights into the nature of these inherent tensions viewed through the lens of the proposed complexity framework, drawing on a *becoming* ontology and the concept of complex responsive processes of relating in organisations. Figure 3 captures these analytical conclusions and illustrates the refined framework within which, we propose, an alternative understanding of the complexity of construction projects as social settings could be achieved. Furthermore, this paper illuminates how the proposed concept of complexity helps provide insights into those aspects of construction projects as social arrangement which require other modes of intervention, leadership, and collaborative learning. Managerial concerns and interventions should go beyond a mechanistic view of communication of information and team integration, and address ambiguity, unpredictability and power that are part of people jointly accomplishing a sophisticated cooperative project task.

Both concepts – the ontology of becoming and complex responsive processes of relating - are complex in their own right and as such present a significant source of limitations to this study. Methodologically, the study could have benefited from a more focused ethnomethodological approach and a narrative form of empirical accounts. Despite these limitations, the study signposts some trajectories for future research in this area. The future task for researchers would be to empirically explore the propositions listed in Table 2 and suggest educational methods and macro-level policies through which these practices can be developed. It would also be beneficial to replicate the study by focusing on a variety of project cases nominally using 'two-stage tender' as a governing framework for project team integration. Our findings also illuminate a need to depart from the view of contract as a social *object* which frames agreement among individuals and groups and their sense of moral duty within material conditions beyond a verbal promise (Pietz, 2002). What became important for this investigation is a more critical view on contracts which could bring notions of 'social' and 'phenomenological' closer to 'material', bringing into more vivid focus the lived structures of agency and governance and the performative micro-reproduction of social order. This reinforces the need to examine in more depth the implications of contracts as 'social objects' and to understand what is actually going on in the social arrangements governed by them. Their situational rather than legal aspect is of interest in order to understand the nature of interaction among participating individuals, and the spatial and temporal dynamics of power relations in a specific project context.

REFERENCES

Alvesson M (2002) *Understanding Organizational Culture*, Sage: London

Baccarini, D. (1996) The concept of project complexity--a review. *International Journal of Project Management*, 14(4), 201-204.

Baier V E, March J G, and Sætren H (1986) 'Implementation and ambiguity' *Scandinavian Journal of Management Studies,* No2, pp.197-212

Betts M and Ofori G (1992) 'Strategic Planning for competitive advantage in construction' Construction Management and Economics, 10, 511-532

Boddy D and Paton R (2004) 'Responding to competing narratives: lessons for project managers' *IJPM,* 22 (2004) 225-233

Bresnen M (1988), 'Insights on site: Research into construction project organisations', in A. Bryman (ed.), Doing Research in Organisations, Routledge, London

Bresnen M (1990) Organising Construction: Project Organisation and Matrix Management, Routledge: UK

Bresnen M and Marshall N (2000a) 'Partnering in construction: a critical review of issues, problems and dilemmas' *Construction Management and Economics,* 18 (2000), 229-237

Bresnen M and Marshall N (2000b) 'Motivation, commitment and the use of incentives in partnership and alliances' *Construction Management and Economics,* 18 (2000), 587-598

Bresnen M , Edelman L, Newell S, Scarbrough H and Swan J (2003) 'Social practices and the management of knowledge in project environments' *International Journal of Project Management,* Vol. 21, pp.157-166

Chia R (1995) 'From modern to postmodern organisational analysis' *Organisational Studies,* Vol.16 No.4, 579-504

Chia, R. (2002). Essai: Time, Duration, and Simultaneity: Rethinking Process and Change in Organizational Analysis, Organization Studies, 23(6), 863-868.

Cicmil S and Egan C (1996) 'An Evaluation of Construction Project Management in the Context of the Internationalisation Process', British Academy of Management (BAM) - Annual Conference 1996, Aston Business School, Birmingham

Cicmil S (2005) 'Participation, Reflection, and Learning in Project Environments – A Multiple Perspective Agenda' in Love P, Irani Z, and Fong S W (eds) *Managing Knowledge in Project Environments*, Butterworth Heinemann: MA, USA ,

Clegg S, Pitsis T, Rura-Polley T, and Marosszeky M (2002) 'Governmentality matters: designing an alliance culture of inter-organisational collaboration for managing projects' *Organization Studies,* 23 /3 pp.317-337

Easterby-Smith M, Thorpe R, and Lowe A (1991) *Management Research – An Introduction*, Sage: London (reprint 1999)

Engwall M (2003) 'No project is an island: linking projects to history and context' *research Policy,* 32(5):789-809

Fernie S, Green S, Weller S and Newcombe R (2003) 'Knowledge sharing: context, confusion and controversy', *International Journal of Project Management,* 21, pp.177-187

Flyvbjerg B (2001) *Making Social Science Matter: Why social inquiry fails and how it can succeed again* (reprinted 2003); Cambridge University Press: Cambridge

Frenken, K (2002) 'Ralph D Stacey: Complex Responsive Processes in Organisations: Learning and Knowledge Creation' *Organization Studies*, 23(6), pp. 983-985

Gray, B. (1989) *Collaborating: finding common ground for multiparty problems.* San Francisco: Jossey Bass.

Green, S.D. (1998) The technocratic totalitarianism of construction process improvement, *Engineering, Construction and Architectural Management*, 5(4), 376-86.

Green, S.D. and May, S. C. (2002) Re-engineering construction: going against the grain, *Building Research & Information*, **31**(2) 97-106.

Hatch M (1997) *Organization Theory,* oxford University press: Oxford, UK

Holt R and Rowe D (2000) 'Total quality, public management and critical leadership in civil construction projects', *International Journal of Quality and R eliability Management,* Vol. 17, No.s 4/5, pp.541-543

Kreiner K (1995) 'In search of relevance: project management in drifting environments' *Scandinavian Journal of Management,* Vol.11, No.4, pp.335-346

Lewin R and Regine B (1999) 'On the edge in the world of business' in R Lewin (ed) *Complexity* University of Chicago press; Chicago pp.197-211

Linehan C and Kavanagh D (2004) 'From project ontologies to communities of virtue' presented at *Making Projects Critical II Conference*, University of West England, Bristol, December 13-14.

Lowe A and Jones A (2004) 'Emergent Strategy and the Measurement of Pertformance: The Formulation of Performance Indicators at the Microlevel' Organization Studies, 25 (8) pp.1313-37

March J G (1989) Decisions and Organisations, (reprint 1990) Basil Blackwell: Oxford,

Marshall N (2001) 'Knowledge, identity, and difference in project organisation' paper presented at the 17th EGOS Colloquium 'The Odyssey of Organising', Lyon, France, 5-7 July 2001

Packendorff J (1995) 'Inquiring into the temporary organisation: New directions for project management research' *Scandinavian Journal of Management,* Vol.11, No.4, pp.319-333

Pietz W (2002) 'Material Considerations: On the Historical Forensics of Contract *Theory, Culture & Society,* 19 (5/6) pp.1-21

Raelin J A (2001) 'Public reflection as the basis of learning' in *Management_Learning,* Vol.32 (1) pp,11-30

Scarbrough H, Bresnen M, Edelman L, Laurent S, Newell S and Swan J (2004) 'The Process of Project-based Learning: An Exploratory Study' *Management Learning,* Vol. 35 (4) pp.491-506

Sommer C S and Loch C H (2004) 'Selectionism and learning in projects with complexity and unforeseeable uncertainty' *Management Science,* 50: 1334-1348

Stacey R (2000) *Strategic Management and Organizational Design – The Challenge of Complexity* (3rd ed.) FT Prentice Hall: Harlow

Stacey R (2001*) Complex Responsive Processes in Organizations: Learning and knowledge creation*, Routledge: London

Stacey R (2003) *Strategic Management and Organizational Design – The Challenge of Complexity* (4th ed.) FT Prentice Hall: Harlow

Sydow J and Staber U (2002) 'The Institutional Embeddedness of Project Networks: The Case of Content Production in German Television' *Regional Studies,* 36 (3) pp.215-227

Suchman L (2000) 'Organising Alignment: A Case of Bridge-building' *Organization,* Volume 7(2): 311-327

Walker A (2002) *Project Management in Construction,* 4th ed. Blackwell: Oxford

Weick K (2002). Essai:, Organization Studies, 23(6), 863-868.

Weick K (1979) *The Social Psychology of Organising* (2nd ed.) McGraw – Hill: New York

Williams T (1999) 'The need for new paradigms for complex projects' *International Journal of Project Management,* 17(5), 269-273

Wood M (2002) 'Mind the gap? A processual reconsideration of organisational knowledge' *Organization,* Vol 9 (1) 151-171

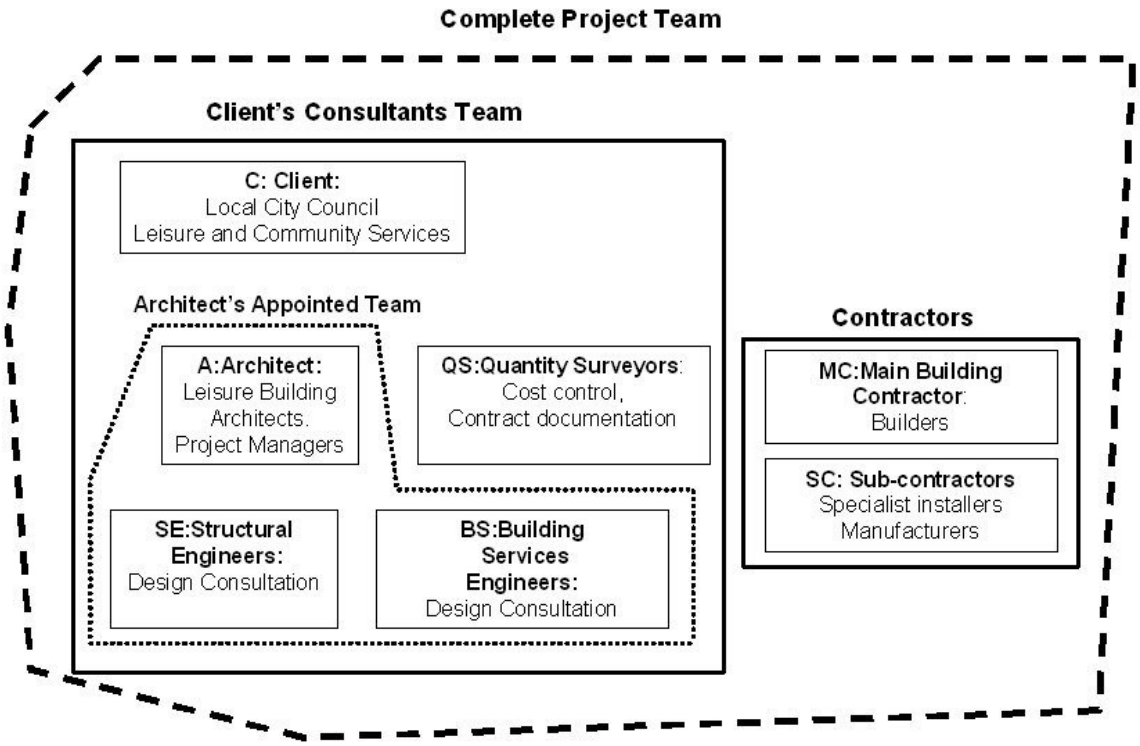

Figure 1: Project Team Composition

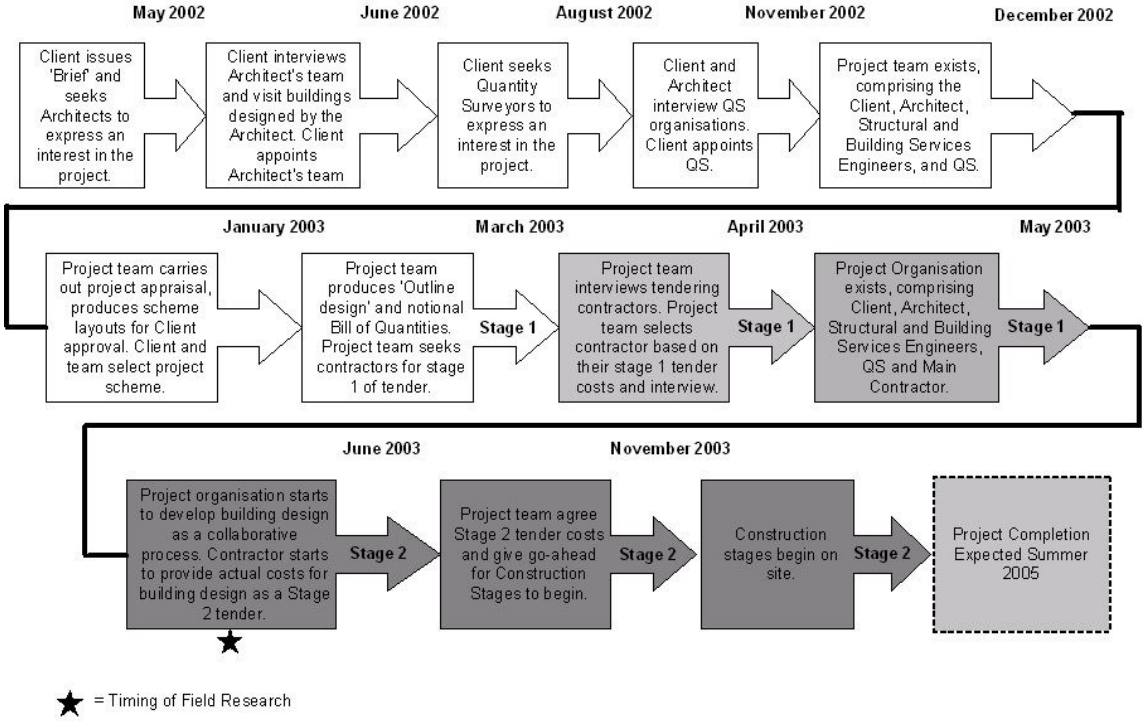

Figure 2: Procurement Process – Team Integration Stages

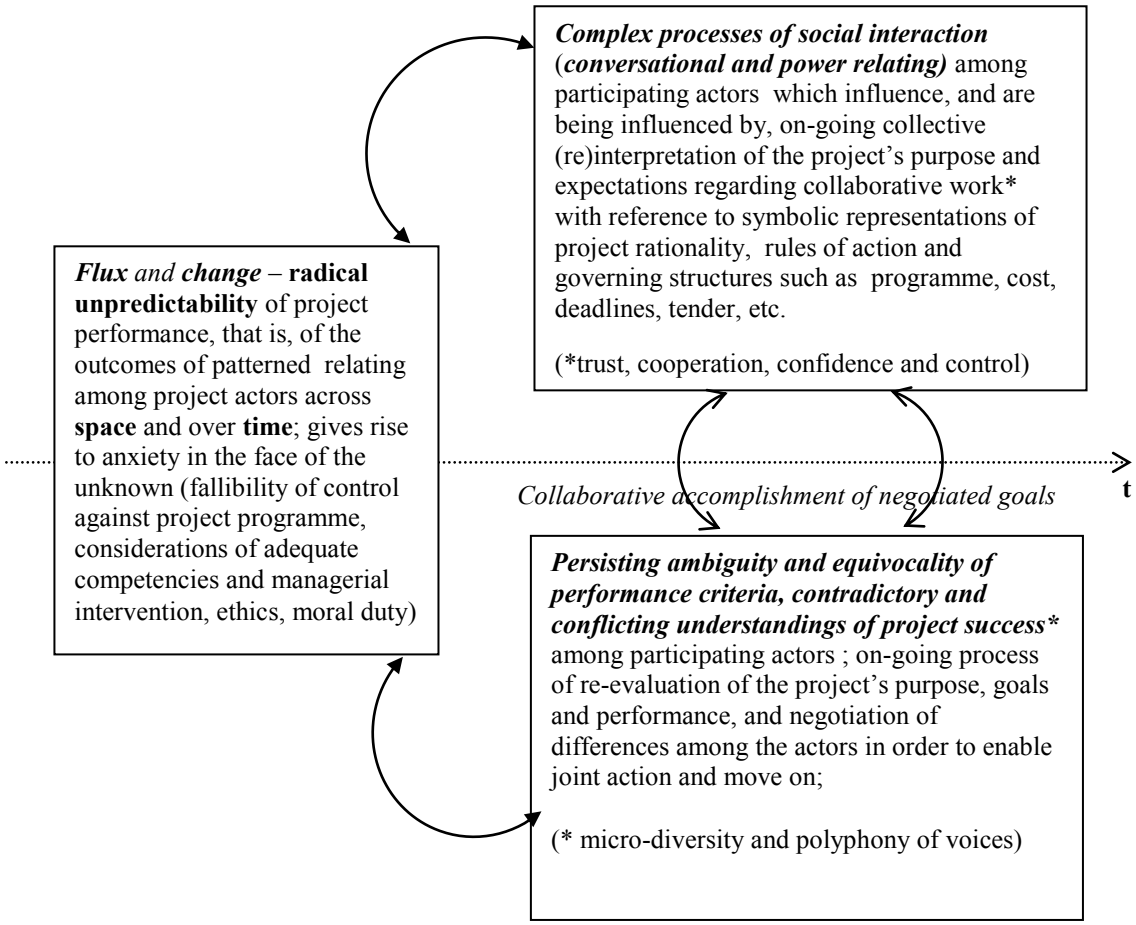

Figure 3 Understanding complexity of construction projects - A conceptual framework