

Explaining the Distinctiveness of
Coordination through an In-depth
Study of a Major Construction Project

By

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THESIS ABSTRACT

In this thesis, I aim at explaining how coordination is a distinctive organisational phenomenon. I critically evaluate and characterise existing organisation theory of coordination as limited insofar as coordination is conflated conceptually with many different organisational processes; most notably, with communication and knowledge sharing. On deeper examination, I attribute this lack of understanding to the unreflective way organisation theorists collectively have studied coordination. I thus draw upon a critical realist philosophy of science in order to engage in a meta-theoretical discussion and explore how coordination can be studied more methodically. From that discussion, I outline some fundamental research principles, which accentuate the significance of context in examining phenomena of coordination. On the basis of those principles, I implemented an intensive research design in the context of a major construction project. In particular, the focus of my empirical research has been on the contract award project for selecting a 'partner' supplier for construction and project management services.

I report on my empirical findings by taking two steps. As a first step, I elucidate the properties of the context of the contract award project, which, I argue, provide the conditions for coordination. As a second step, I illuminate how those properties are involved in and impinge upon the efforts of organisational actors to accomplish the project and coordinate over time. My findings reveal that the historically constructed project context not only made the procurement process possible, but also provided a mix of conditions for coordination. These conditions, I show, create heterogeneous production demands, with which organisational actors attempt to cope by coordinating. In essence, I argue, organisational actors coordinate by 'engineering' compromises and connections among these heterogeneous demands.

On the basis of my empirical insights, I re-imagine coordination as the phenomenon of 'engineering' compromises and connections among heterogeneous demands emanating from organisational contexts; a processual phenomenon, I claim, that enables organisational accomplishment over time. Effectively, I raise claims for original contributions to organisation theory of coordination by developing a novel theoretical framework, whose distinctiveness I highlight by proposing the analogy of 'diarthrosis'. Finally, I validate the usefulness of the new theory through using it to re-describe existing perspectives on coordination and demonstrate how organisation theorists' confusion regarding coordination may be resolved.

To my beloved parents, Giorgos and Maria

(Στους αγαπημένους μου γονείς, Γιώργο και Μαρία)

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Acknowledgements

Hope that is seen is not hope:

Why should one hope for something one already sees?

But if we hope for that we see not, then do we with patience wait for it.

(The Epistle Of Paul The Apostle To The Romans, Chapter 8, 24-25)

Like any PhD candidate, I suppose, I have been hoping for something I couldn't see for the past 4 and half years: the completion of my thesis. I was waiting for this moment with patience and resilience. Yet, I wouldn't have been able to reach my destination without the help of numerous people and institutions. I would first of all like to acknowledge the generous financial support provided by the ESRC, the University of Liverpool, Management School as well as Aston Business School. I am also very grateful to my primary supervisor Jason Ferdinand for being there for me at all those moments when I... almost lost hope. I would also like to thank the following individuals who assisted me in their own ways throughout this research: Martin Chambers, Geoff Minshull, Ian Johnson, Stephen Moffatt, Jayne Mallon, Peter Gibson-Leitch, Andy Gibson, Robert Flavell, Marissa Richardson, Carol Stithcman, Kostas Samiotis, Duncan Shaw, John Edwards, Emmanuel Thannasoulis, Rakesh Vikram and Frank Worthington as well as my examiners Davide Nicolini and Helga Drummond. In addition, I would like to thank especially my friends Swetketu Patnaik, Christoph Laucht, Luis Rene Jeay Lopez, Erik Casagrande, Manolis Ntelakis, Lefteris Spartis, Alexandros Hadjitheodorou as well as my cousin Georgia Grigoraki. I am also very grateful to father Methodios for his moral support. My words are not enough to describe my gratitude and feelings of thankfulness towards Prita Banerjee, without whose continuous encouragement and care, I wouldn't have been able to cope with the very demanding task of doing a PhD so well. Finally, I couldn't forget to thank my parents, Giorgos and Maria, and my brother Theodosios, who were there for me at every moment of this process and whose love made me wait for... hope with lots of patience.

CHAPTER 1

INTRODUCTION

1.1. RESEARCH BACKGROUND

Towards the end of the first decade of the 21st century, *coordination* has become a favourite topic of analysis for politicians and governments, businessmen and academics. An increasing interest in the notion of coordination is especially reflected in newspapers, business reports and academic journals:

Governments need not just to communicate, but also to *co-ordinate*. Past banking crises show that late, piecemeal rescues cost more and work less well. Ad hoc mergers work for a while, but demands for help tend to recur. Inconsistency sows uncertainty. Cross-border banking can make one country's policies awkward for the neighbours.

(The Economist, 2nd October 2008, emphasis added)

EU economy ministers agreed on the need for a "coherent and *coordinated*" effort to help European carmakers, all of which are seeing dramatic declines in sales.

(The Associated Press, 13th March 2009, emphasis added)

President Barack Obama pressed global leaders in a written message on Tuesday to take "bold, comprehensive and *coordinated*" steps against the debilitating recession. "Only *coordinated* international action can prevent the irresponsible risk-taking that caused this crisis...", the president said.

(The Associated Press, 24th March 2009, emphasis added)

The No. 1 obstacle (to implement innovation), according to our survey takers, is slow development times. Fast-changing consumer demands, global outsourcing, and open-source software make speed to market paramount today. Yet companies often can't organize themselves to move faster... Indeed, a lack of *coordination* is the second-biggest barrier to innovation, according to the survey's findings...

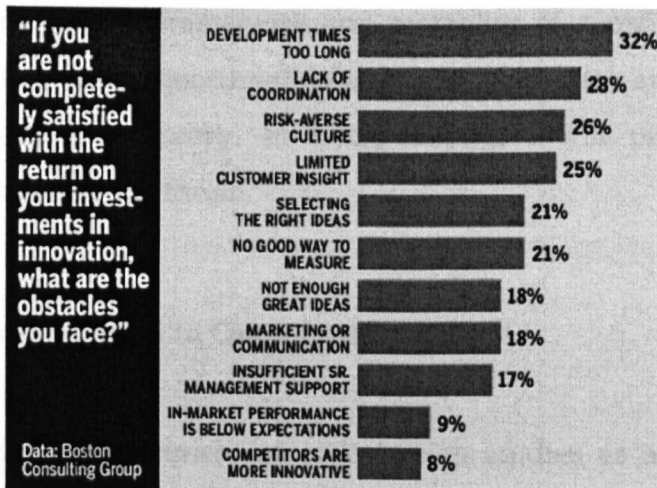


Figure 1. BusinessWeek, 2006

(Special Report On Innovation, BusinessWeek and the Boston Consulting Group, 24th April 2006, emphasis added)

It's time to end the myth of the complete leader: the flawless person at the top who's got it all figured out. In fact, the sooner leaders stop trying to be all things to all people, the better off their organizations will be. In today's world, the executive's job is no longer to command and control but to cultivate and *coordinate* the actions of others at all levels of the organization. (Ancona et al, 2007, p. 92-94, emphasis added)

In light of a growing interest in coordination, my purpose in this thesis is to enhance understanding about the distinctive features of this important phenomenon by focusing on organisations. In particular, I examine existing knowledge of coordination in organisation theory and draw the conclusion that current explanations are inadequate. On deeper examination, I attribute this lack of understanding to the unreflective way organisation scientists or theorists (I use the two terms interchangeably) collectively have studied

coordination. I thus cogitate about how to study coordination more systematically and outline key research principles, which have guided me in the implementation of an in-depth study of a major construction project. Furthermore, I report on the results I obtained from that study and argue that new insights regarding coordination emerge. Effectively, I develop a novel theoretical framework and metaphor of coordination to explain the distinctiveness of coordination and raise claims for an original contribution to organisation theory. In what follows, I will present the underlying architecture of the thesis.

1.1.1 Coordination in Organisation Theory¹

Since the establishment of organisation studies as a social scientific field (middle of 20th century), it has been argued that coordination represents an important organisational phenomenon (Coase, 1937; March and Simon, 1958). Mintzberg, for example, concurred that:

Every organized human activity – from the making of pots to the placing of a man on the moon – gives rise to two fundamental and opposing requirements: the *division of labour* into various tasks to be performed, and the *coordination* of these tasks to accomplish the activity. (1979, p.2, emphasis added)

More recently, a growing number of scholars have suggested that coordination is crucial for enabling organisational flexibility (Gittel, 2000), enhancing the implementation of global strategies (Davies et al, 2006), facilitating the development of new products in timely fashion (Teece et al, 1997; Faraj & Sproull, 2000; Bechky, 2003a) and the synthesis of diverse sources of expertise and innovation (Leonard-Barton, 1995; Carlile, 2004; Gerwin, 2004).

¹ My use of the term 'Organisation Theory' (OT) is very similar to Tsoukas' and Knudsen's (2003), who define OT as "the academic field specialising in the study of organisational phenomena (both micro and macro) and for this reason OT is used here as synonym for Organisation Studies" (p.2).

Considering the large number of studies that have explored coordination-related phenomena, one would expect that we know coordination better. However, if one explicitly questions the current knowledge status of coordination in organisation theory, the findings are daunting.

By reviewing the current literature, I come to the conclusion that organisation scientists have made little progress as regards theoretical understanding of coordination (Chapter 2). I show that there is significant confusion among scholars with reference to their epistemologies of coordination, i.e. their theories of knowledge of coordination. For some, coordination is about 'working together', 'cooperating', 'collaborating'; for others, it refers to 'synchronising', 'synthesising' and 'aligning'. Theoretical confusion is plainly manifested in the fact that coordination is frequently synonymised and conflated conceptually with other phenomena and processes, such as: communication, control, information processing, knowledge sharing and transfer, and boundary-crossing. In essence, conceptual conflation represents evidence of limited organisational scientific progress on the topic. I also argue that this limited progress can be explained as a consequence of fragmented, disjointed and unreflective research endeavours (Knudsen, 2003).

Therefore, I put forward the argument that the most serious consequence of a fragmented body of literature is that organisation scientists have not verified their knowledge and have not clarified the distinctiveness of coordination as an organisational phenomenon. So, in this thesis:

I aim at explaining how coordination is a distinctive organisational phenomenon.

In order to fulfil my aim, I raise and address methodically three interrelated questions:

Q₁: How should I pursue my research objective to explain the distinctiveness of coordination through empirical organisational research?

Q₂: What new insights have been produced from my empirical study, which I designed on the basis a consolidated answer to Q₁?

Q₃: How does my research explain in an original way the distinctiveness of coordination as an organisational phenomenon, in light of a consolidated answer to Q₂?

1.1.2 Designing Further Research on Coordination

With respect to Q₁, I argue that the roots of our limited understanding of coordination concern fundamental disagreements among organisation scientists about how research on coordination should be conducted. I infer that those disagreements should be addressed systematically through reflection upon research assumptions prior to conducting further research (chapter 3). I thus draw upon a 'critical realist' philosophy of science (Sayer, 1992; Archer, 1995; Bhaskar, 1998) and engage in a 'meta-theoretical' discussion (Tsoukas & Knudsen, 2003). From this discussion, I substantiate the argument that I should pursue further empirical research on the basis of consistently aligned conceptions about 'what the nature of organisational phenomena is' (ontology) and about 'how knowledge of those phenomena can be acquired' (epistemology). I thus clarify my ontological assumptions: I conceive organisational and coordinative phenomena as inherently social phenomena, which are embedded in broader social contexts with distinct properties. I further assume that such phenomena are necessarily influenced by the properties of their contexts, such influence being manifested throughout a situated organisational process. With respect to my epistemological assumptions, I argue that explaining coordinative

phenomena should involve: (a) conceptualising the properties of their social contexts, and (b) elucidating how organisational actors' endeavours to coordinate are constrained and enabled by such properties over time and in concrete settings. As a result, I adopt an intensive empirical research design (Sayer, 1992; Tsoukas, 1989b) in order to be able to conduct abstract (needed for [a]) and concrete research (needed for [b]).

With an enhanced awareness of what kind of empirical research I should pursue and how, I have made an informed decision to conduct an in-depth study of a construction project in connection to the redevelopment of a major railway station in an EU metropolis (hereafter identified with the pseudonym 'Theta Project'). In view of my research aim and imperative for an intensive research approach, my focus has been on investigating coordination on a subproject of the Theta project: the contract award project for selecting a 'Construction Consultant' (CC, title of contract disguised) – a 'partner' supplier for construction and project management services. In this empirical setting, I have also used multiple qualitative research techniques for the purposes of abstract and concrete research.

1.1.3 Empirical Findings

From my empirical research, I have been able to generate manifold new insights regarding coordination (answer Q₂). On the basis of my ontological, epistemological and research design commitments, I report on my findings by taking two steps. As a **first step**, I elucidate the properties of the context of the CC contract award project, which provide the conditions for coordination. As a **second step**, I illuminate how those properties are involved in and impinge upon the efforts of organisational actors to accomplish the project and coordinate over time (see also figure 2, p.11).

With regards to the **first step**, I show that the project context has two kinds of properties: (A) those historically inherited and (B) those pertaining to the nature and locus of the problem at hand (procurement).

Properties (A) exist, since the CC contract award project is essentially the historical outcome of three phases: (i) the genesis of an integrated idea for the 'Theta project' (chapters 4), (ii) the development of justified investment decisions, project objectives and design solution (chapters 5), and (iii) the formulation of the overall procurement strategy (chapter 6). My findings confirm that properties (A) become more and more complex over time, insofar as in each phase the products of previous phases are used.

Results from my abstract and concrete research into these phases shed light on the ways the complexity of these properties developed historically. In particular, as regards phase (i), I show that the socio-material properties of the railway station conditioned how a future station was imagined and consequently the way a project idea/vision was generated. In phase (ii), my findings indicate that the development of the project objectives and design solution was constrained and enabled by the properties of a general evaluative framework, the 'regime of investment justification'; in accordance with which the project funders justified their decisions to invest in the project idea (created in phase [i]). As for phase (iii), I elucidate that the properties of a general construction industry 'delivery discourse' conditioned the formulation of the procurement (delivery) strategy, which seemed suitable for addressing the project objectives and design solution (created in phase [ii]). As a result of that strategy, the CC contract award was eventually made possible. Effectively, my research findings show that the complexity of properties (A) increased over time through historically assembling the heterogeneous: (Ai) socio-material properties of the station, (Aii) properties of the 'regime of investment justification', and (Aiii) properties of the construction industry delivery discourse.

Furthermore, my results elucidate that **properties (B)** exist since the contract award project: (1) refers to solving a problem of a particular nature, and (2) is situated in the specific context of a public institution in the European Union (EU) (chapter 7). With regards to (1), I postulate the existence of a general procurement problem-solving convention (Thévenot, 2001b). This convention, I argue, impinges upon contract award projects by way of supplying procurement 'problem solvers' with an abstract evaluative framework. The distinct properties of this framework, I further argue, enable and constrain how 'most suitable' suppliers/contractors can be selected as well as coordination of procurement processes. With regards to (2), findings indicate that the requirements of the EU legal discourse, which aims at the creation of a single market in the EU area, also impinge upon procurement processes. Essentially, the complexity of properties (B) pertains to the heterogeneous properties of: (B1) the procurement convention and (B2) EU legal discourse.

With the completion of the first step, I argue that the CC contract award project is embedded in a context characterised by a plurality of properties (Ai, Aii, Aiii, B1, B2), which provide the conditions for coordination.

With regards to the second step, results from my in-depth and longitudinal investigation of the procurement process illuminate how the project context properties are actually involved in and impinge upon what actors coordinate and how over a period of time (chapter 8). Impingements, I argue, manifest themselves to organisational actors as heterogeneous demands, which the latter need to address for the purposes of successful project accomplishment. In essence, organisational actors coordinate in order to get their job done by 'engineering' compromises and connections among these heterogeneous demands. I discuss in detail how this happens in all stages of the project: from advertising the contract and preparing a pre-qualification questionnaire to assessing bidders' 'partnering capabilities' and evaluating their bids.

Findings also indicate that heterogeneous demands influence the accomplishment of coordination in a differential fashion. That is, the properties of the project context are not only heterogeneous, but also exert differential influence on the procurement accomplishment over time. For example, when organisational actors 'engineer' compromises, they are always constrained and enabled by properties (B), which represent, I argue, foundational conditions for coordinating procurement problem solving; while properties (A), especially (Ai) and (Aii) impinge upon organisational actors only at certain stages. Yet, all context properties, I argue, have the potential to impinge upon coordination and project accomplishment. With the **completion of the second step**, I assert, it is possible to draw general conclusions and explain why and how coordination is a distinctive organisational phenomenon (see figure 2, p.11).

1.1.4 Re-imagining Coordination in Organisation Theory

In response to the third question (Q₃), I effectively re-imagine coordination as the phenomenon of 'engineering' compromises and connections among heterogeneous (differentially influential) contextual demands; a processual phenomenon that produces certain outcomes in order to enable organisational accomplishment over time. I argue that this conception represents an advanced epistemology of coordination because it explains its distinctiveness (chapter 9). I further propose that the uniqueness of this new epistemology of coordination can be emphasised by ascribing to it the metaphor of 'diarthrosis'. While the term 'diarthrosis' is used in English as medical term to refer to the movable bone joints e.g. knee or shoulder, I also draw on its (original) Hellenic (Greek) semantic domain, where it refers to the phenomenon of 'connecting disparate elements to create a unified whole'. I suggest that diarthrosis has significant metaphorical advantages and can be introduced in organisation theory as an advanced analogy of

coordination that connotes a historically conditioned and dynamic organisational happening.

A perspective of 'coordination as diarthrosis', I claim, not only explains how coordination is a distinctive organisational phenomenon, but also attests to its 'practical adequacy' (Sayer, 1992). In particular, I vindicate that 'coordination as diarthrosis' is adequate and 'intelligible' for conceptualising coordination in (research) practice through using it to re-describe existing perspectives on coordination and demonstrate how organisation scientists' confusion regarding coordination may be resolved. Finally, I conclude by drawing further implications for research and practice.

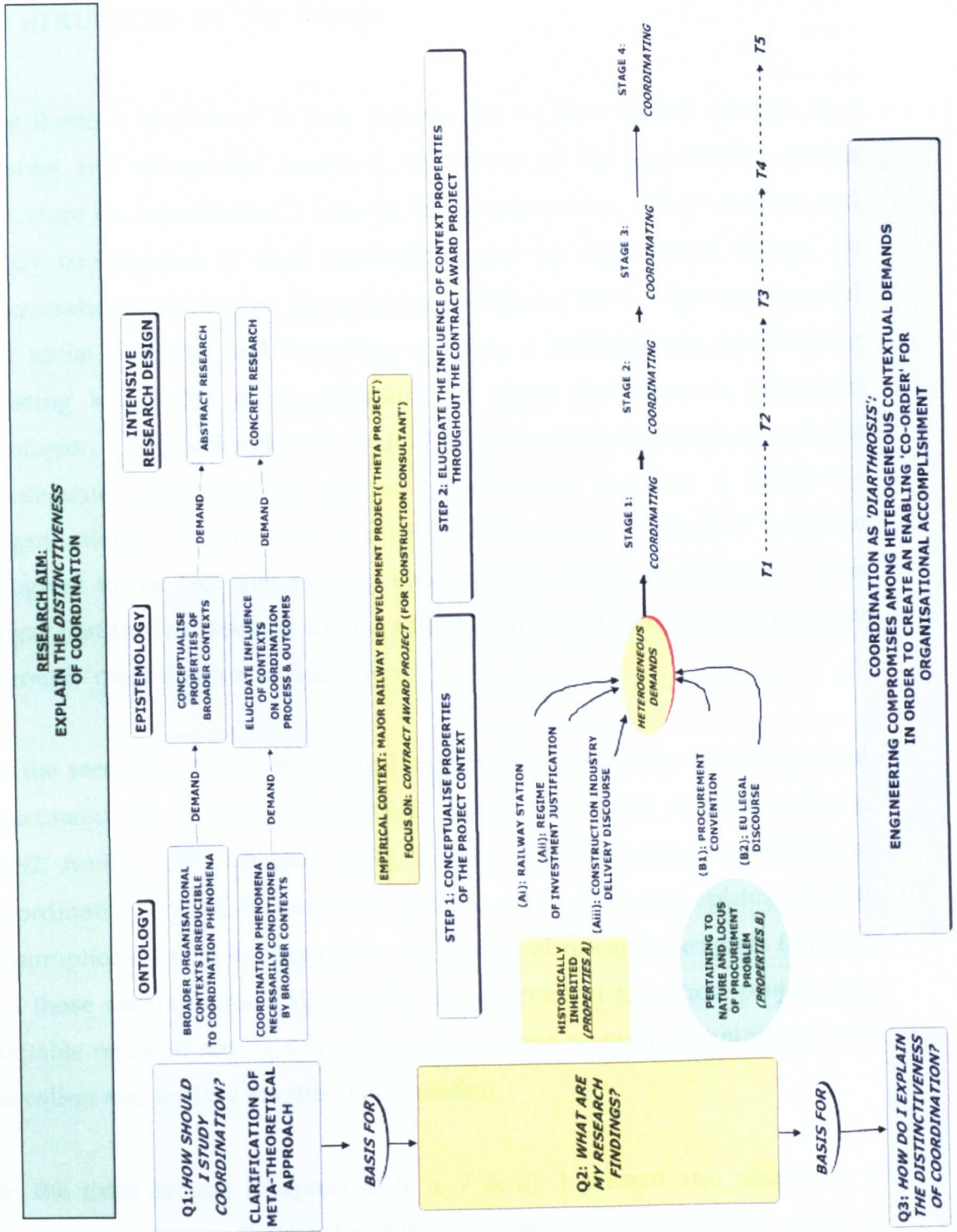


Figure 2. Thesis Overview

1.2. STRUCTURE OF THE THESIS

The thesis is structured in four sections. In the first section (chapter 2), I present and discuss the results of my review of the organisation studies literature on coordination. I identify four perspectives, which conceive and study coordination in their particular ways: (a) organisation design, (b) organisational economics, (c) groups as distributed knowledge systems, and (d) social practices and boundary crossing. I subsequently problematise existing knowledge of coordination and show that there is significant confusion. I emphasise that the major limitation of the literature regards the inadequate understanding of how coordination becomes a distinctive organisational phenomenon. I attribute the causes of limited scientific progress to the fact that existing knowledge is highly fragmented. I thus argue that further research should address this fragmentation systematically through 'meta-theoretical' reflection.

In the second section (chapter 3), I engage in an extensive meta-theoretical discussion. By drawing on a 'critical realist' philosophy of science (Sayer, 1992; Archer, 1995; Bhaskar, 1998), I argue that developing new theory of coordination should be based on specific ontological and epistemological assumptions. I then explicate how my empirical research design is founded on those assumptions. I also justify my selection of the Theta project as a suitable research setting and discuss the various research techniques I used to collect and analyse empirical information.

In the third section (chapters 4, 5, 6, 7 & 8), I present and discuss in a comprehensive way the results of the meta-theoretically grounded study of the Theta project. The separation of the research findings into four chapters is based on the premise that each chapter should deal with a distinct historical 'project phase'. Moreover, discussions in the first three chapters (4, 5 & 6)

provide an exegesis of how conditions for accomplishing project activities and coordination throughout the CC procurement process are historically moulded. Hence, in chapter 4 I focus on the 'genesis of an integrated project idea', while in chapter 5 I provide possible explanations of the justifications made by the multiple Theta project's stakeholders to invest financially in a potential railway redevelopment scheme. In chapter 6, I explain the process of developing a procurement strategy in relation to the project's embeddedness in the construction industry context. In chapter 7, I discuss the characteristics of procurement problem-solving contexts. In light of the discussions presented in chapters 4-7, in chapter 8 (the largest results chapter), I show how coordination throughout the complex CC contract award project is accomplished and constrained and enabled by the complex Theta project context.

In the fourth and final section (chapters 9), I raise claims for original contributions to organisation theory. I elaborate on those claims and propose a new epistemology of coordination that explains its distinctiveness. I also argue that a new metaphor/analogy needs to be explored. The outcome of such exploration is the development of a metaphor of 'coordination as diarthrosis'. In order to demonstrate the usefulness of the new theory, I re-describe existing epistemologies of coordination (presented in chapter 2) and highlight opportunities to improve those. I also draw implications for interrelated research fields, policy and practice. Finally, I summarise the main contributions to knowledge and sketch out some ideas for conducting future research on coordination, after discussing limitations of the research approach I adopt in this thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, I will examine the existing organisation studies literature on coordination. I view this examination as an attempt to organise knowledge and to problematise its foundations. As Locke and Kolden-Biddle (1997), who studied papers published in leading academic journals, suggested, organising knowledge in organisation studies may involve two interrelated processes:

How do organization researchers construct adequately justified opportunities for making contributions to knowledge? More particularly, how, through the medium of language, are such opportunities crafted?... (there are) two key processes... In order to establish contribution, organization studies manuscripts first must represent and organize existing knowledge so as to *configure a context for contribution* that reflects the (lack of) consensus of previous work. The presence of existing knowledge legitimizes a research area by underscoring the intellectual resources devoted to it and, at the same time, provides a theoretical orientation for present investigations. Second... manuscripts must in a sense turn on themselves, subverting or *problematizing the very literatures* that provide locations and *raison d'être* for the present efforts. Showing that existing scholarly and research efforts are wanting in some respects opens up opportunities for advancing knowledge about topics of investigative concern. (p. 1029, emphasis and parentheses added)

The implications are that the way one organises existing knowledge of a phenomenon will constrain and enable the process of identifying gaps in that knowledge as well as the possibilities for addressing those gaps. I would add that the accomplishment of those two processes also depends on (a) the 'nature' of existing bodies of research and (b) the research values adopted by

an investigator. As regards (a), there may be a few or a lot of studies, looking at one or many aspects of an organisational phenomenon, attempting to synthesise and/or being inattentive to various research traditions and to the validity of their claims. As regards (b) the reviewer may exercise different kinds and degrees of doubt during the research process (Locke, et al, 2008), which will inevitably influence the outcome of this endeavour. In view of these observations,

My aim in this chapter is to organise knowledge of coordination in organisation theory in order to delineate and assess the current epistemological status of coordination, i.e. how well we know it.

The intermediate objectives concern the re-examination of relevant studies with a view to:

- Identifying distinctive approaches to studying coordination
- Explicating their conceptions of what coordination may be
- Revealing their underlying research assumptions about the phenomenon of interest and underpinning conceptual organisation
- Delineating problems and consequences of that organisation
- Articulating the need to pursue advancements of knowledge of coordination in order to enhance its epistemological status
- Making initial suggestions for designing future research, which will address the limitations of existing literature.

The chapter is organised in two sections. In section 'A', I re-collect organisational texts on coordination and construct an 'inter-textual' field (Locke & Kolden-Biddle, 1997) in order to determine the knowledge status of that important organisational phenomenon. Characterising that field as non-coherent and confused, I move on to section 'B', where I articulate my research aim in this thesis: to explain the distinctiveness of coordination in organisation theory.

2.2. SECTION A: CONSTRUCTING AN INTER-TEXTUAL FIELD OF THE EXISTING LITERATURE

When I first engaged with the organisation studies literature on coordination, I was struck by the amount and diversity of intellectual resources employed to examine this phenomenon. Gradually, I developed a sense of why this was the case. Coordination appears to be necessary and/or observed in almost every organising setting; e.g. large bureaucracies, projects, ad hoc teams, groups, orchestras, emergency response groups, even in situations of aircraft hijacking where passengers and crew members organised a counterattack against the hijackers (Quinn & Worline, 2008). Not surprisingly, different perspectives have emerged and, in some cases, dominated the study of coordination in organisations. I also observed that the literature is not simply diverse and polyphonic, but significantly disjointed, dissonant and characterised by problematic heteroglossia - different and disconnected discourses. Although pluralism in organisation theory is desirable and should be expected (Knudsen, 2003), especially for such an empirically differentiated phenomenon, our existing knowledge of coordination resembles more like a cacophonous product; and the causes for such an outcome, I will attempt to show, do not lie exclusively in the differentiation of organisational reality, but primarily in the way the latter has been studied, probed, interpreted and generally conceptualised.

In an attempt to explore more systematically the roots of this cacophony and to assess more precisely the current epistemological status of coordination, I identify and present the different organisational research perspectives on coordination. The grouping of those is done on the grounds of scholars' own accounts of their identity as well as on the basis of similarities in general approach and assumptions. More specifically, throughout the second half of the 20th century and at the beginning of the 21st, organisation researchers have approached the phenomenon of coordination from the following

theoretical angles: 'contingency theory', 'coordination theory', 'organisational economics', 'sense making and distributed cognition', 'transactive memory theory', and, more recently, 'practice-based' and 'boundary spanning perspectives'. In order to make the review more comprehensible, I cluster 'contingency theory' and 'coordination theory' studies into the paragraph: 'Coordination from an Organisation Design Perspective'; and, studies of 'sense making and distributed cognition', and 'transactive memory theory' are grouped under the heading 'Coordination from a 'Group as a Distributed Knowledge System' Perspective'.

2.2.1 Coordination from an 'Organisation Design' Perspective

2.2.1.1 Contingency Theory

Contingency theory is generally considered the dominant organisational research approach to studying and explaining coordination. Its origins can be traced back in the middle of the 20th century and its influence can be observed until the time of this writing. In what follows, I take a chronological perspective on the development of knowledge of coordination in 'contingency theory'.

1950 – late 1960s

In their highly influential book entitled 'Organizations' (1958), March and Simon highlighted the central role of coordination for the existence and functioning of organisations:

Organisations are assemblages of interacting human beings and they are the largest assemblages in our society that have anything resembling a *central coordinative system*... the high specificity of structure and coordination within organisations – as contrasted with the diffuse and variable relations among organisations and among unorganised individuals – marks off the individual organisation as a sociological unit comparable in significance to the individual organism in biology. (p.4, emphasis added)

Their ideas were fully embraced and further developed particularly by Thompson (1967), whose book 'Organizations in Action' may be considered the turning point of organisational and management research in coordination. For Thompson, coordination is an organisational phenomenon,

which becomes necessary due to the impact of technology² on organisational structure. Coordination is essential because the technological and task environment, which is considered given, creates interdependencies. Coordination aims to resolve the consequences of interdependencies, that is, contingencies affecting the interaction between different parts of an organisation and have various properties: nature, location, order and form. Thompson elaborated more on the form of interdependence, which is defined as the pattern of workflow exchanges of resources and other products between organisational components.

On the basis of those basic distinctions, Thompson developed a typology of interdependencies, which has been the most cited in studies of coordination and interdependence for decades (Staudenmayer, 1997b). Pooled (or indirect) interdependence means that different tasks can be accomplished independently, yet their outcomes are interdependent insofar as there is an overriding objective underpinning the entire organisation; sequential (or serial) interdependence exists when the input of one task requires outcomes or information from another task; and reciprocal (or mutual) interdependence exists when both two tasks require as inputs the outcomes or products of each other (interpenetration).

According to Thompson, this typology helps explain many aspects of the coordinative functions of organisations. Most notably, it explains the different coordination mechanisms, i.e. organisational structural devices used to cope with given interdependencies. Building upon March's and Simon's work (1958), Thompson argued that organisations coordinate by (a) standardisation, (b) plans and schedules and (c) by mutual adjustments. The underlying assumption is that organisations would tend to address varying degrees of contingencies stemming from the technological environment

² Barley noted (1990) that from a contingency theoretical point of view, "technology is frequently used in the sense of organisation, a specific arrangement of persons, materials and tasks" (p. 64); e.g. construction technology refers to the construction project.

(predominantly interdependence) by developing suitable structures with the appropriate capacity to 'absorb' such contingencies.

Under 'norms of rationality', organisations 'match' coordination mechanisms with the form of existing interdependence (Thompson, 1967). More specifically, organisations would create (1) rules and procedures (standardisation) as coordination mechanisms to 'match' pooled interdependencies. Organisations, Thompson's model proposes, would create (2) plans and schedules under conditions of sequential interdependence, while they would create (3) processes for mutual adjustments when reciprocal interdependence exists. Interestingly, Thompson argued that different forms of interdependencies are not alternative, but are additive. That is, when there is reciprocal interdependence in organisations, there must also be sequential and pool. If there is sequential, then there must be pooled, but not necessarily reciprocal, while pool interdependence is a condition of all organisations. The following table summarises those ideas.

Table 1. Thompson's typology of coordination (1967)

	Form of Interdependence		
	Pool	Sequential	Reciprocal
Coordination Mechanisms	Rules and procedures	Sequences	Mutual adjustments

In essence, according to Thompson (1967) coordination happens as soon as the right organisational structures are in place. By estimating the level of interdependence and the resultant amounts of contingency, his argument goes, organisations tend to develop structures (coordination mechanisms) that have the capacity to cope with the demands of interdependence.

Revolutionary at that time, Thompson's model, nonetheless, defines coordination very vaguely as e.g. the 'assembling and interrelating' of

organisational components or as 'concerted actions' (Thompson, 1967). Coordination seems to occur automatically after the design of the right mechanisms and without the involvement of organisational actors (Barley, 1990). There is great ambiguity with respect to who coordinates and how; whether coordination mechanisms differ from other structural devices; whether the impact of technology on coordination, can be fully encapsulated by the construct of interdependence; ambiguity, which is unfortunately pervasive 40 years later (Kretschmer & Puranam, 2008; Gerwin, 2004; Barki & Pinsonneault, 2005).

In addition to Thompson, Lawrence and Lorsch (1967) also drew heavily upon March's and Simon's work (1958) and upon notions of organisations as 'open systems'. Refraining from focusing on the individual, Lawrence and Lorsch (1967) began with the organisation as the unit of their analyses and developed their theory on the grounds that organisations have an overall task, which has to be segmented. The consequence of that segmentation is the creation of subsystems, which are differentiated. The roots of differentiation are exogenous sub-environmental and task circumstances (different kinds of environments), which subsystems deal with. Some sub-environments are more stable or dynamic than others, which has a direct impact on the way departments differ from each other. For instance, think of the very dynamic and constantly changing environment of a marketing department in contradistinction with the relatively stable and controllable environment of a manufacturing department.

On the other hand, there is an overall organisational task, for which integration is needed to achieve unity of effort between subsystems. Although they do not explicitly use the term coordination, Lawrence and Lorsch (1967) used 'integration' in the same way Thompson used 'coordination'. Also, instead of using the term interdependence, they referred to March's and Simon's notion of 'requisite integration' (1958), as a defining element of 'integration'.

Their principal assumption was that there is an 'antagonistic' relationship between differentiation and integration, yet their empirical findings revealed that an organisation in order to perform well has to be both well differentiated and well-coordinated. For example, a marketing department has to develop suitable organisational structures to take hold of the requirement of the marketing environment (be well-differentiated), while the entire organisation should develop mechanisms that enable coordination across departments. They referred to 'integrative devices', such as 'hierarchies', 'control systems', and 'coordinative departments' to describe the coordinative function (Lawrence & Lorsch, 1967). In their empirical survey of 6 complex organisations they measured the effectiveness of integration and coordination by measuring the status of relationships between subsystems; notably, only two at a time, i.e. coordination was incorporated in their model as happening only between two units and "in the face of various degrees of subsystem differentiation" (Lawrence & Lorsch, 1967, p. 30). It is unclear, however, what might happen if coordination is required among more units, since the accomplishment of an abstract overall organisational goal apparently requires many departments.

For Lawrence and Lorsch (1967), integration or coordination has to address 'overall' environmental demands and particularly the consequences of segmenting the environment, which is required due to organisational actors' 'bounded rationality' (March & Simon, 1958). Their main contribution lies in the fact that they were the first to argue that difficulties in achieving coordination may arise due to the divisionalisation of organisations, which result in problematic 'integrative situations' and should be resolved through the development of the most suitable 'integrative devices' (Dougherty, 2001; Carlile, 2002). Unfortunately, however, they made no distinction between 'integration', 'coordination' and 'cooperation' between departments; while it is generally very difficult to delineate whether coordination is caused by or refers to inter-department interaction.

1970's

Since 1967 a cluster of studies have followed to test and further develop the propositions made by Thompson and Lawrence and Lorsch. The dominant assumption was that coordination is primarily the outcome of organisational structures, which links different components of an organisation and enables the accomplishment of an overarching objective (McCann and Ferry, 1978; Victor and Blackburn, 1987). Organisational researchers thus attempted to validate whether and how 'matching' occurs between coordination mechanisms and the demands of various 'conditions'. Van de Ven et al (1976), for instance, considered 'task uncertainty', 'task interdependence' and 'unit size' as "fundamental factors", i.e. exogenously given independent variables, to explore why different coordination mechanisms were used within organisational units; without explaining, however, why those factors are fundamental. Van de Ven et al (1976) argued that those "fundamental factors" incorporate different information processing requirements and thus require different information processing mechanisms; the more interactive the mechanism, e.g. 'personal communication' or 'group meetings', the greater the information processing capacity of that mechanism. Van de Ven et al (1976), for instance, showed through their large survey based empirical study that as task uncertainty increased, and thus the need for processing more information, substitution between alternative coordination modes tended to happen in organisations; while if task interdependence increased, the use of all coordination mechanisms was observed. Overall, coordination depends on the level of 'interactiveness' and on the frequency of use of alternative or complementary coordination structures, which should match uncertainties from various sources.

In order to further clarify the notion of 'congruence', i.e. 'matching' technological requirements and organisational structure, organisational scholars attempted to develop an integrated 'grand theory' of organisations

as information processing systems; at the core of which lies the notion of coordination. The protagonists were Galbraith (1973, 1977) and Tushman and Nadler (1978), who argued that organisations must design structures in order to be able to collect, gather and process information. External (environment) and internal (task interdependence) sources of uncertainty exist and create requirements for bridging the gap between amounts of needed information and information already possessed by organisations. Other “working assumptions” (Tushman & Nadler, 1978) were that there is a “most appropriate configuration of working units (as well as linkages between these units)”, which can be rationally found. Effective coordination mechanisms have to be developed to facilitate coordination within and among differentiated units by addressing requirements of intra-unit and inter-unit interdependencies, which, in line with Thompson (1967), are exogenous forces. It is not clear, however, whether and how those requirements, i.e. intra- and inter-unit interdependencies, differ.

Conclusively, organisational theorists of that epoch (1970’s) generally agreed that coordination is a key information processing activity, which has to be designed in relation to sources of uncertainty. Although consensus centred around the idea of ‘matching structures’, which were labelled ‘coordination mechanisms’, a lot of confusion was generated about the (differential) sources of uncertainty; e.g. interdependence, task environment and complexity, unit size, etc. In addition, coordination was viewed as the outcome of a mechanical and controlling process enabled by the ‘mechanisms’ of various levels of ‘bandwidth’ (Gittell, 2002), i.e. capacity to handle volumes of known bits of ‘objective’ information (Tsoukas, 2005). In short, organisation theorists considered coordination as part of a bigger task of determining the parameters of organisational form and structuring; rather than understanding how coordination actually works in practice or how it is a distinctive process.

Mintzberg's work on organisational structuring (1979) may be regarded as the zenith of the collective organisational scholarly endeavour to construct theories for organisation design. His model describing the possible distinct organisational forms was built upon the assumption that there are five parts within organisations, the work of only one has to be coordinated; the operating core (the others are the 'strategic apex', 'middle line', 'technostructure' and 'support staff'). For Mintzberg, coordination happens as long as there are the right 'coordination mechanisms' in place to control the linking of the distinct tasks assigned to a divisionalised operating core. These are: direct supervision, standardisation of work processes, standardisation of outputs, standardisation of skills and mutual adjustments. It is notable that some structures are designed carefully by other parts of the organisation (e.g. the accountants), while others involve the participation of e.g. the middle managers. Furthermore, the design of coordination mechanisms depends on other parameters. For example, 'unit grouping', i.e. how to cluster jobs into units and subunits, determines whether and how direct supervision and mutual adjustment is effectuated.

Notwithstanding the contribution of Mintzberg's framework to understanding the structuring of organisations, it reproduced conceptual obscurity as regards coordination, since, along with other contingency theorists, some structures or mechanisms resolve coordination problems automatically. Furthermore, it is not clear why direct supervision is a coordination mechanism or what exactly and how it coordinates. Also, it is not explained whether coordination is needed across the other four parts of the organisation (Mintzberg, 1979). Coordination becomes a synonym of control, since the 'organisation designer' can specify how to divide the overall organisation task, and thus interdependence. It thus becomes increasingly difficult to identify the distinctiveness of coordination as an organisational process and to explain how it is constituted and unfolds.

1990s - early 2000

The theoretical ambiguity around the concept of coordination remained until 1995 when Adler reported findings of an empirical study of interdepartmental interdependence and coordination in manufacturing firms. Sensitised by the empirical observation that those firms experimented with the interface between design and manufacturing departments, Adler (1995) wanted to explore:

the normative question of how departments should coordinate in order to manage most efficiently their interdependence, rather than on the descriptive/positive theory of how departments actually do coordinate (p.149).

In contradistinction to the existing (up to that point) contingency theoretical perspectives, Adler studied coordination over time and in projects, and tested the hypothesis that interdependence changes over time (since the nature of the task and the technology also change) as well as the 'fitting' requirements for the design of coordination mechanisms.

Building upon Thompson's framework, Adler enriched the typology of those mechanisms; compatibility standards, design rules, tacit knowledge, sign-offs, design review meetings, engineering change orders, joint and transition teams are some of the newly introduced categories. He showed that the suitability of those structural elements for 'optimal coordination' depends not only on cost and information 'bandwidth', but also on the project phase. Organisations will tend to use different mechanisms over the life of a project, since different project task requirements exist at each phase. The following table illustrates Adler's enhanced typology of coordination mechanisms.

Table 2. Adler's typology of coordination mechanisms (1995)

<u>Categories of Coordination Mechanisms</u>	<u>Actual coordination mechanisms</u>		
	Pre-project phase	Product-process design phase	Manufacturing phase
Non-coordination	Anarchy	Over-the-wall	Work-arounds
Standards	Compatibility	Design rules, etc.	Manufacturing flexibility
Schedules and plans	Capabilities development schedules	Sign-offs	Exception, resolution plans
Mutual adjustment	Committees	Design reviews	Engineering change process
Teams	Joint development	Joint teams	Transition teams

Despite his new interesting findings, Adler preserved an overemphasis on merely one particular dimension of 'coordination mechanisms'; their capacity to process the required (by given interdependencies) volumes of information and to facilitate interaction, i.e. communication across departments. A view of coordination as one more element of organisational structure, which is not differentiated in any significant way from other control mechanisms, e.g. hierarchy, routines, and standardisation, dominated. It is also a striking fact that, while Adler observed throughout his qualitative study different kinds of coordination processes and structures, he insisted on reusing the theoretical typology developed by Thompson in 1967. For instance, instead of treating design review meetings in their own 'coordinative merit', he preferred to categorise those meetings under the broader Thompsonian category 'sequences'. What actually happens in those meetings is considered of no theoretical importance for Adler (1995). That is, the interactions among organisational actors in those meetings do not

constitute coordination, even though the event of a meeting is a coordination mechanism; quite contradicting argument, I would say.

A more recent stream of studies examined coordination in the context of new product development (Eppinger & Sosa, 2004; Brown & Eisenhardt, 1995). I will discuss the representative study by Terwiesch et al (2002). The authors extended Adler's work and argued that information-processing capacity should not be considered only in terms of the information frequency, but also of information content. In the context of concurrent engineering, they showed that the source of contingencies or interdependence is not task or environmental requirements. Rather, it is concurrency, which stems from management's decision to overlap activities, which are 'normally' sequentially related. They thus recognised that the influence of human factor is consequential for how coordination should be designed. Yet, instead of elaborating on that, they focused on proving that using plans or schedules to cope with interdependence would not work, because it is the information nature of the exchange that matters.

More specifically, in the context of concurrent product development, Terwiesch et al (2002) argued that it is not sufficient to investigate the pattern of information exchange when concurrency is the source of contingency. Rather, in order to study coordination one should focus on what is communicated, how and when. In other words, the unit of analysis is the 'information exchange' activities. Terwiesch et al (2002) accentuated the idea that increasing the information capacity of organisations with the formulation of cross-functional teams and other mechanisms is not sufficient. Organisations should evaluate the exchange of preliminary information within project teams as well as the format, content and timing of that exchange, if they are to effectively design coordination strategies. Terwiesch et al suggested that coordination strategies need to:

... shift from the traditional question “how much should we communicate” (to which the response is generally “a lot” among strongly coupled tasks) to the question of defining a trajectory over time between information stability and information precision (2002, p. 416).

It seems that the research focus shifted towards exploring different properties of information, e.g. time-dependence, format, content, precision, stability, etc. in order to enhance understanding of the design imperatives of coordination. There was less emphasis on ‘coordination mechanisms’ and greater interest in explaining the determinants of a suitable ‘coordination strategy’ (Terwiesch et al, 2002). This change of research orientation was triggered primarily from the realisation that the ‘bandwidth’ of mechanisms and the afforded interactiveness is a necessary, but not an efficient cause of coordination results.

The exploration of different dimensions of information exchange, however, was not accompanied by an investigation of the impact of interdependence, which for Terwiesch et al is ‘given’. They didn’t clarify whether the content of coordination might change if interdependence is not given or static, but dynamic and constantly evolving. This conceptual ambiguity most likely contributed to synonymising unproblematically coordination with communicative action, which, especially in the context of concurrent engineering, is highly interactive. It is unclear how coordination differs from communication and why the former should be conceived as a kind of communication outcome.

This lack of clarity as regards the distinctiveness of coordination was reproduced by Jody Hoffer Gittell, whose studies (2000, 2001, 2002), nonetheless, are important developments in contingency theory. Her main contribution, the articulation of the notion of ‘relational coordination’, exemplifies this point.

Relational coordination is coordination—the management of task interdependencies—carried out in the context of relationships with other group members. Relational coordination includes a *communication component*, reflecting the frequency and timeliness of communication among group members. In addition, it includes a *relational component*, reflecting the strength of problem solving, helping, mutual respect, shared goals, and shared knowledge among group members involved in the same work process. (Gittell, 2001, p. 471, emphasis added)

Note how coordination, the so-called ‘management of task interdependencies’, is equated to a communication process, ‘backed up’ by the quality of relationships among group members. Although the notion of ‘relational coordination’ revives interest in investigating how organisational actors actually enact coordination, at the same time, it undermines the prospects of such an examination by reifying the distinctive components of coordination as an organisational process; coordination is conceived as an outcome of the interactiveness that can be observed between the members of a group.

Notwithstanding the above, Gittell (2002) was instrumental in unpacking ‘coordination mechanisms’ as ‘bandwidth devices’. She questioned that belief and highlighted the importance of interactions enabled by or supplementing those mechanisms. In the context of flight departures and patient care, she studied coordination in groups and accentuated the idea that relational and communication processes interrelate. Coordination processes, Gittell argued, are carried out in and through a set of relationships of shared goals, knowledge and mutual respect (2002). In other words, we cannot understand the bandwidth of coordination mechanisms unless we explore the supporting ‘relational component’ of needed interactions. Based on findings of survey-based empirical studies, Gittell showed that, contrary to what existing literature would have suggested, routines (a ‘low-bandwidth’ mechanism) may actually be effective under conditions of high uncertainty (need for high bandwidth), because they facilitate relational coordination, i.e. the interactional processes needed to accomplish

coordination within a group. This could be attributed to the capacity of routines to e.g. facilitate the development of shared goals, mutual respect, and shared knowledge (components of relational coordination). She argued:

If routines, through codification, enhance participants' understanding of the overall process and their own role in that process, then those mechanisms should be more rather than less effective as uncertainty increases. This interpretation is consistent with the finding reported here that routines improve performance by strengthening relational coordination, rather than by reducing the need for it. (2002, p. 1424)

The implications are that dealing with uncertainties (stemming from task interdependence) requires more than the design of a coordination mechanism of the required bandwidth. The development of the necessary levels of relational coordination should also be carefully considered.

Conclusively, while the notion of relational coordination represents a positive development of contingency theory, since it emphasises the human involvement in coordination process, it does so without clarifying the foundational components of that process. Coordination is defined without justification as 'management of dependencies', which also entails the facilitation and management of interactions of the members of a particular group. In addition to equating unreflectively coordination and communication, Gittell persisted in relying on Thompsonian conceptions of interdependence as exogenously driven by the technology (e.g. in settings of flight departures, there is 'reciprocal interdependence'), even though she didn't locate coordination at the intersection of organisational parts, but within a team. This unfruitful reliance on Thompson's typology undermined any effort to examine possible deeper conceptual inconsistencies in the contingency theoretical image of coordination and question, for instance, whether there is any difference between task interdependence and interdepartmental interdependence.

One of the few scholars, who doubted the validity of contingency theoretical claims, was Nancy Staudenmayer (1997a, 1997b). She expressed dissatisfaction with regards to the progress that had been made in the field:

Many scholars have identified interdependence as a critical variable for understanding organizations. Overall, this body of research has progressed from some early ideas to a vast spectrum of work by various authors. One unfortunate outcome of this rich history, however, is a confusing multitude of conceptualizations and operationalisations... as scholars we are also left with a high degree of ambiguity and confounding with respect to the concept of interdependency. (1997b, p. 2)

Staudenmayer hoped to clarify this term by conducting two in-depth studies of large-scale software development projects. She explored patterns of interdependencies and attempted to classify those in terms of: 1) source of interdependence, 2) task structure, and 3) predictability. For instance, she argued that the source of interdependence may be 'product technology' or 'product environment' or 'organisational structure'; task structure could be 'bilateral' or resembling a 'chain'; also, interdependence could be relatively predictable or 'hidden'. Based on that classification, Staudenmayer argued that many assumptions of contingency theorists do not hold. For instance, there may be many different interdependencies interacting at the task level.

The analysis demonstrated how the very addition of more (different) interdependencies alters the definition of the task set (both refining existing tasks and necessitating new ones), in effect shifting the basic set of things that need to be performed and coordinated (Staudenmayer, 1997a, p. 129, parenthesis original).

Staudenmayer saw coordination as a dynamic phenomenon, which is conditioned by the amount and types of interdependences that can change task requirements and task relationships. Interdependencies should be considered neither given nor their impact anticipatable. She critiqued contingency theorists' ambiguous propositions that technology-driven

interdependence, e.g. between software components, is the same as task interdependence:

Contingencies between product components may or may not be reflected in similar interdependent relationships at the task level (e.g. sequentially interfacing components lead to both sequentially development tasks and reciprocal testing tasks). Assigning the component to different developers or repartitioning the task itself can also transform one type of interdependence into another. (1997a, p. 133)

The implications are that one should examine one type of interdependence in relation to other types. For example, she found that the propositions, such as 'if there is sequential interdependence, then the use of sequences and plans is more suitable' are flawed, since in practice organisational actors need to manage multiple pooled, sequential, and reciprocal interdependencies at the same time (and not one at a time). In addition, Staudenmayer (1997a) argued that coordination structures cannot be designed independently of a consideration of how tasks will be affected by those structures. Coordination of large-scale product development projects entails the situated, multifaceted and multi-agent management of 'web-like' interdependences' (Staudenmayer, 1997a).

This view contrasts sharply with commonly held (at that time) beliefs that designing coordination is a straightforward sequence of tasks of: (1) identifying interdependence, (2) defining the level of contingency, and (3) creating a 'matching' coordination mechanism. Instead, she suggested that, from an organisation design perspective, the management of multiple interdependences should be taken into consideration, and more specifically, the parameters: "a) part-whole coordination to avoid organisation design conflicts, b) planned and unplanned structure, and c) time to coordinate and time to produce" (Staudenmayer, 1997, p. 131).

In conclusion, Staudenmayer resisted the "counterproductive tendency to say that 'the number of interdependencies is infinite' or 'everything depends

on everything else” (Staudenmayer, 1997a, p. 222). She was instrumental in representing and analysing the pattern of interdependencies in software development projects, and thus in clarifying, to a certain extent, the notion of interdependence. However, her representationalist focus deprived her of explaining human entanglement in coordination processes or of moving beyond a structuralist notion of coordination mechanisms. For instance, although interdependences may indeed be important for carrying out coordination, the way people take hold of those is not examined. She recognised some of those limitations and observed that from her case studies other important themes remained to be explored³; e.g. that people tend to focus on different kinds of interdependencies, devote a lot of time ‘discovering’ interdependencies, and that “interdependencies are socially, culturally, and historically embedded” (1997a, p.243). In fact, in her future research directions, Staudenmayer stressed the need for longitudinal studies of ‘interdependency management’, which track the interaction between task and structure over time and examine behavioural influences.

2.2.1.2 Contingency Theory on Coordination: Summary

The review of this literature reveals that organisation theorists have generally been pre-occupied with testing, validating and/or falsifying a ‘grand theory’ (the contingency theory). Their explanations are prescriptive and highly deterministic and based on, what Adler called (2005), ‘simplistically materialist view’, while Barley observed (1990):

Because contingency theorists postulate direct links between technology and structure, their work propagates a materialistic ontology. Acts, interpretations, and intentions of those who design, purchase, or use technologies play little role in either theory or analysis. Contingency theory, therefore, tends to ignore (if not actually dismiss) human action as potential cause for observed relations. (p.62)

³ Nancy Staudenmayer passed away in 2000 after having created work of highly intellectual value. We are indebted to her for studying interdependence in such a systematic fashion.

The limitations of this 'materialistic ontology' and of reliance on a 'grand theory' were repeatedly manifested in the definitions provided by scholars as well as in the way they studied and explained coordination in organisations. Thompson's typology of interdependence, for instance, had been adopted unreflectively (with a few exceptions) by most researchers for almost 30 years, until Staudenmayer (1997a, b) questioned its empirical validity and proved its inadequacy. Also, 'coordination mechanisms' is another reified category, which refers to various functions such as 'supporting', 'constraining', 'facilitating', 'ordering', 'governing action', 'communication', etc. It is still not clear why those processes constitute coordination and how coordination is a distinctive process; or why coordination mechanisms relate to the volume of information, since the effects of those mechanisms on action refer to processes not necessarily related to that property of information. For example, routines are said to pre-specify tasks and sequences of tasks as well as to outline task contents (Gittell, 2002). The relationship between 'pre-specifying', 'outlining', 'regulating', 'governing' and coordination is not explained.

In summary, from a contingency theoretical perspective, coordination is fundamentally conceived as the outcome of organisational structuring, and, more specifically, of the mystified 'work' of coordination mechanisms, which, with the necessary capacity, address various interdependencies. Some of the most important extensions of the theory refer to:

- the notion of 'relational coordination', i.e. the impact of group relationships on coordination;
- the influence of time, i.e. that different coordination needs emerge at different project phases;
- the importance of understanding the dimensions of information, e.g. format and kind, and the micro-processes of information exchange;
- the polymorphic nature of interdependence and its dynamic potential involvement in coordination processes.

Unfortunately, most of these extensions aimed to clarify the conditions for designing better 'coordination systems' (to use March and Simon's term, 1958), rather than understanding how coordination actually works in practice. They failed to articulate whether coordination is and what makes it a distinctive organisational process. If anything else, these studies, have explicated that coordination cannot be known adequately from the contours of an outdated 'grand theory'.

2.2.1.3. 'Coordination Theory'

'Coordination theory', an organisation design theory is the product of a sub-stream of contingency-theory-inspired research. 'Coordination theory' has been developed since 1990's by the MIT centre for coordination science (<http://ccs.mit.edu>). The origins of the theory can be traced back to the work of Thomas Malone. In a series of papers, Malone and Malone and others (Malone, 1987; Malone et al, 1987; Malone & Crowston, 1994; Malone et al, 2003) examined the economic (Williamson, 1975) and organisational design characteristics of various structures, which were labelled 'coordination structures'.

We define a *coordination structure* as a pattern of *decision-making and communication* among a set of *actors* who perform *tasks* in order to achieve *goals*. For example, a coordination structure used by an automobile manufacturing company might be thought of as having a set of goals (e.g. producing several different lines of automobiles) and a set of actors, or "processors", (people and machines) to perform the tasks (e.g., engineering, manufacturing, and sales) necessary for achieving those goals. (Malone, 1987, p. 1319, emphasis and parentheses original)

In contrast to previous organisation design perspectives, developing 'coordination theory' was an attempt to conceptualise how coordination mechanisms work. Viewing organisations as information processing units, Malone (1987) explored four basic 'coordination structures': 'product hierarchies', 'functional hierarchies', 'centralised markets' and 'decentralised markets'. With the aid of modelling and assuming that the four structures exhibit differential production, coordination and vulnerability costs, Malone (1987) argued that organisations can choose among the most optimal coordination structure after assessing and representing trade-offs among those costs. Coordination costs are "proportional to the number of connections between agents and the number of messages necessary to assign tasks" (Malone, 1987, p. 1324). For instance, while 'product hierarchy' exhibits high production and vulnerability costs, it appears to have low

coordination costs; on the other hand, 'decentralised markets' appear to have low production and vulnerability costs and high coordination costs. There is a fundamental trade-off between how to produce, how to coordinate, and how much flexible to be.

Malone's approach to conceptualising and modelling coordination has been the basis of 'coordination theory'. One of the foundations of the theory is an implicit analogy that, 'organisations process information like computers do' (Malone, 1987). From this perspective, coordination is conceived as a constituent part of the overall information-processing task of organisations. Being more attentive to the actual micro-activities involved in the execution of such a task, proponents of 'coordination theory' focused on the number of (informational) connections between actors and on the transmission of a number of messages between them in order to perform tasks and achieve goals. Strikingly, a view on 'what coordination is' is already imposed, i.e. that coordination is an information exchange process, while such a view is not justified.

Furthermore, Crowston (1991, 1994, 1997) built upon the work of his PhD supervisor, Malone, and attempted to create a 'coordination cookbook', i.e. 'recipes' for designing the coordination of an organisational process. He examined empirically a 'routine' organisational process, the 'engineering change process', in three different contexts, and found out that the same general process was managed differently in those contexts. His interpretation was that the engineering change process is basically very similar across contexts, since the process has similar dependencies. That is, there are connections between the activities affecting coordination process, and if such connections are explored, represented and characterised concretely, a lot more can be gleaned about how to design coordination better.

Crowston's main contribution was to create a 'taxonomy of dependencies' at the level of activities, rather than at the level of interdepartmental workflow

proposed by previous organisation researchers (Malone et al, 2003). On the basis of that taxonomy, organisation designers may be in a better position to suggest 'better' coordination systems, which, according to Crowston (1994), could be more usefully thought of as constructed responses to the problems caused by dependencies. The articulation of a 'coordination theory' (Malone & Crowston, 1994) was thus made on the grounds that dependencies between activities can be loosened or strengthened and generally managed with many alternative coordination mechanisms. Effectively, a new definition of coordination was articulated: coordination is about "managing dependencies between activities (Malone & Crowston 1994, p. 90)", which can be facilitated by alternative methods.

The proponents of 'coordination theory' also suggested that the representation of organisational processes could be formalised and facilitated by a universal modelling methodology. They introduced, without justifying, however, their theoretical rationale or the validity of their underpinning philosophy, four distinct 'objective' concepts: goals, activities, actors, and resources. For also unknown reasons, Crowston later (1994, 1997) grouped 'goals' and 'activities' into one category, which he called 'tasks', and 'actors' and 'resources' into another category, which he called 'resources' (Crowston, 1994). He also argued that one could study relationships/dependencies between: task - task, resource - resource, task - resource. Inspired by artificial intelligence research, he developed a 'model of action' (his unit of analysis) to empirically examine the last relationship, i.e. task-resource. The following figure (No.3) illustrates this model.

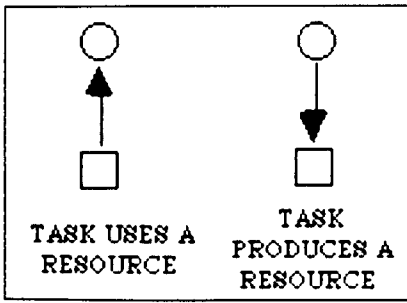


Figure 3. Crowston's 'model of action' (1994)

The identification of existing dependencies and coordination mechanisms can be achieved by either documenting apparent coordination activities or by looking for all activities involved in the process and then determining coordination activities (Crowston, 1997). Figure 2 shows the universally possible relationships - dependencies. Any analysis of an organisational process, the argument goes, can be based on those formal scenarios. For instance, two tasks may require the use of the same resource, or the resource produced by one task may be used as a resource by another task, etc.

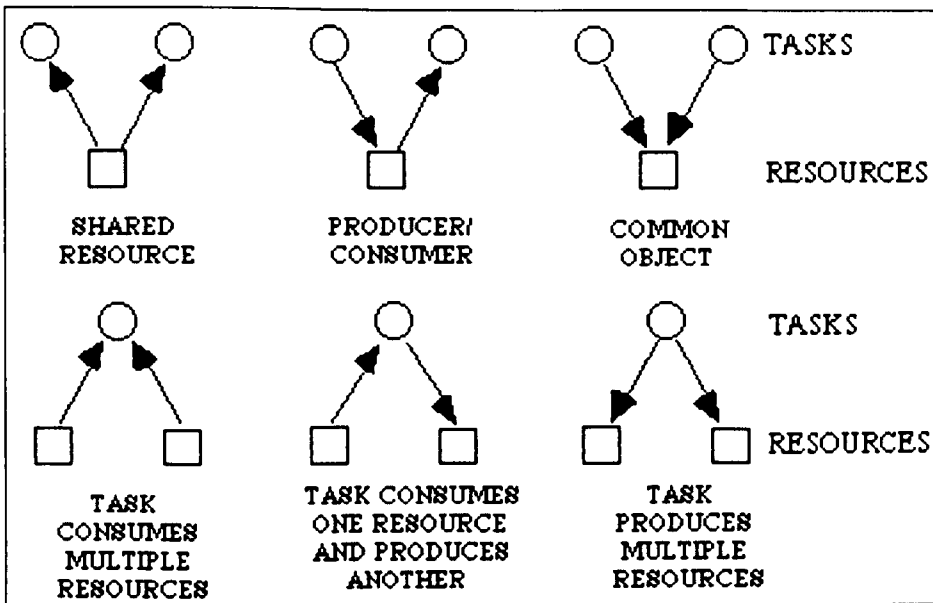


Figure 4. Crowston's taxonomy of dependencies (1994)

An interesting example of how coordination theory might be used in practice, was given by Hayashi & Herman (2002). They wished to explore

process alternatives for 'product design'. From a coordination theory perspective, the process of product design can be represented (using Crowston's universal 'model of action') in order to delineate coordination process constraints and opportunities. They argued that the representation of dependencies inherent in the product design process would create possibilities for assessing alternative organisational forms and strategies for how to organise it better and align it with other downstream processes. For example, the 'product design process' for differentiated products, i.e. products with many possible desired final forms (e.g. car models which may be of different colour, 'extras', etc.), can be represented as consisting of two distinct tasks of (1) 'designing an interim resource' and (2) 'differentiating the interim resource'. Also, the second task could be specialised as (2a) 'adding differentiating elements to the interim resource', (2b) 'removing differentiating elements from the interim resource', or (2c) 'sorting the interim resource'. Those three alternatives, which could be identified in a formal way by using 'coordination theory', articulate important implications for how the product design and production process will be organised. In essence, the coordination between the product design process and the production process could be reconsidered by identifying the task-resource dependencies across the activities involved. The following figure illustrates the reconsideration process and the various possible options.

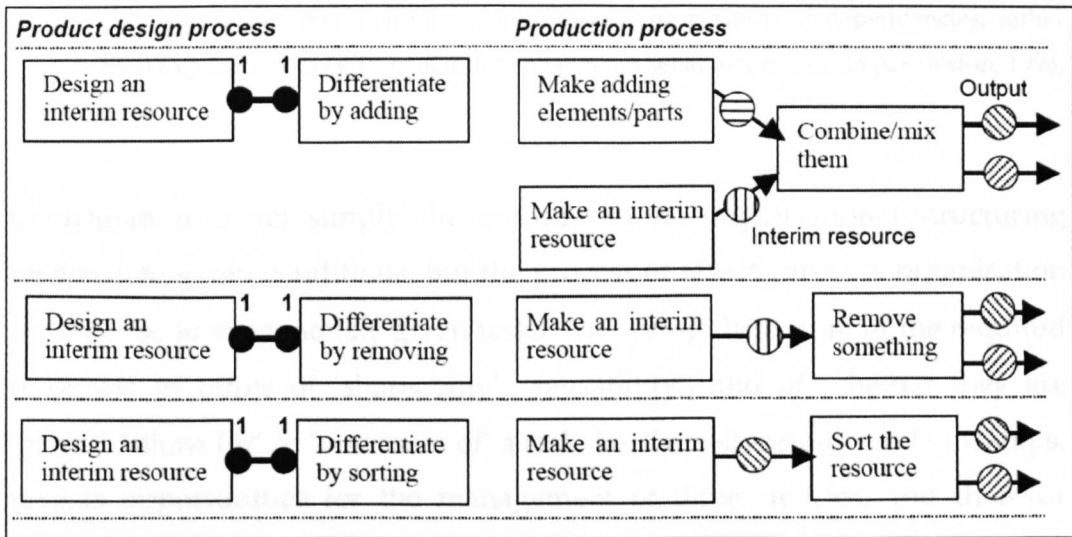


Figure 5. Source: Hayashi & Herman (© 2002)

On deeper examination, Staudenmayer (1997b) argued that ‘coordination theory’ (Malone & Crowston, 1994; Crowston, 1997) assumes specific (different from other contingency theories) relationships between technology and dependence and thus coordination, i.e.

Task/environment uncertainty → flow and control of resources → interdependence
 [→ indicates direction of causality]

The underlying premise is that there are given technological and task conditions, which, nevertheless, afford opportunities for changing the organisation of the flow and control of resources needed to carry out the tasks. It is the movement of resources across tasks that creates dependencies, and not the technology or task environment per se. Crowston (1994) rejected that (inter)dependence simply exists and argued that coordination theory comes to fill the gap in knowledge in that:

A finding to its proponents, ‘coordination theory’ constitutes an important contribution to the study and analysis of organisational process redesign,

... past research has focused more on describing patterns of dependencies, rather than explicating the effects of a dependency on what actors can do (Crowston, 1994, p. 4).

Coordination is not simply the outcome of an organisational structuring response to given conditions, but the process of structuring the organisation in response to exogenously given tasks. Analysing the nature of the required resources in terms of 'shareability', 'reusability', and of whether they are 'preconditions for' or 'outcomes of' a task, i.e. the task-resource relationships, reveals opportunities for the management of dependencies, and thus for coordinating activities. Such opportunities have been exploited for purposes of software development; the most known initiative is the creation of the so-called 'Process Handbook' (Malone et al, 1999; Malone et al, 2003; <http://ccs.mit.edu/ph/>).

However, a foundational problematic assumption of 'coordination theory' is that there are very predictable and observable task requirements, which can be represented as dyads of tasks and resources, i.e. a task uses resources, and a task produces resources. The theory can only account for the relationships between two tasks of standardised organisational processes, where people know exactly what to do (task requirements), how to do it (resources and activities), and what exactly they need to achieve (goals). Coordination theory cannot account for coordination activities between three or more tasks. In fact, for Crowston (1994), tasks are different from activities, such as 'software requirements analysis', which, he admitted could not be fitted into the category of 'task'. Essentially, 'coordination theory' does not take into consideration that coordination may be needed in non-routine organisational settings!

2.2.1.4 'Coordination Theory': Summary

According to its proponents, 'coordination theory' constitutes an important contribution to the study and analysis of organisational process redesign,

rather than of coordination. A focus on the micro level of task organisation has probably been a positive development in investigating the basics of coordination. Yet, imposing a specific information-processing 'model of action' (inspired by artificial intelligence research) for exploring how coordination could be improved has offered very little opportunities for understanding how it is actually accomplished. Coordination is pre-eminently viewed as a process of information exchange, or more accurately, resource exchange on the basis of given technological and task requirements. The way those requirements actually affect task content is an 'independent variable'. That is, organisational actors have to cope with those very predictable requirements. In short, the creation of a formal model of coordinative action has not contributed to an enhanced understanding of the actual constituents of that action in organisations.

In addition, the model of 'activities', 'resources', 'actors', and 'goals' not only is very difficult to be used to study 'non-routine' activities. More than that, the hypothesis that routine activities are standardised patterns of actions, which are invariant to any significant endogenous transformation, also cannot hold, since there has been a lot of evidence to the contrary (Feldman, 2000, 2004). Repeated patterns of activities are actually characterised by internal dynamics (e.g. actors improvise incremental modifications to the performance of their tasks over time), which cannot be incorporated in 'coordination theory's' model of action. Finally, there have been no empirical studies to investigate and validate the effectiveness of redesigning organisational processes from a 'coordination theory' perspective; only the potential of such an approach has been articulated (Crowston, 1997).

2.2.1.4 *Coordination from an 'Organisation Design' Perspective: Summary*

Contingency theory and 'coordination theory' constitute two interrelated perspectives on the study of coordination. Their main aim is to draw implications useful for designers of organisations. In pursuit of their objectives, organisational scholars have generally modified insignificantly and extended only incrementally their original conceptions of 'what coordination is' (e.g. Thompson's (1967) and Malone's (1987). Any developments essentially illustrated more succinctly the limitations of their approach. For instance, the modification of the unit of analysis from ongoing to project-based interdepartmental interaction over time by Adler (1995) showed that many different kinds of coordination mechanisms may be used, which can no longer be conceived in terms of the Thompsonian constructs of 'plans', 'sequences', and 'mutual adjustments'. Or Staudenmayer's (1997a) shift of focus on identifying the patterns and sources of interdependence explicated the need to study the behavioural dimensions of interdependence and their impact on coordination over time. In short, from an 'organisation design' perspective the distinctive meaning of coordination is reified, while other research traditions tend to be ignored.

An unfortunate outcome has been that scholars with a peripheral interest in the theme of coordination (see Gerwin, 2004, Kretschmer & Puranam, 2008; Kotlarsky et al 2008) have also inherited the limitations of an 'organisation design' perspective, since the later has generally been conceived as the dominant research tradition studying coordination. A summary of the key characteristics identified in the aforementioned discussion is illustrated in the following table.

Table 3. Summary of 'Organisation Design' Perspective

<i>Key assumptions</i>	Given impact of technology and task environment on organisational structure, simplistic materialism, predictability of task requirements
<i>Conceptions of coordination</i>	Outcome of 'coordination mechanisms', caused by interdependence, information exchange process, communication across people, interactivity between group members, 'management of dependencies'
<i>Conditions/factors affecting coordination</i>	Exogenous interdependence, 'bandwidth' of coordination structures, flow of resources, fixedness/routine task requirements, project phase, type of information
<i>Unit of analysis</i>	Interdepartmental interface, project tasks, task-resource relationship, group interactions, information exchange activities
<i>Research Approach</i>	Representationalism of organisational processes, emphasis on structure over activity, focus on design implications, 'betterness' of the system
<i>Main limitations</i>	Coordination is not a process, but an outcome, indistinguishability between coordination and other processes, e.g. communication and interaction, naïve materialism, unreflective reliance on Thompsonian constructs (e.g. interdependence), inattention to human entanglement in coordination

2.2.2 Coordination from an 'Organisational Economics' Perspective

An economist thinks of the economic system as being *co-ordinated* by the price mechanism... Outside the firm, price movements direct production, which is *co-ordinated* through a series of exchange transactions on the market. Within a firm, these market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the *entrepreneur-co-ordinator*, who directs production. It is clear that these are alternative methods of *co-ordinating* production. Yet, having regard to the fact that if production is regulated by price movements, production could be carried on without any organisation at all, well might we ask, why is there any organisation? (Coase, 1937, p. 387-388, emphasis added)

Answering the latter question has been one of the principal tasks of those identifying themselves with the field of organisational economics. 'What makes firms or markets superior systems of coordinating production' and 'under which conditions' are key lines of enquiry. Generally, the research focus has been on the economic variables and governance characteristics that may affect the choice of 'firms' over 'markets' and, particularly, the transaction costs (Williamson, 1975; Kogut & Zander, 1992, 1996). For instance, researchers have examined the notion of the 'boundaries of the firm', i.e. the factors and conditions that influence a firm's position and its boundaries in a production value chain and its interfaces with other suppliers (Brusoni et al, 2001; Jacobides & Billinger, 2006); e.g. how firms become more or less vertically integrated and whether, how, and why the co-ordination of the totality of production activities occurs to a greater or lesser extent 'in-house' (Jacobides, 2005; Jacobides & Winter, 2005; Cacciatori & Jacobides, 2005). In one way or another, the above research topics rely heavily on the idea of coordination.

Broadly speaking, the students of organisational economics and of organisation design share a common mission to develop a "theory of effective organisations" (Grandori, 1997). Their main differences in

connection to the study of coordination mainly relate to the focus and level of analysis; organisational design mainly on firms' organisational structure; organisational economics on industry, inter-firm relationships and governance structures. Instead of focusing on the coordination costs of various 'coordination structures' at the micro level, as Adler (1995) or as Malone did (1987), organisational economists studied governance and coordination costs at a macro level, e.g. industries, joint ventures, inter- and intra-firm relationships. The two fields have nevertheless shared a pool of conceptual resources to represent coordination. For example, Grandori (1997) built upon Thompson's typology of interdependence and coordination mechanisms in order to develop her model of 'inter-firm coordination modes'. Argyres (1999) also used Galbraith's ideas of information processing to examine the impact of information technology on the coordination of aircraft development suppliers. In essence, researchers in both fields have adopted a mechanical conception of coordination as the outcome produced by some kind of 'coordination structures'.

Notwithstanding the above, the students of organisational economics have concluded some interesting additional propositions since the beginning of 1990's. More specifically, in their seminal paper, Henderson and Clark (1990) showed that coordination might be a source of innovation and of strategic repositioning. In their effort to understand the evolution of competitive dynamics in the photolithographic industry, Henderson and Clark examined the behaviour of the key players in that industry by analysing how different types of innovation emerged. Their investigation concluded a generic framework of four types of innovation (illustrated in figure 6).

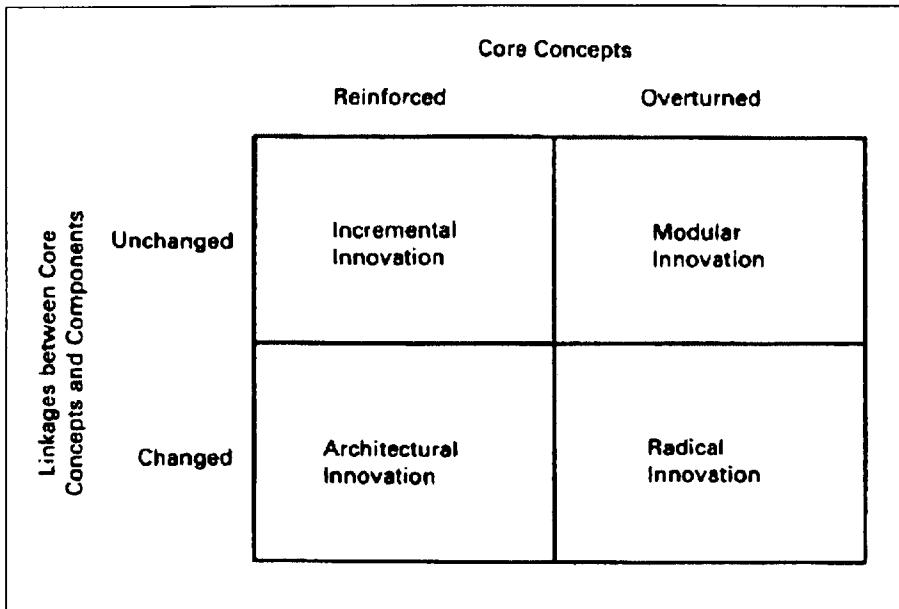


Figure 6. Henderson's & Clark's model of innovation (1990, © Cornell University)

Henderson's and Clark's analysis was based on the premise that,

Successful product development requires two types of knowledge. First, it requires *component knowledge*, or knowledge about each of the core design concepts and the way in which they are implemented in a particular component. Second, it requires *architectural knowledge* or knowledge about the ways in which the components are integrated and linked together into a coherent whole. (1990, p. 11, emphasis added)

They also argued that a firm's management processes of architectural knowledge are usually embedded in organisational routines (Nelson & Winter, 1982) and influenced by an industry's dominant design. Architectural knowledge becomes implicitly encoded in a firm's communication channels, information filters and problem solving strategies, which are gradually developed and constitute knowledge of coordinating specialised production activities. On the basis of that theoretical background, Henderson and Clark focused on the under-examined case of architectural innovation, i.e. innovation that stems not from an advancement of knowledge in any of the technological components of the physical product, but from a reconfiguration of how those components are integrated.

Established firms in the photolithographic industry seemed to have failed to appreciate and engage in architectural innovation, because they failed to renew their 'hard-won' architectural knowledge of how to coordinate reconfigured linkages between existing components; an approach that led to the weakening of their competitive positioning.

The implications from this line of reasoning are that 'architectural knowledge' may be the foundation of coordination and be related to a firm's production outcome, i.e. a physical product. It facilitates processes that aim to integrate the different physical components of a production artefact. From this perspective, the way firms coordinate depends (a) on the 'architecture' of a product, i.e. on how the physical product is divided into different elements and on the interfaces and linkages among those elements, as well as (b) on firms' approach to taking hold of that architecture through their organisational structures, processes and routines. This is a departure from the contingency theoretical conception of coordination (as the outcome of coordination mechanisms), since coordination requires knowledge and refers to the product. From Henderson's and Clark's (1990) perspective, coordination as architectural knowledge has a much more specific goal (integration of physical components) than the 'overarching organisational goal' assumed by contingency theorists (Thompson, 1967; Van de Ven et al, 1976; Tushman & Nadler, 1978).

Such an alternative framing has also been explored by Brusoni et al (2001), who built upon Henderson's and Clark's (1990) framework in their investigation of the aircraft engine control systems industry. They attempted to examine the role of architectural knowledge in inter-firm configurations required for the production of these systems. In particular, Brusoni et al (2001) investigated in that industry the linkages and the relationships between specialised firms as well as firms' capabilities to manage those linkages. Using patent, databases and interviews in order to understand whether and how inter-organisational structures and reconfigurations

occurred over time, they concluded that firms patented technologies (held knowledge) which are useful not for production, but for coordination. Coordination, from that perspective is viewed as the process that supports the integration of a product's components.

The implications are that firms may invest in developing and applying architectural as well as component knowledge and determine their boundaries on the basis of an assessment of coordination opportunities. For instance, Brusoni et al (2001) showed that some firms in the aircraft engine control systems industry transformed into systems integrators, i.e. organisations, which outsourced the manufacturing of product components, yet they controlled the design and all the activities for 'bringing all the pieces together'. In essence, the division of knowledge ('what firms know') is different from the division of labour ('what firms make') and their relationship is mediated by architectural knowledge, i.e. knowledge of coordination.

In addition, Brusoni et al (2001) attempted to specify the drivers which underpin the creation of architectural knowledge and which influence a firm's decision to be more or less vertically integrated and/or act as a system integrator. They argued that the degree of predictability of the interdependencies among different product components, i.e. how well understood their interfaces and linkages are, and the rate of change of component knowledge create constraints and opportunities for determining firms' boundaries. For example, if component interdependencies are not well understood, then the conditions would be more favourable for firms to become more vertically integrated in order to coordinate or, generally, control the component integration process and focus on developing architectural knowledge. On the other hand, if new knowledge for a particular product component is created faster than other component knowledge, this may necessitate renewal of architectural knowledge and of firm boundaries. The following quadrangle illustrates four basic scenarios.

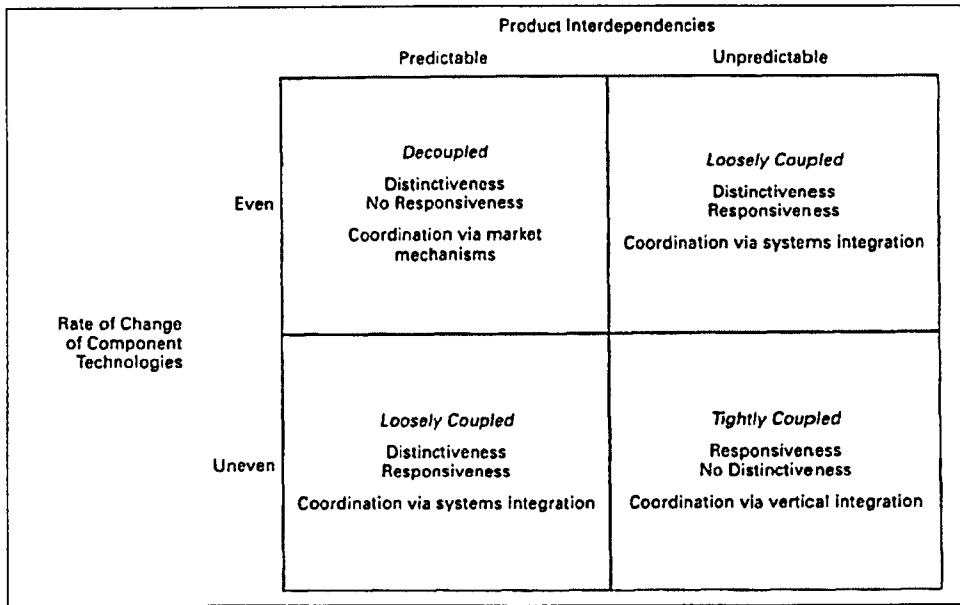


Figure 7. Coordination model by Brusoni et al (2001, © Cornell University)

Brusoni et al (2001) used the terms 'distinctiveness' and 'responsiveness' (Orton and Weick, 1990), to further argue that each sub-quadrangle of the above figure essentially represents a different scenario of possible inter- and intra-organisational differentiation and integration (Lawrence & Lorsch, 1967). In other words, they attempted to show that strategising via coordination, i.e. architectural knowledge, has organisational structural implications. This argument was elaborated by Brusoni and Prencipe (2001) and Prencipe (2005), who showed that product architecture does not necessarily 'mirror' organisational architecture. Especially in the case of 'modular product architecture', i.e. architecture of standardised linkages and interfaces between product components, they showed that organisational modularity, i.e. the divisionalisation of work in well-demarcated units corresponding to product modules, can not be considered a natural outcome (Eppinger & Sosa, 2004). In short, what matters is what kind of and where architectural knowledge of coordination is required and lies, respectively.

In a more recent paper, Brusoni and Prencipe (2006) showed that Pirelli, a tire manufacturing company, developed a non-modular and integrated

organisational design in the face of increasing product modularisation. They argued that organisational integration, rather than modularisation of the required design activities was necessary for coordinating and managing a modular manufacturing architecture. Staudenmayer and colleagues also argued (2005) that, in industries, which are characterised by product modularity, the interdependencies between firms constantly evolve, i.e. they are not modular. The existence of product architecture, they claimed, does not ensure that firms can simply produce their 'module' which can be easily integrated with other modules into a coherent whole, i.e. a physical product. They argued that successful firms coordinate inter-firm production by managing their interdependencies, rather than by eliminating those, as theories of modularity have suggested (Sanchez & Mahoney, 1996).

Notwithstanding those very interesting insights, a lot of questions emerge as to how 'architectural knowledge' in a single firm (Henderson & Clark, 1990) differs from 'architectural knowledge' in inter-firm networks. Brusoni et al (2001) did not explain whether there are qualitative differences. Also, they failed to clarify whether they conceived coordination as embedded in organisational routines, communication process, etc. as Henderson and Clark did (1990). It is not clear whether patents, for example, are the only form of architectural knowledge they referred to (Brusoni et al, 2001). More importantly, in all the aforementioned studies, knowledge of coordination or how it is actually accomplished in practice is not explored, while conceptions of what coordination is are not clarified.

In addition to the above studies, the idea of architectural knowledge has also been examined (using alternative phraseology) by the proponents of a knowledge-based view of the firm (Kogut & Zander, 1992, 1996; Grant, 1996a, 1996b). For instance, Kogut and Zander (1992) argued that a firm's 'combinative capabilities', i.e. capabilities about how specialised expertise is coordinated for production purposes, cannot be easily imitated because they entail both explicit and tacit knowledge. The development of this key

knowledge is based on foundational 'organising principles'. Kogut and Zander further argued (1996) that,

A firm is distinct from a market because coordination, communication and learning are situated not only physically in locality, but also mentally in an identity. (p. 502)

From their view, coordination is dependent on 'social and tacit knowledge', which is anchored on a firm's identity. Also, coordination is about conventions and convergent expectations and the acceptance of certain rules, which 'organise' somehow multiple actors. The role of identity in supporting coordination lies exactly in the 'encoding' of organising principles in the social knowledge, which is collectively and tacitly owned by actors sharing the same 'firm identity'. Despite the positive development of a focus on the social dimensions of knowledge, the abstractness of those arguments offers very little opportunity to tease apart the principal elements of a notion of coordination. For instance, the interesting proposition that 'conventions and convergent expectations' are important for coordination fails to specify how conventions and rules constitute coordination and under which circumstances.

Grant also underscored the importance of 'combinative capabilities' for a knowledge-based theory of the firm (1996a, b). He argued that firms exist because they create conditions for 'knowledge integration', which primarily entail the coordination of efforts of different experts. For Grant (1996b), knowledge integration is neither about cooperation nor about the transfer of knowledge. Rather, it is a 'mode of suitable interaction' among experts, and 'a logic', different from the logic of markets, to govern and manage economic activities. Unfortunately, those arguments offer little help to the students of organisations, who wish to know in what sense coordination is a distinctive process and appreciate why the expression 'mode of interaction' is more suitable to encapsulate coordination processes. This may be due to the fact that, Grant (1996b) attempted to unpack the concept of knowledge

integration by unfruitfully reproducing (without justifying the use of) Thompson's ideas about interdependence and coordination mechanisms. His main point was that a 'suitable mode of interaction' requires the creation of 'common knowledge' (similar to Nonaka's and Takeuchi's [1995] concept of 'redundant information'), such as common language, and procedures, shared specialised knowledge, and shared cognitive schemata; an addition, which, contrary to his initial claims and intentions, essentially does not differentiate between knowledge integration and knowledge transfer (Carlile, 2004). In essence, proponents of a 'knowledge-based' view of the firm have not explained the distinctiveness of coordination as an organisational phenomenon.

2.2.2.1 Coordination from an 'Organisational Economics' Perspective:

Summary

The review of the above literature reveals that scholars adopting an organisational economics perspective conceive coordination differently from contingencies theorists; yet, their conceptions do not necessarily evoke a better-understood phenomenon. On the one hand, they have made some interesting propositions, e.g. framing coordination in teleological terms - in terms of serving production purposes and supporting the integration of different components of a final product. At the core of this conceptualisation of coordination lies the notion of knowledge, and particularly of 'architectural knowledge', which is inherently related to, yet not determined by product architecture.

On the other hand, there is considerable confusion over those terms. For instance, for Brusoni et al (2001) coordination knowledge is an objective 'body of knowledge'; for Henderson and Clark (1990), it is embedded in organisational routines and 'information filters, communication channels and problem solving strategies'; for Kogut and Zander (1996), it is

'convergent expectations' and rules tacitly held by members of the firm; for Grant (1996b) it is a 'suitable mode of interaction' between experts. It is impossible to delineate consistent or complementary conceptions of 'what coordination is' and 'how it is accomplished'.

Furthermore, overemphasis on macro-conditions, e.g. industries, inter-firm governance, industry product architecture etc., has deprived organisational economists of studying the micro-foundations of coordination activity. In fact, one observes a counterproductive tendency to borrow constructs developed by early contingency theorists, or to explain the micro-process of coordination with conceptual tools of organisation design theories; for instance, coordination is viewed as a communication process facilitating a 'suitable mode of interaction' (Grant, 1996b) or as an information processing activity (Henderson & Clark, 1990; Grandori, 1997). Also, the arguments made by some scholars are oftentimes too abstract, and thus undermine the distinctiveness of the terms they use, e.g. 'convergent expectations', 'interdependence', 'organising principles', etc. In short, this field has developed inadequate understanding of coordination as an organisational phenomenon.

A summary of the key characteristics identified in the aforementioned discussion is illustrated in the following table.

Table 4. Summary of 'Organisational economics' Perspective

<i>Key assumptions</i>	Transaction cost economics impact on organisational boundaries, simplistic materialism, external economic conditions impact on firm organisation, substitutionability between firms and markets,
<i>Conceptions of coordination</i>	Knowledge of integrating product components, mode of interaction, communication process, convergent expectations, underlying firm boundaries etc.
<i>Conditions/factors affecting coordination</i>	Interdependence between product components, product architecture, task environment, inherent transaction costs, division of knowledge, division of labour, component knowledge
<i>Unit of analysis</i>	Industry, value chain structure, governance mechanisms, firms, networks of firms
<i>Research Approach</i>	Modelling industry economic conditions, studying utilisation of knowledge as asset, strategy implications
<i>Main limitations</i>	Indistinguishability between coordination and other processes, e.g. communication and interaction, naïve structuralism, conceptual confusion, e.g. architectural knowledge, abstractness, reliance on contingency theory models, inattention to human entanglement in coordination

2.2.3. Coordination from a 'Group as Distributed Knowledge System' Perspective

The idea that, organisations create knowledge of 'how to coordinate' has also been examined from a perspective of 'groups as distributed knowledge systems'. Studies drawing on such a perspective conceive coordination phenomena as occurring in groups and emerging from distributed activities enacted by actors occupying distinct positions in a group. I will discuss two main theories in that stream: 'collective mind' and 'transactive memory'.

'Collective Mind'

One of the most important theoretical advancements in this field has been made by Weick and Roberts, who, in their seminal paper (1993), developed the concept of 'collective mind'. They were primarily interested in framing conceptually how complex and highly interrelated tasks may get accomplished; and, thus, get coordinated. In the context of high-reliability organisations, such as flight-deck operations on aircraft carriers, Weick and Roberts argued that concerted actions emerge due to the enactment of more fully developed aggregate mental processes. They articulated and proposed (1993) the metaphor of 'collective mind' to explain how actors, who hold related information for the performance of an entire system in disparate locations, manage to coordinate their actions heedfully in the absence of a global plan or central coordinative system (as March and Simon suggested in 1958). Their explanation lied on the premise that collective mind is possible due to some foundational conditions: redundancy of representation (overlapping task knowledge), cognitive interdependence (i.e. know-how) and emergence of a global structure of a system from local interactions of group members (Hutchins, 1990). The 'collective mind', which affords and constitutes the interrelating of actions, is not a purely cognitive phenomenon taking place 'in the head' or 'in many heads'. Rather, it is a collective

disposition to heed, to mind, and to care; it is the manner and style of distributed and simultaneously collective acting (Weick & Roberts, 1993).

Individuals, occupying discrete positions in group – system,

... construct their actions (contribute) while envisaging a social system of joint actions (represent) and interrelate that constructed action with the system that is envisaged (subordinate). (Weick & Roberts, 1993, p. 363)

The result of this process is a situation of ‘interrelations among activities’. In essence, knowledge to coordinate is an emergent phenomenon, a collective mind, which is constituted and manifested through the aforementioned process. Such knowledge is neither an object to be stored and transferred easily, nor an outcome produced mechanically through the design of suitable modes of interaction or structures. Collective mind is not the sum of group members’ cognitive capabilities and cannot be understood in its entirety by each individual member. It has a ‘trans-individual’ quality; “portions of it are known to all, but all of it is known to none” (Weick & Roberts, 1993, p.252). In Asch’s words (cited in *ibid*):

Such a system does not reside in the individuals taken separately, though each individual contributes to it; nor does it reside outside of them; it is present in the interrelations between the activities of individuals. (1952, p. 252)

The collective mind emerges from the local contributions of individual actors, who, at the same time, interrelate their performances heedfully and enact an intelligent system. It is the density of the ties across activities and the manner by and through which those activities are enacted that defines the collective mind, the intelligent accomplishment of coordination. This metaphor helps explain how complex problems, which cannot be comprehended by isolated individuals (no matter how intelligent they are), can be comprehended by an intelligent social system.

Heedful interrelating of activities constructs a substrate that is more complex and, therefore, better able to comprehend complex events than is true for smart but isolated individuals. (Weick & Roberts, 1993, p. 373)

This perspective contrasts sharply with organisation design and economics as regards the conceptualisation of coordination. It rejects determinism, i.e. coordination as the outcome of 'intelligently designed' organisational structures. Coordination is to be viewed not as the product of 'coordination mechanisms', but as a social-cognitive process. Thus, great emphasis is put on the ongoing, situated, group-mediated, and performative manner by which organisational actors interrelate their activities.

In disagreement with Gittell (2000, 2001), Weick and Roberts did not conceive the 'relational component' of coordination as a state of a set of elements, e.g. shared goals, shared knowledge, and mutual respect. For them, it is not the similarity of attributes that defines the effective accomplishment of coordination, but the very manner by and through which different group members perform their individual actions and align their work processes. In their view, 'relational coordination' is not an independent variable, which can be increased and supports the interactiveness of coordination mechanisms (e.g. routines), but an ongoing process; it is about supporting interactiveness in action or interactivity. The maturity or the sharedness of group characteristics is unlikely to determine the intelligent accomplishment of a collective mind, since mature groups may envisage a joint system of actions carelessly, without heed (Weick & Roberts, 1993).

In essence, from this perspective, coordination is 'worked out' in advance, i.e. in heedful representations of individuals, who envisage a system of joint actions. It is the overlapping know-how of that system that precedes the activities and their interrelating; such overlapping being nurtured and sustained through ongoing socialisation (Weick & Roberts, 1993). The commonality of knowledge structures is necessary because the contributions of individuals must 'converge with', 'supplement', 'assist' and become

'defined in relation to' the requirements of joint action. At the same time, the existence of such connected cognitive representations is not given by some external source, but depends and lies on activity, the ongoing and enacted performances of a group of distributed individuals; without action those representations are inconsequential. There is mutual constitution between the collective mind as capacity and as a process.

The metaphor of collective mind does not come without some important limitations. Firstly, one could critique Weick's and Roberts' suggestions that,

If dispositions toward individual and collective heed were increased in most organisations in conjunction with increases in task-related interdependence and flexibility in the sequencing of tasks, then we would expect these organisations to act more like-high reliability systems (p. 376).

It appears that the notion of task interdependence is framed quantitatively (more or less). Yet, Staudenmayer (1997a) showed that the sources of interdependence(s) can be very diverse and with different dynamic impacts on task structure and accomplishment; that is, interdependence should be conceptualised in terms of (potentially complex) qualitative dimensions. Also, increasing flexibility in the sequencing of tasks is not always possible, and especially in complex product development. Think, for example, how difficult it is to increase flexibility between architectural design activities and construction process in an airport terminal construction project.

In addition, though very useful, Weick's and Roberts' theory poses constraints to its application in other settings where ongoing socialisation between group members is very unlikely. The theory of 'collective mind' presupposes well-developed aggregate (group) mental processes; an assumption, which in the case, for instance, of newly-established project teams facing novel complex problems may not apply. Although Weick and Roberts argued (1993) that it can be useful in understanding ad hoc project team processes, the examples they provided entail the implicit assumption

that an envisaged social system pre-exists; television specials, motion pictures, aircraft cockpits, jazz improvisation. Bechky showed (2006), however, that film sets, despite their temporariness and ephemerality, are actually based on a long lasting generalised system of role structures (a kind of collective mind), which enables organisational actors to organise their activities even under very new production settings. Overall, applying or drawing upon the metaphor of collective mind is quite limited, especially in contexts where well-established representations of a social system do not exist.

Another problematic assumption is that the actions of group members are driven by consensus over an overarching organisational objective. The metaphor of collective mind does not account for dissensus, conflict and compromise; coordination can collapse only if group members interrelate their activities heedlessly; they cannot disagree or be politically motivated. Furthermore, though important in understanding coordination (Adler, 1995; Staudenmayer, 1997a), temporality is not accounted for, since heedful interrelating concerns the manner, rather than the timing of coordinating.

Finally and most importantly, the theory of 'collective mind' is based on the ontological assumption that a specific social entity - the group - totalises social reality. Weick and Roberts (1993) drew extensively and almost exclusively on literature on social psychology of groups, since, for them, the group is the progenitor of social action and precedes social action. It is not clear, however, how a group relates to other social entities, e.g. societies, industries, or broader social conditions. The inherent limitation of that approach is that it fails to explain why and how groups come along (Tsoukas, 1996; Schatzki, 2005), and, more importantly, whether and in what ways the group is connected to a wider social context.

'Transactive Memory systems'

In addition to the collective mind theory, there have been a number of studies, which also adopt a view of coordination as dependent on a distributed cognitive system. Adopting a 'transactive memory system' perspective, Faraj and Sproull (2000) studied software development projects and argued that coordination in such projects involves two processes: administrative coordination (similar to what coordination theory refers to as 'managing dependencies') and expertise coordination. The first relates to routine tasks, while the second becomes necessary for complex non-routine intellectual tasks (Faraj & Sproull, 2000). Expertise coordination refers to the phenomenon that members within a team know where expertise in the group lies and thus how to access it. From this perspective, while team members' breadth and wealth of knowledge is important, it is also critical to understand how this knowledge can be valued and used. Faraj and Sproull (2000) argued that on software development projects a transactive memory system is needed to coordinate knowledge.

A transactive memory exists when people in close relationships use other people as memory storage locations. Thus, team members can rely on others to process and encode knowledge that is related to their area of expertise. By knowing the location rather than the content of what is being stored, and by relying on one another to furnish necessary detail, team members can enhance their own memory stores and reduce their cognitive load. (Faraj & Sproull, 2000, p. 1556)

A transactive memory system in a group facilitates coordination because dispersed knowledge within a team can be effectively accessed and linked, since everyone knows 'who knows what'. The team tasks get done and coordinated due to the existence of this common knowledge (Crampton, 2001). In other words, shared cognitive representations not only facilitate the interaction among group members, but also support the organisation of distributed activities. A similar model is proposed by Rico et al (2008), who

argued that within a group 'implicit coordination' takes place on the foundations of a shared 'team situation model'; that is,

the mental representation associated with a dynamic understanding of the current situation (i.e. environment, task, team) that is developed by team members moment by moment. (p. 167)

Both studies, however, described representations in terms of possession, rather than enactment - a key difference with the metaphor of collective mind (Rico et al, 2008). According to their assumptions, the necessary condition for 'expertise' or 'implicit coordination' is states of shared knowledge of other people's location or mental models and not the manner in which coordination unfolds. The specific processes by which a transactive memory system or a team situation model may support coordination are not accounted for. The idea of 'collective mind' may thus be considered more advanced and conceptually coherent, since it manages to relate cognition to action and does not treat the two independently of each other (as some applications of the metaphor inaccurately suggested - e.g. Crowston & Kammerer, 1998).

In a more recent study, Faraj and Xiao (2006) attempted to address that limitation by conducting a longitudinal field study at a trauma centre and by adopting a so-called 'practice lens'. They argued that, expertise coordination (Faraj & Sproull, 2000) also happens when the trauma centre team relies on protocols, reconfigures flexibly its composition, and shares information informally. On the contrary, in the face of unexpected events, e.g. a patient's recovery state deteriorates significantly, the team members engage in 'dialogic' coordination. That is, people from different specialties, e.g. anaesthesiologists, nurses, technicians, surgeons and others, interact in non-routine, spontaneous and unprecedented ways in order to jointly resolve the unforeseen negative consequences of often incomprehensible events (Faraj & Xiao, 2006). When enacting 'dialogic' coordination, the team members do not always agree on what needs to be done. Conflict is frequent; ongoing

interactions may be contentious when things don't work out 'as planned'; and, protocols may also be discarded. At other times, joint sense making may be needed as well as crossing task boundaries between the various disciplines. Faraj and Xiao (2006) thus showed that within groups, where ongoing socialisation takes place, dissonance may also emerge and may not relate to heedlessness (Weick & Roberts, 1993).

Although Faraj and Xiao (2006) attempted to disembark from a positivistic 'transactive memory system' approach and focus on how such system may be enacted in practice, they failed to distinguish adequately between the two kinds of coordination processes, i.e. expertise and dialogic. To argue that those processes differ on the basis of the 'expectedness' of the circumstances offers little help in understanding the (potentially different) foundations that make such processes distinctive. For instance, if processes of relying on and breaking the protocol indeed constitute coordination, what underpins their enactment? Is it the enactment of an aggregate mental process, e.g. transactive memory system or collective mind? Do phenomena of distributed cognition take place at all? If so, how do actors modify or even abandon their representations of an envisaged system of joint action (Weick & Roberts, 1993) in the face of unexpected problematic events? To argue that coordination unfolds differentially due to the "logic of the situation" (Faraj and Xiao, 2006), is inadequate to advance understanding of coordination.

2.2.3.1 Coordination from a 'Group as Distributed Knowledge System'

Perspective: Summary

In contrast to organisation design and economics, a distributed cognition lens emphasises the role of human agents as members of established groups, with well-defined tasks in coordinating. This lens emphasises that the distributed efforts of team members are synthesised, not through plans, sequences and other formal-structural coordination strategies, but by

drawing upon shared mental representations of 'who knows what', and of 'when and how one does his/her task'. Coordination is a distributed cognitive process, rather than a design-driven accomplishment. It requires the existence of shared knowledge structures among group members, which enable the coordination of their activities. Weick's and Robert's metaphor of collective mind also accounts for the interaction between cognitive conditions and the manner by and through which human agents construct their actions in practice, highlighting the mutual constitution between group cognition and practice. For them, the 'coordination system' is not centrally controlled (March & Simon, 1958) by inherently distributed and emerges from the enacted connections among individuals.

On the other hand, the review of the aforementioned studies revealed that their theory of knowledge of coordination is inadequate, insofar as certain problematic preconditions are hypothesised. As Majchrzak et al (2007) observed, some of those are: the existence of shared goals, a clear reward structure, known group membership, expertise and skills to accomplish the tasks and time to share who knows what. Group-level cognition has been a very fruitful approach to investigating how people may coordinate their knowledge and/or actions on the grounds that these people know each other for a long time, rely on each other because of their close relationships, share mental models (overlapping understanding of each others' tasks and/or knowledge), identity and perception of inter-task relationships, and they are able to observe and be attentive to each others' behaviours. As Majchrzak et al (2007) observed, when these preconditions (upon which a distributed cognition perspective lies) do not hold anymore, the applicability of such an approach becomes less useful. Although their scepticism referred to a 'non canonical' situation of group process (emergent response groups), their points are valid for any context where the assumption of the well-developed group as ultimate unit of analysis cannot hold; for instance, new product development involving differentiated departments.

In addition, a perspective of 'group as a distributed knowledge system' assumes that knowledge to coordinate emerges only from literal interactivity among individuals. That is, coordination can only occur through the actual interactions among group members. Yet, such a conception cannot account for the ways coordination may be accomplished across time and space, e.g. in a construction project or between teams, which do not interact frequently, e.g. global product development (Orlikowski, 2002). Also, it cannot explain situations where coordination breakdowns may not be attributed to heedlessness, but, for example, to inattention to product component integration challenges or other systemic integration challenges (Heath & Staudenmayer, 2000). In other words, coordination is portrayed as independent of production purposes and only as a human process.

In conclusion, all the aforementioned studies adopt a 'distributionist-cum-connectionist' image of coordination (Tsoukas, 1996). In pursuit of proving the superiority of that image, they view coordination as a seamless process of interactivity in routine operations, which take place in a 'bracketed environment', i.e. without being affected by contextual forces, and during a homogeneous project phase, e.g. of normal or unforeseen patient care trajectory (Faraj & Xiao, 2006), of expected or unexpected flight departures and arrival (Weick & Roberts, 1993). Though possibly useful in a restricted number of cases, a conception of coordination from a distributed knowledge system perspective offers little opportunity to explain coordinative activity in contexts where technology, organisational structure and product integration play an important part. In conclusion, such conception represents an isolated body of knowledge of coordination.

A summary of the key characteristics identified in the aforementioned discussion is illustrated in the following table.

Table 5. Summary of 'Group as Distributed Knowledge System' Perspective

<i>Key assumptions</i>	Distributed cognition in groups, high interactivity of group members, organisations as 'groups'/'teams', stable group roles and membership, routine organisational processes
<i>Conceptions of coordination</i>	Heedful interrelating, emerging without a 'global plan', distributed-cum-connected interactive process, 'worked out' in advance,
<i>Conditions/factors affecting coordination</i>	Existence of connected representations of the system, heedfulness, situated cognition, stability of interactivity, seamlessness of ongoing operations, group norms and relationships
<i>Unit of analysis</i>	Group processes, cognitive models, team mental models, literal interactions
<i>Research Approach</i>	Knowledge to coordinate as activity, constructionism, mind as representation and practice, superiority of distributionism-cum-connectionism
<i>Main limitations</i>	Exclusively based on a group social ontology, a-historical, a-processual, unappreciative of technological influence on coordination

2.2.4. Coordination from a 'Boundary-Crossing and Social Practices' Perspective

With a proliferation of interest in knowledge-related phenomena, e.g. organisational learning, innovation, knowledge transfer and sharing, a number of studies have explored how coordination in organisations may also be (re-)examined in relation to some new themes and concepts, such as 'communities of practice' (Lave & Wenger, 1991), 'knowledge and practice' (Gherardi, 2000; Orlikowski, 2002; Carlile, 2002; Bourdieu, 1977; Giddens, 1979), 'situated cognition' (Suchman, 1987; Lave, 1988), 'common knowledge' (Clark, 1996) as well as 'communication', 'narratives' and 'discourse' (Boland & Tekansi, 1995; Harré & Gillet, 1994). The outcome of this collective research endeavour has been the re-imagination of coordination as happening at the intersection and especially during interactions between communities of practice (Brown & Duguid, 2001) and knowledge communities (Lindkvist, 2005) or, most recognisably, in relation to 'boundaries' (Levina, 2001).

For the investigation of knowledge sharing and coordination activities in organisations, significant research effort has centred on the processes by which knowledge becomes 'sticky' or 'leaky' (Brown & Duguid, 2001; Ferdinand & Simm, 2007), i.e. moves easily or with difficulty from one 'site' to another. For most scholars, the study of knowledge sharing processes in organisations should commence from an investigation of the social and cultural distinctiveness of different organisational departments, communities and occupations taking part in a transfer process. Most studies have shown that knowledge within those groups (or communities of practice) is inherently tied to their social, cultural, discursive, and material activity contexts (Brown & Duguid, 1991; Duguid, 2005). Furthermore, some phenomena seem to be particularly salient: different 'thought worlds' (Dougherty, 1992), interpretative frameworks and discursive practices

(Boland & Tekansi, 1995), increasing complexity in moving information and knowledge across communities. For instance, Dougherty (1992) showed that people from different departments adopt a different interpretation of 'what market is'; for technical people, market is seen as what the product does; for marketing people, market is seen as what the buyer wants; while, for manufacturing people, market is seen as product performance. Communication between organisational subcultures becomes problematic, because any sort of information messages are encoded and decoded by people with different assumptions, beliefs, values and 'worldviews' (Bechky, 2003a).

In other words, knowledge cannot be shared and coordinated easily because whatever is transferred (e.g. texts, drawings, pictures, emails, etc.) means different things to actors belonging to different communities. Knowledge becomes 'sticky' if it is to flow towards an activity context, which is different from the one it was originally constructed; its 'decontextualisation' poses not only semantic, but, at times, also political challenges (Carlile, 2002; Bechky, 2003b; Levina, 2005). In short, social 'boundaries' emerge at the intersection of different communities of practice and constitute significant roadblocks to effective sharing of knowledge and coordination (Brown & Duguid, 2001).

It should be noted that the epistemological and methodological commitments of scholars who examined 'boundaries' relate primarily to various sociological and mainly phenomenological research traditions, such as ethnomethodology (Garfinkel, 1967), symbolic interactionism (Spradley, 1979), structuration theory (Giddens, 1984), practice theory (Bourdieu, 1977), actor-network-theory (Gherardi & Nicolini, 2000), and communication theory (Yates & Orlikowski, 1992). Whilst varying in the specific approach and rigour, adopting such approaches usually entails a commitment for examination of "the native's point of view" (Geertz, 2001) as well as of the cultural activity system and work practice of communities (Barley & Kunda, 2001). With the aim to establish 'grounded theories' (Glaser & Strauss, 1967),

i.e. theories that will be generated from systematic in-depth exploration of the 'lived' everyday organisational experience of boundaries and knowledge sharing episodes, most studies were carried out as part of longitudinal fieldworks, ethnographies, participant observations and interviews.

Although those developments have significantly enhanced our understanding of the processes that may be involved in knowledge sharing phenomena, I believe they have also ended up obstructing the investigation of the (if any) distinctive character of coordination in organisations by overemphasising boundary-crossing and thus ignoring other elements. It seems that the majority of the studies (inspired by the above ideas) portray coordination as the process of reconciling differences and of facilitating literal exchanges of information, meanings, and objects across organisational subcultures. Though much needed in organisation theory, those proposals have been embraced with, I think, an unreflective zeal when it comes to conceptualising 'what coordination is'. For instance, an overemphasis on boundaries have deprived most organisational researchers of actually questioning e.g. 'what if boundaries are not salient', 'whether there is anything else apart from boundaries' or 'how coordination is achieved in the absence of actual human interaction'. In order to clarify and justify my scepticism, I will present the specific arguments of some key studies and then attempt to elucidate the specific sense in which, I feel, they contribute to an intellectual 'stasis' as regards understanding of coordination.

2.2.4.1 Challenges of Sharing Knowledge Across Boundaries

One of the most influential scholars of this research theme is Paul Carlile. His ethnographic studies and theory on knowledge and boundaries (Carlile, 1997, 2002, 2004; Carlile & Reberich, 2003; Østerlund & Carlile, 2005) have been the source of inspiration for and of critique from a large number of organisation students. Primarily concerned with the prevailing and

problematic, in his view, knowledge transfer metaphor, the so-called 'conduit metaphor' (Shannon & Weaver, 1949 – see figure 8), Carlile aimed to illuminate the relationship between practice and knowledge and thus to re-examine the knowledge transfer problem.

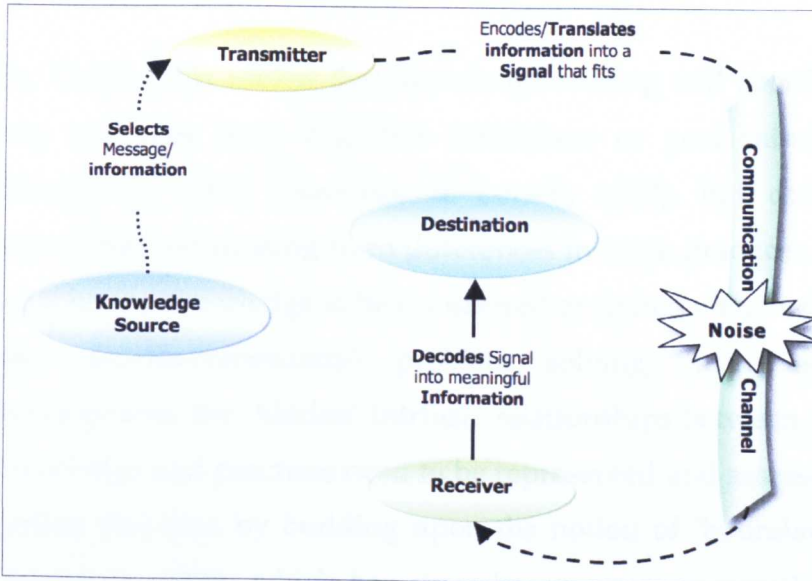


Figure 8. The Conduit Model – adapted from Shannon & Weaver (1949)

Inspired by Bourdieu's 'theory of practice' (1977), he studied the work practices of four occupational communities in a manufacturing company – sales, design engineering, manufacturing engineering, production – and showed how knowledge is structured differently within those four contexts. He argued that the material world, the objects people use and the ends they want to achieve in everyday problem solving, define the knowledge boundaries across communities. That is, knowledge is seen as a process of creating, managing and manipulating specific objects and ends, and this also implies that very different processes and objects and ends are performed and used in each community. For example, salespeople take hold of price/cost specifications, delivery dates, volume requirements, contracts, spreadsheets, databases, faxes, etc. (objects) in and through a specific manner and process in order to achieve 'the right numbers', to 'close deals', to get and keep the business (ends). Thus, knowledge is localised around specific problems,

embedded in the everyday activity cycles of problem solving, and invested in practice, i.e. has developed through investments in great effort, thinking and acting (Carlile, 1997, 2002). In essence, the different relationships between knowledge and practice that characterise different communities of practice create boundaries.

For Carlile, this means that knowledge-sharing and coordination problems may not arise from cognitive differences or goal misalignments per se (Dougherty, 1992; Lawrence & Lorsch, 1967), but due to 'knowledge boundaries' originating from differences in work practices. The implications are that, for knowledge to be transferred or shared effectively for purposes of joint (across-community) problem solving, such as new product development, the 'hidden' intrinsic relationships between different kinds of knowledge and practices need to be represented and assessed. He developed further this idea by building upon the notion of 'boundary object' (Star & Griesemer, 1989), which has since become a very popular concept within organisation and management studies (Zeiss & Groenewegen 2009). Carlile argued that, 'boundary objects' may facilitate representation, learning and transformation of knowledge at cross-functional problems solving settings (Carlile, 2002); that is, those objects enable interactions. He also argued that, different objects may have different 'capacity' to address the challenges posed by knowledge boundaries, i.e. difficulties in knowledge sharing, which may vary subject to conditions of novelty characterising cross-functional interaction (Carlile, 2004); different 'boundary objects' evoke different boundary-crossing capacities (see following figure).

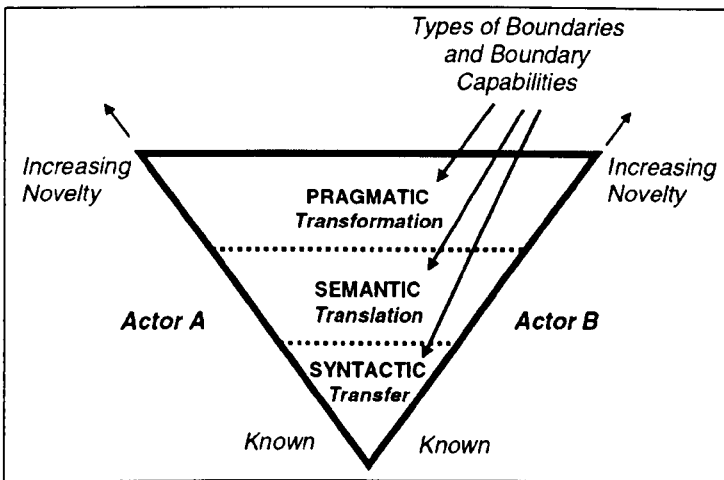


Figure 9. Carlile's (2004) framework of 'boundary-crossing' (©2004 INFORMS)

Carlile's work has enhanced our understanding of how knowledge sharing at cross-functional interactions may be accomplished with the aid of a suitable 'boundary object'. Carlile has further argued that his insights help explain coordination and knowledge integration.

A core challenge of any organisation is to create new knowledge (i.e., solutions to problems, new products, etc.) through the integration of knowledge from different sources. The study of knowledge transfer is an important area of prior research that supports this inquiry because the movement of knowledge from one location to another is central to integration activities. (Carlile & Rebentisch, 2003, p.1181)

Although knowledge transfer may indeed be very important for knowledge integration, Carlile failed to explicate how the two knowledge processes differ and/or whether framing coordination as knowledge integration is possible. My critique is that 'managing knowledge across boundaries' (Carlile, 2004) should be conceived as a distinct process and should not be conflated with coordination, for the following reasons. First of all, Carlile's theoretical framework (2002, 2004) focuses on the interactions between different communities of practice that take place at cross-functional project meetings. Secondly, it illuminates specific challenges to enable knowledge transfer when communities interact directly, i.e. face-to-face. Thirdly, 'boundary objects' are representational artefacts and their use becomes

effective if it facilitates the required learning challenge at the boundary – interaction episode. Fourthly, knowledge, especially in novel joint problem solving circumstances (cross-functional interactions), is not transferred, but transformed through the mediated use of representational and learning objects (Carlile, 1997). In short, those ideas are limited in framing the coordination problem in organisations, since they evoke an image of coordination as happening only at knowledge transfer episodes and during face-to-face interactions. Coordination as knowledge sharing (implicit in Carlile’s perspective) is a problematic metaphor, insofar as it remains agnostic to questions, such as: What if coordination and knowledge integration involve more than knowledge transfer processes? Is a focus on boundaries still legitimate? In settings of limited face-to-face interactions, does knowledge transfer require the use of learning (boundary) objects?

On a very similar line of thinking, Beth Bechky also argued that coordination should be framed in terms of the interactions among different social groups. She showed that the main three occupational communities in a semiconductor manufacturing firm – engineers, technicians and assemblers – enacted different ways of knowing in their respective work contexts (Bechky, 2003a). She articulated their differences in terms of: content of work, locus of practice (conceptual or physical), conceptualisation of the product (schematic, spatio-temporal, etc.), and language (Bechky, 2003a). Her findings indicated that the interactions between, e.g. engineers and assemblers, on the production floor of that firm, were occasionally problematic due to the differences in work practices – what Carlile called ‘knowledge boundaries’ (2002). For instance, she wrote

Engineers and assemblers did not share the same context in working with the technology, and therefore they talked about the same object in different ways. Because engineers had a more static, schematic conceptualization of the production process while assemblers understood it spatially and temporally, even in situations where they were discussing the same machine, they often did not have the perspective and context that was required to understand the others’ comments. In

decontextualisations, the machine or situation was presented in language that was assumed to be universal and unproblematic, but in fact the words were incomprehensible to those who did not share an understanding of the context of the situation. (Bechky, 2003a, p. 320)

In awkward situations such as the above, Bechky argued, a transformation of understanding was required for coordination and was oftentimes made possible through informal conversations among organisational actors and facilitated by interactions with 'boundary objects' (Star & Griesemer, 1989). She dovetailed with Carlile (2002) that knowledge may need to be transformed, rather than transferred and that artefacts may mediate such process of learning and transformation. Yet, she did not argue that objects may have a boundary capacity. Rather, the use of and interaction with objects affords actors – knowledgeable members of different occupational communities – to modify and enrich their existing understandings and relationships with the technology; on the basis of which coordination is accomplished. In this case, the transformation of knowledge is about the co-creation of common ground, i.e. "the sum of mutual or common knowledge, beliefs or suppositions" (Clark, 1996, p.93) between the actors who interact in particular situation. For Bechky, it appears that this interactional process becomes necessary due to the emergence of 'glitches' in the course of 'normal' knowledge sharing practices across boundaries. In other words, the development of new understanding becomes salient in order to resolve problems or inadequacies of existing platforms for crossing-boundaries, i.e. for coordination.

2.2.4.2 Crossing Boundaries Across Occupational Communities

Bechky also focused on routine coordination practices and argued that 'workplace artefacts' play an important role in facilitating and occasionally constraining the interactions among occupational communities (2003b). More specifically, she showed that artefacts, such as engineering drawings,

mediate social relations among communities. They do not only represent knowledge and enable joint cross-functional learning (as Carlile might argue), but also inscribe the social characteristics of boundary-crossing platforms, such as relations of jurisdiction, authority and legitimacy (2003b). On the basis of those findings, Bechky clarified her conceptions of coordination (2003c). She argued that coordination is enabled by the foundational condition of organisational accountability, which is based on the enactment of artefact-mediated practices. That is, in order to traverse occupational boundaries (according to Bechky, the essence of coordination), artefacts invoked organisational accountability, which is,

... the reciprocal recognition by organization members of appropriate work roles. Organizational accountability does not require overlapping understanding of knowledge, but instead requires shared acknowledgement that members are participating appropriately for their role in the organization. In other words, while common ground requires that participants share an understanding of the process of the work, organizational accountability requires a mutual visibility of the expected actions of others. (Bechky, 2003c, p. 12)

In the context of the semiconductor-manufacturing firm she studied, this condition facilitated the prevention of coordination problems; whereas, in the face of interactional breakdowns, i.e. coordination breakdowns, the process of creating common ground resolved the inter-occupational social order. In essence, Bechky focused on occupational boundaries and their effect on the flow of knowledge within organisations and elucidated how the (preventive and reactive) use of artefacts at the intersections of and literal interactions between different communities facilitates the creation of an 'order' and/or coordination. From this perspective, coordination is framed only in relation to those milieus, i.e. intersections and interactions.

Notwithstanding the valuable insights gained by Bechky's in-depth studies, I would like to argue that her ensuing image of coordination as knowledge sharing has important limitations. First of all, she assumed that the division

of work (in that case product development work) is stable and its effects represented in the concept of occupational boundaries. In contexts where this assumption does not hold because, e.g. the division of labour is neither fixed nor corresponds symmetrically to a well-established division of communities, a conception of coordination as occurring only at the intersections of different occupations becomes dilapidated. Secondly, such conception undermines the processual characteristics of coordination, since the (single) unit of analysis is the nature of inter-occupational interactions irrespective of when those interactions take place or why. For instance, organisational accountability is viewed as a condition for preventing coordination problems (Bechky, 2003c), which exhibit the same undifferentiated challenges over time. Yet, as Adler (1995) and Staudenmayer (1997a) attempted to show, coordination problems do change and pose different challenges to be prevented throughout product development endeavours. Thirdly, Bechky (like Carlile) acknowledged the existence of interdependence as a very significant condition for coordination, nonetheless, without examining the nature of interdependence and its relationship to preventive or reactive coordination practices; the reified consequences of interdependence, i.e. the need for interaction, simply exist regardless of their origin. It is a striking fact that Thompsonian conceptions of interdependence were still used to contradistinguish between contingency theoretical predictions and grounded theoretical images of occupational interactions:

While contingency approaches would suggest that there is one best way of coordinating in response to the environment, this study demonstrates that coordination is a set of dynamic practices that grow in relation to the conditions of production. For instance, many of the traditional approaches describe the coordination strategy of "feedback" or "mutual adjustment" which is necessary when the environment is complex and the work highly interdependent... (however,) At EquipCo (a semiconductor-manufacturing firm), mutual adjustment was used to create common ground between less interdependent groups when problems occurred on the production line. (Bechky, 2003c, p. 16)

The new finding does not refute the (flawed) Thompsonian typology of interdependence, but the causal relationship between amounts of interdependence and various coordination mechanisms. In short, Bechky's work (2003a, b, c) provides an inadequate substrate to define and frame the distinctiveness of coordination, amidst its valuable and substantial contribution to understanding knowledge sharing practices across occupational groups in organisations.

Another related and interesting article by Gherardi and Nicolini (2002) also examines cross-boundary phenomena and provides an alternative perspective on the debate of coordination as knowledge sharing in organisations. The authors studied 'a constellation of communities of practice' and proposed that the interconnected practices of such a constellation very often have dual characteristics and may be both harmonious and dissonant. That is, inter-community interactions may not always lead to a synthesis of understanding between interacting actors, an outcome which is usually connoted by terms like 'transformation of understanding', 'common ground' and 'common knowledge' (Carlile, 2002, 2004; Bechky, 2003a). For Gherardi and Nicolini (2002) those interactions may also be characterised by discontinuity and dissensus even when coordination problems are prevented. Focusing explicitly on "practices of communication among communities of practice" in the context of construction accidents and safety processes, the authors viewed cross-boundary interactions as constituting a discursive practice (Vaux, 1999).

Discursive practice is a practice in itself, which is not performed only to produce negotiation over meanings, or to convince, or to form alliances, or to coordinate, even though these outcomes may arise and be visible. Discursive practice in a constellation of interconnected practices is also a way of accommodating a plurality of discourses and legitimating their co-existence. It is a way of working knowledges together while keeping them distinct. Accordingly, we may say that a constellation of communities of practice constitutes a discursive community which makes *co-ordination* possible: competent participation in discourse in practice and on practices

both constructs the practice and shapes each of the communities involved. (Gherardi & Nicolini, 2002, p. 422, emphasis added)

The authors' conception of coordination refers to the symbolic and expressive functions of boundary spanning and communication. Drawing on interviews, which aimed to elicit the experiences of actors (conceived as members both of different communities and of their 'constellation') of construction accidents, Gherardi and Nicolini (2002) showed that the perspectives of site supervisors, engineers and contractors were more than simply exchanged and taken into account or rejected by each other. They also enacted a discursive practice in that the distinct identities of those actors were reaffirmed and re-positioned through the performance of that practice. In other words, Gherardi and Nicolini claimed (2002) that knowledge sharing and coordination across communities of practices may be better understood as occurring not across discrete groups, but within an assemblage of heterogeneous groups and through a discursive mode of co-ordering work.

The subtle, yet significant difference from previous studies (Carlile, 2002; Behcky, 2003a) is that transferring knowledge and communicating across boundaries is imagined as getting accomplished in and through the relations 'knotting' different communities; also encapsulated in the authors' conclusions that,

...understanding is less necessary to be able to talk than recognition of the discursive position and discourse legitimacy of the Other. (Gherardi & Nicolini, 2002, p. 434)

While avoiding to frame coordination in relation to literal intersections of communities of practice, Gherardi's and Nicolini's ideas do not provide clear explanations as to where those relations come from, i.e. whether and why there is a particular division of labour. Also, it appears that the authors conflate different phenomena, such as work and talk, interaction and

conversation, coordination and communication: “doing and saying were the same things”, “words were just as instrumental as drawings or any other artefact”, “the two practitioners (engineer and site foreman) were de facto setting up the site by means of words” (p.430, emphasis original). It seems that coordination is reduced to recurrent speech acts, which construct the discursive practice of a constellation of different communities. If this is indeed accepted, then there is a missing link between communication and material production of physical products or project outcomes. Similar conceptual challenges can be identified in a theoretical paper by Quinn and Dutton (2005), who also viewed coordination as the experience of conversation. They drew upon a different discourse analysis framework and argued that coordination is communication performed in and as conversations, which are experienced by organisational actors and structured within a narrative sequence. Although I do not dispute the importance of discourse and narratives in constituting organisational reality, I do believe that they cannot be viewed as the only aspects of such reality; conversation and material practice go hand in hand, and each cannot be reduced to the other (Sayer, 1992). Effectively, coordination is conflated with many other concepts.

More than that, the interesting proposition that a discursive community, i.e. the constellation, enables coordination is not well elaborated and does not distinguish among various conceptions of such a community. For instance, there is no clarification as to how the discursive community of a single group differs from the discursive community of multiple groups. It is merely stated that ‘a constellation accommodates a plurality of discourses’, an argument which does not explain why there are multiple groups involved in the first place and what consequences of that plurality a constellation addresses. To put it differently, the argument takes for granted the existence of different communities of practice and does not justify why such plurality can only be accommodated by ‘conversation’. Finally, Gherardi and Nicolini (2002) also mentioned the key influence of interdependence on the workings of a

constellation; yet, they did not clarify in what sense two or more communities are interdependent and/or what aspects of interdependence a constellation refers to, since they do not take into account of existing knowledge of coordination. In short, the refreshing image of coordination as embedded in interconnected discursive practices offers few opportunities to explore and delineate (if any) the distinctive characteristics of coordination as an organisational process.

2.2.4.3 Coordination in Post-bureaucratic Settings

In a more recent paper, Kellogg, Orlikowski and Yates (2006) put forward an argument that previous perspectives on cross-boundary coordination are anachronistic. They concurred that conceptions of coordination in bureaucratic organisations elaborated by previous studies, may not be applied to post-bureaucratic settings and that little is known about

... how knowledgeable work is coordinated across boundaries in such new organizational conditions. This is the question we explored in the study described below, which examined cross boundary coordination in an interactive marketing firm facing the issues of velocity, interdependence, disembodiment, and distributed authority characteristic of heterarchic organizations. (Kellogg et al, 2006, p. 23)

Surprisingly, although the paper articulates the development of a 'grounded theory', there is an 'eminent' focus on boundaries and on construing organisational knowledge on coordination as knowledge sharing across boundaries; an approach, which, I would argue, introduces unjustifiable bias for the development of a grounded theory. The authors thus used interchangeably the terms 'knowledge sharing' and 'cross boundary coordination' to characterise a set of (primarily communicative) activities, which were observed throughout project work accomplishment. Relying on ethnographic observations and interviews and drawing upon Giddensian conceptions of practice (1984), they argued that,

We identified three cross-boundary coordination practices (...) members *displayed* work across boundaries (i.e. they made their work visible and accessible to other communities), they *represented* work across boundaries (i.e. they expressed their work in a form that was legible to other communities) and they *assembled* their separate contributions across boundaries into an emerging collage of diverse elements (i.e. they reused, revised, and aligned their work over time so as to keep it dynamically connected across multiple communities). (p.28, emphasis original)

Those interesting findings corroborate with prior accounts of boundary crossing (e.g. Gherardi & Nicolini, 2002) and suggest that the development of shared understandings or common understanding, etc. is not a necessary precondition to sharing knowledge. In spite of the existence of four distinct communities, coordination in 'heterarchic organisations' may be mostly manifested as format-based, rather than content-based communication activities. That is, cross-boundary learning is not salient because the conditions of rapid change, uncertainty, and information overload afford merely fast 'trading' of informational products. The members of different communities do not have the 'luxury' to learn about each other's knowledge; production is more important than enhancing the quality of linking the expertise of different communities.

In addition, Kellogg et al (2006) further developed those ideas by drawing upon the work of the historian of science, Peter Galison, who argued (1997) that the interaction among different scientific subcultures (theoretical physicists, experimentalists, and engineers) on joint scientific endeavours, such as multidisciplinary experiments in physics, was made possible due to the development of a 'trading zone'. For Kellogg et al,

Engaging in a trading zone suggests that diverse groups can interact across boundaries by agreeing on the general procedures of exchange even while they may have different local interpretations of the objects being exchanged, and may even disagree on the intent and meaning of the exchange itself. (p. 39)

Undoubtedly, the notion of a 'trading zone' seems useful and may need to be taken up more warmly in organisation studies. Yet, I cast doubts over its use by Kellogg et al (2006) to understand coordination in contemporary organising settings for the following reasons. First of all, Galison studied ongoing cooperative efforts among scientists from multiple disciplines, which also constitute very stable, long-lasting and distinct subcultures ('traditions') (Fuller, 2006). On the other hand, Kellogg et al (2006) looked at the recurrent project work (usually lasting for a few weeks) in heterarchic organisations, where, they argued, the division of labour and roles are blurred and boundaries are fuzzy. Although the observed and experienced phenomena, i.e. interactions, may intuitively look very similar across the two studies, no clarification is provided as to how the above foundational differences (ongoing interactions vs. short-term project delivery) matter.

Secondly, Galison referred to (among other things) the dimension of 'locality' and explained that 'trading zones' were co-developed by different subcultures in relation to particular problems, i.e. experimental demands; 'procedures of exchanges' were co-created in order to facilitate problem-based interactions. In his analysis of Galison's work, Fuller wrote:

The theoretical description of Y (object of exchange) was not one that the experimentalists could use to design and run experiments. Instead the two groups (experimentalists and theorists) worked out a practical definition that contained the necessary information for the operation of the experiments and that produced the information required by the theoreticians for their research... the language (trading zone) that Galison identifies is not just tied to and contained in procedures. (2006, p. 49, parentheses added for clarification)

Contradistinguishingly, Kellogg et al (2006) do not refer to the processes of (co-)developing a 'trading zone' and do not relate the emergence of 'general procedures of exchange' to specific problem solving needs. Rather, they focused only on the performative dimensions of those exchanges, i.e. how

they were enacted, and neglected why such a zone was created in the first place.

This omission is also linked to and reflected in another important, I believe, limitation of this study; the a-contextuality of its theoretical account. In particular, Kellogg et al (2006) mentioned that:

Coordination on Adweb's (the interactive marketing firm) teams was shaped by temporal, competitive, informational, and technological conditions that characterized their project work. (p. 27)

Project circumstances are portrayed as the context – 'container', which does not affect in substantial ways the qualitative characteristics of a trading zone; those circumstances, "taken together" (p.28), are viewed principally as exogenous forces, which are to be taken for granted in order to highlight the performative aspects of activities. In other words, Kellogg et al (2006) focused (perhaps myopically) on the manner and style through and by which cross-boundary coordination, i.e. literal interactions across communities, was accomplished; without examining and explaining how the observed so-called 'coordination practices' developed in relation to the demands of project work. From their perspective, coordination is vaguely 'shaped by' rather than inherently 'entangled in' an organising context of production. Organisational actors' objectives, e.g. "to achieve the innovative products demanded by clients" (p.26) and "to get the work done" (p.38), are mentioned as key causes to coordinate, yet not as a key dimension to be included in their analysis of coordination.

In conclusion, the paper by Kellogg et al (2006) provides an inadequate explanation of 'what coordination is', since the adopted definition of coordination, i.e. as crossing-boundary, is not justified; while it suggests unconvincingly that knowledge sharing (what they might have called the 'happening of coordination') can be studied independent of its intrinsic relationship with the object and conditions of project work. Lastly, by relying

on previous perspectives on coordination as crossing boundaries, the work by Kellogg et al (2006) also inherited most of the limitations of those perspectives as identified above; e.g. reification of interdependence, a-processuality, an image of the division of labour as a division of communities.

Possibly the most conceptually innovative account of coordination (from a 'social practices' and 'boundary-crossing' perspective), is outlined in Bechky's most recent paper (2006) where she developed further her previous theory. Having studied as a participant observer a number of different film projects, Bechky found that coordination is inscribed less in practices of boundary crossing, and more in recurrent enactments of a generalised role-structure. She showed that in the film industry there is a clear and stable role system (distinct roles, role-relationships and role expectations for each actor - occupier of a role), which facilitates the very demanding accomplishment of (film) project work. According to Bechky, organisational actors have internalised a specific and vivid image of that system through experience and socialisation. Most importantly, that image, embodied as a disposition, is socially shared, i.e. an overlapping (among project members) abstract conception of the role system, and is continually negotiated in film sets. Thus:

From the first moment they arrived on set, members of these temporary organizations relied on role expectations to guide relationships and tasks. These expectations were based on two interrelated elements of roles: structure and enactment. The generalized role structure provided the continuity and stability that the individual temporary projects lacked. On each project, members in certain roles were expected to perform certain tasks. At the same time, strong social pressure was exerted to ensure that crew members conformed to role expectations. The coordination practices at the crew level were influenced by the structural context of the film industry: In order to maintain friendships and further careers, people were inclined to express expectations in as soft a manner as possible and to accept criticism and try hard to meet those expectations. This social pressure not only

helped coordinate tasks, but also contributed to sustaining the generalized role structure. (Bechky, 2006, p. 14)

Bechky's paper is very insightful because, contrary to previous perspectives, interactional performances are inherently linked to the 'structural context'; in this case, the film industry career structure as well as the highly institutionalised production conditions. Bechky also argued that 'role-based coordination' resembles the notion of 'collective mind' (Weick & Roberts, 1993) and augments that notion by showing that 'heedful interrelating' is about being mindful and attentive not only to the specifics of others' task accomplishment, but also to the social cues emanating from a generalised role structure. Undoubtedly, those arguments have been very useful in framing how organisational actors' experiences and constructed actions may be related to coordinative phenomena.

Notwithstanding her important contribution, her conception of coordination as a kind of negotiated order (Strauss, 1978) is essentially restricted as she acknowledged:

The study of film sets raises questions about how coordination might be accomplished in...(other) settings... Mere intensity of interaction while at work may not be sufficient... Further, if these environments do not rely heavily on roles, what processes are key to achieving coordination? It remains to be seen how the coordination practices found in this study of film sets compare to those in other settings. (Bechky, 2006, p. 17, parentheses added)

In addition, I would argue that the image of 'role-based coordination' is primarily limited not only due to the empirical context, but also because it does not account for the ways by which experienced interactions relate to the outcome of those interactions. That is, the interactive processes that occur on film sets are not analysed in relation to how they actually support production activities and results, i.e. the actual film production. It seems that the personal and collective experiences of role negotiations are analytically disconnected from material conditions and processes, which also remain

theoretically unappreciated. This may be due to the particular phenomenological stance adopted by Bechky to frame 'role-based coordination': coordination is possible only due to the existence of a human disposition to act in certain manners and not others. Material objects, such as the "call sheet, which indicates what time each person is to arrive and what scenes will be shot on a particular day" (Bechky, 2006, p. 10) are left out from an account of coordination constituents, since they do not tantamount to an experience of role-based interactions; their influence can only be enveloped in that experience. In other words, from this perspective, one cannot ask what else (in addition to actual 'interaction orders') happens to enable coordination or even what the outcome of coordination may be. Coordination is predominantly "embedded in the generalised role structure understood by members as they arrived on a temporary project" (p. 18) and its sole conceivable outcomes are reproductions and/or changes in that structure and in the perspectives of organisational actors.

2.2.4.4 Coordination from 'Boundary-Crossing and Social Practices'

Perspectives: Summary

A significant body of knowledge has developed through studies of knowledge, knowledge sharing, boundary crossing and social practices in organisations adopting various (mostly phenomenological) sociological frameworks. On the one hand, I concur that the in-depth and extensive examination of work in bureaucratic and post-bureaucratic organisations has revealed important insights as regards knowledge sharing phenomena. On the other hand, however, I critique those studies because they have not made significant conceptual advancements and distinctions in relation to the idea of coordination (although they claimed so). More specifically, the majority of this work problematically conceptualises coordination as occurring only at the intersections of different occupations. There seems to be a seamless, unreflective and lacking an explicit justification focus on boundaries.

Furthermore, the notion of interdependence is used in a vague and unreflective manner, while existing knowledge on the topic is not accounted for (Staudenmayer, 1997a). Also, coordination is conflated with communication, which is performed in and as conversations or through any other social procedure of exchange. By synonymising coordination with such processes, I argue the distinctiveness of coordination disappears. Finally and more significantly, the theoretical substrate of all the above accounts, i.e. coordination imagined in and through the experiences of 'actual interactive processes', appears to be self-contained, introverted and insular; any other element, which cannot be enclosed in the realm of those processes, is unlikely to attract any research attention. In my view, to assume that actual social interactions are the ultimate objects of studying and understanding coordination impedes research imagination and endeavour to conceptualise coordination more holistically.

Table 6. Summary of 'Boundary-Crossing and Situated Practices' Perspective

<i>Key assumptions</i>	Stable division of labour instantiated by distinct communities, social interaction as contours of understanding social order, experience as the ultimate object of knowledge, actors are 'knowledgeable'
<i>Conceptions of coordination</i>	Knowledge sharing, Crossing Boundaries, Discursive Practice, Role-based
<i>Conditions/factors affecting coordination</i>	Social conditions of e.g. common ground, organisational accountability, 'procedures of exchanges', boundary objects, mode of communication
<i>Unit of analysis</i>	Work practice, intersections between communities, literal (face-to-face) interactions, 'boundaries', the happening of coordination
<i>Research Approach</i>	Ethnography, understanding the 'native's point of view' and situated communicative processes, symbolic interactionism,
<i>Main limitations</i>	Unreflective focus on boundaries, division of labour is given, coordination synonymous with many processes (communication, interaction, knowledge sharing, conversation), reified technology (e.g. interdependence, context, etc.), a-processuality, a-contextuality, actualism, i.e. coordination as what is actually observed and experienced by knowledgeable actors

2.3 SECTION B: PROBLEMATISING EXISTING KNOWLEDGE

Following the review of the literature, I will now address the question: *What is the current epistemological status of the notion of coordination in organisation theory?*

2.3.1 Undermined *Distinctiveness* of Coordination

My conclusion and answer is that existing knowledge of coordination is significantly limited because it is not possible to explain how and/or why coordination is a distinctive organisational phenomenon. This is manifested primarily in instances of theoretical conflation. That is, the majority of the aforementioned studies synonymise coordination in an unproductive fashion with many different processes; with, for example, 'controlling', 'decision making', 'communication', 'discursive practice', 'social interaction', 'boundary spanning', 'knowledge sharing', 'knowledge transfer' and 'knowledge integration'. Organisational scientists are confused regarding the distinctiveness of coordination and end up conflating its meaning with various other processes. In short, it is not possible to delineate what coordination is.

There are a number of consequences originating from such theoretical conflation. First of all, there are profound disagreements over the object of coordination. For 'organisation design' and 'organisational economics' perspectives, coordination is the mechanical activity or the outcome of organisational structural configurations and of production conditions; essentially, human agents cannot intervene in the accomplishment of coordination. On the contrary, 'collective mind' and 'transaction memory system' perspectives view structure and technology as exogenous or given and focus exclusively on how organisational members (belonging to and working within the same group) determine collective coordinative action.

Antithetical to this and to the previous theoretical substrate, 'boundary-crossing and social practices' perspectives portray coordination as a process of reconciling the views and differentiated working practices of organisational actors (members of differentiated organisational groups); while they also reify the involvement of technological or broader structural conditions.

Secondly, all those studies fail to justify why their preferred analytical lens is superior or complementary to others. A thorough explanation for conceiving coordination as either one thing or another is hardly discernable; e.g. why should one give priority to studying coordination at the boundaries of occupational communities? It is unclear and, to say the least, unconvincing.

Thirdly, the meanings of some frequently used concepts such as 'interdependence', 'division of labour', 'coordination process', 'coordination structure' are either synopsised, i.e. briefly summarised, by some authors or ignored by others. It becomes very difficult to appreciate how the appropriation of these concepts in different texts of organisation studies resembles or differs and in what ways.

Conclusively,

In order to advance understanding of coordination in organisations theory, I am at explaining through further research **the sense in which coordination is a distinctive phenomenon.**

2.3.2 Overcoming a 'Fragmentation Trap' in Organisation Studies

In order to pursue such research more systematically, I submit, it is crucial to understand why this problematic situation has emerged. Effectively, I argue

that the roots of theoretical conflation can be explained as a consequence of a 'fragmentation trap' (Knudsen, 2003). According to Knudsen,

The fragmentation trap will emerge when too many new theories are proposed at a too fast pace in order for the scientific community to be able to evaluate each contribution properly and to integrate them into a reasonable coherent knowledge structure... there is not enough time to determine the relationship between the different theories, i.e. whether they compete or complement each other... since the relationships between old and new theories are never determined there will be no cumulative growth in the field. New theories will either just succeed – rather than replace – old theories until one or both of them are forgotten. (2003, p. 264)

I thus conclude that the current epistemological status of coordination in organisation theory is significantly undermined because of a fragmentation trap. Indeed, understanding of coordination is remarkably cacophonous, since multiple studies, adopting diverse theoretical perspectives, have generally developed contradictory and disjointed theories of what coordination might involve. Theoretical dissonance should not be attributed merely to the diversity of perspectives. I argue that conceptual confusion over the constituents of coordination is not about the lack of theoretical uniformity or sameness. Rather, it is more about the impossibility of delineating points of theoretical intersection. It concerns the inadequacy of existing knowledge (at the level of individual as well as collective theories) to clarify fundamental assumptions, upon which conceptual organisation of the topic is based.

Effectively, in order to overcome the problematic situation of a 'fragmentation trap', connections across existing unrelated bodies of knowledge should be pursued Knudsen (2003). I delineate three kinds of unexamined relationships between different perspectives on coordination.

First of all, I identify that all authors implicitly assume that coordination is necessary because of the presence of heterogeneity; e.g. 'different

components of organisations', 'different tasks', 'diverse expertise', 'different experts' and 'distinct social groups' and/or 'departments'. Moreover, I find that organisation scientists agree that coordination specifically aims to grasp heterogeneity for the purposes of an organisational end, e.g. the production of a film, project delivery, the development of a new product. My observation dovetails with Heath and Staudenmayer's (2000), who attempted to define the coordination problem:

In the simplest version of the coordination problem, an organisation *divides* an overall problem into subtasks and assigns the parts to individuals. We could imagine, for example, an organisation that *divides* the modules of a computer among programmers with similar skill. Organisations undertake this *division of labour* because individuals have limited information-processing abilities. Eventually, however, the organisation must re-integrate the tasks it originally divided. In the end, the modules of a computer program must work together as a single program, so the programmers who develop individual modules must integrate their efforts. Thus, the *flip-side of division of labour is integration*. (p.159, references omitted, emphasis added)

On deeper examination, it becomes apparent that different perspectives focus on different phenomena depending on their own partial definition of heterogeneity, which, more often than not, is taken for granted and/or not explicitly justified and examined. For example, for contingency theories, heterogeneity concerns the different departments as well as the different technologies, while decisions to grasp heterogeneity refer to the different structural mechanisms to be used; while for practice-based perspectives, heterogeneity refers to the different social groups and grasping heterogeneity involves crossing social boundaries. A lot of the confusion among organisation scientists hence concerns their competing and/or contradicting definitions of heterogeneity, which coordination aims to grasp. In conclusion, consensus exists only up to the point that heterogeneity is important for coordination. It is not possible to draw further connections as regards the nature of heterogeneity and thus the way coordination relates to it.

Furthermore, I argue that despite the existence of dissonance, there has been general consensus over the importance of (rather than the research approach towards) the teleological dimensions of coordination. Most studies have highlighted that coordination is needed in order to: 'achieve an overall organisational goal', 'realise a given project's ends', 'integrate the different components of a final product', 'accomplish the development of a new product' and so on. Again, however, there is little consensus regarding how to frame coordination in teleological terms. Some explain coordination as determined by organisational ends (e.g. contingency theorists and organisational economists), while others reify how coordination relates to such ends (e.g. practice-based studies). In conclusion, consensus exists only up to the point that there are teleological dimensions of coordination. It is not possible to draw any further connections across existing theories.

Finally, another implicit agreement among scholars is that coordination represents a process that occurs over time and therefore produces outcomes (supporting the accomplishment of organisational ends). In other words, coordination refers to a progressive accomplishment and/or a trajectory of actions aimed to achieve organisational ends. Notwithstanding this general consensus, some studies have ignored either the 'process-dimension' (mostly contingency theorists and organisational economists) or the 'outcome-dimension' of coordination (mostly social psychologists and proponents of practice-based theories) and, most importantly, their relationship. In essence, consensus exists only up to the point that coordination is a process that produces outcomes. It is not possible to draw any further connections as regards the ways both the process and outcome of coordination interrelate.

Ultimately, in order to clarify the sense in which coordination is a distinctive phenomenon, I should pursue further research, which addresses the following questions:

- (1) How does coordination address heterogeneity in organisational situations?

- (2) How can coordination be framed in teleological terms?
- (3) How does the process of coordination relate to certain outcomes?

On the basis of these general questions, I discuss in the following chapter what kind of further research will be needed and how it can be conducted more systematically. The following table summarises the key points of the literature review.

	Organisation Design	Organisational economics	Group as Distributed System	Crossing boundaries	KEY QUESTIONS
Key assumptions	Structuralism, simplistic materialism	Transaction cost economics, simplistic materialism	High interactivity of group members, organisations as 'groups'/'teams'	Social interaction, experience as the ultimate object of knowledge	Need to overcome actualism, i.e. focusing on literal activities? How to avoid teleological determinism?
Conceptions of coordination	Outcome of 'coordination mechanisms', activity caused by interdependence, information exchange process	Knowledge of integrating product components, mode of interaction, convergent expectations	Heedful interrelating, distributed-cum-connected interactive process, 'worked out' in advance	Knowledge sharing, Crossing Boundaries, Discursive Practice, Role-based	How to study the 'grasping' of heterogeneity? What is heterogeneity? How to link coordination process and outcome?
Conditions off for coordination	Exogenous interdependence, 'bandwidth' of coordination structures	Exogenous interdependence between product component, task environment	Existence of connected representations, heedfulness, stability of interactivity	Shared understanding, discursive practice, boundary objects	Which factors affect the 'grasping' of heterogeneity? What 'resources' are to be used? Does context affect coordination and how?
Unit of analysis	Interdepartmental interface, group interactions, information exchange	Industry, value chain structure, governance mechanisms, firms	Group processes, cognitive models, team mental models, literal interactions	Intersections between communities, literal (face-to-face) interactions, 'boundaries'	Focusing on a single unit? Multiple units? Why and how?
Research Approach	Modelling of organisational processes, 'betterness' of the system	Modelling of industry economic conditions, strategy implications	Knowledge to coordinate as activity	Ethnography, studying situated communicative processes, discourse analysis	What kind of approach, would enable a more holistic investigation?

Figure 10. Summary of Literature Review

2.3.3 Chapter Summary

In this chapter, I reviewed the literature in order to assess the current epistemological status of coordination in organisation theory. I structured the review in two sections. In the first section, I discussed and critically evaluated the knowledge claims of four different perspectives on coordination. In the second section, I problematised the existing literature and argued that organisational scholars are confused as to 'what coordination is'. I thus accentuated as the central aim of this thesis to advance knowledge of coordination in organisation theory by exploring and explaining its distinctiveness. In order to serve that aim, I discuss in the following chapter my general research approach and design.

CHAPTER 3

META-THEORETICAL ASSUMPTIONS AND RESEARCH DESIGN

3.1 INTRODUCTION

In this chapter, I will provide a thorough answer to the following question: How should I pursue my research aim to explain the distinctiveness of coordination through empirical organisational research? (Q_1 in § 1.1.2)

As a first step, I consider what kind of further research is needed in order to address my research aim and make an original contribution to organisation theory. I also argue that any future research attempt to enhance understanding of coordination should first critically reflect upon the process of theory generation. As a second step, I draw upon a 'critical realist' philosophy of science in order to engage in such reflection and explicate my ontological and epistemological assumptions. I assert that by committing to these assumptions, my research questions can be addressed more systematically. As a third step, I outline how I have designed accordingly a sophisticated research strategy to study coordination empirically and through using multiple qualitative research methods.

3.1.1 Pursuing Original Contributions to Organisation Theory

In order to explore an answer to Q_1 , I need to clarify what kind of theory I aim at making a contribution to. According to Danermark (2001), theories, which explain concrete social phenomena, such as organisation theory, are 'descriptive theories' (Danermark, 2001). Furthermore, a descriptive theory

can be: (a) 'substantive', referring to specific situations and processes, e.g. innovation in UK biotechnology firms, and (b) 'formal', relating to more general structures and relationships of social phenomena, e.g. innovation in strategic alliances. Effectively, knowledge of coordination in organisation studies constitutes a body of 'formal' descriptive theory and my research questions (p. 94) should be conceived as 'formal theoretical'.

This conclusion prompts me to address the following question: How can contributions to a 'formal theory' be made? According to Sayer (1992):

'Internal' questions concerning the coherence of a theory are not independent of 'empirical' questions concerning the adequacy of its 'external' reference to the world. (Sayer, 1992, p. 206)

The implications are that the development of new 'formal theory' is interdependent with the development of new 'substantive theory'. According to Glaser and Strauss (1967), insights from 'substantive research' need to be translated and incorporated into the body of 'formal theory'. For example, Bechky (2006) first developed new 'substantive theory' about how film projects are accomplished and coordinated and then raised claims for a contribution to ('formal') organisation theory of coordination. Black et al also argued (2004) that:

The progressive consolidation of substantive analyses into more formalized, general categories is a key step in developing theory. (p. 574)

Conclusively, I can pursue my research aim and make original contributions to existing knowledge of coordination in organisation theory through the creation of new 'substantive' theory. This means that I need to: (a) conduct empirical research in a concrete organisational setting, (b) develop new 'substantive' insights, on the basis of which (c) I can address my 'formal theoretical' research questions. In what follows, I discuss how I designed this three-phased research process. As a first step, I elaborate on the need for

reflection upon the principles of knowledge creation in the context of coordination research.

3.1.2 How to Study Coordination? Need for Reflection

In chapter two I showed that the undermined epistemological status of coordination in 'formal' organisation theory can be explained as the consequence of a 'fragmentation trap' (Knudsen, 2003). In addition, overcoming that trap is not possible by simply creating conceptual connections across existing perspectives. This is due to deep-seated disagreements regarding fundamental issues of research strategy. Important issues remain open as regards how to study coordination. For instance, questions such as the following have not been addressed: should one refrain from focusing on the interaction taking place among different organisational groups and embrace a more holistic lens and why? Is it possible to advance understanding of coordination, if there is an exclusive research focus on 'organisational experiences'? Is it sufficient to frame heterogeneity only in relation to different groups, departments and/or tasks? How to study coordination both as a process and outcome? Is a single unit of analysis adequate or should multi-level analysis be conducted? And how to decide? Is there a way to study organisational action teleologically and avoid deterministic explanations?

Answering such foundational questions, I argue, is a prerequisite for conducting future research on coordination. As Tsoukas and Knudsen (2003) suggested:

Raising such questions implies taking a step back from ordinary theoretical activity to reflect on what the latter should be aiming at and how it ought to be conducted – it is for this reason that such reflection is called '*meta*-theoretical'. By raising those '*meta*' questions the purpose is not to generate new theory about particular

organisational topics but to make the generation of theory itself an object of analysis.
(p.5)

In line with these authors, an increasing number of organisation scholars convincingly argue that 'meta-theoretical' discussions enable the creation of better theory because methodological rigor can be enhanced through the clarification of foundational assumptions (Reed, 2005a,b; Contu & Willmott, 2005; Tsoukas, 1994; Deetz, 1996; Schultze & Stabell, 2004; Orlikowski & Robey, 1991). Conclusively, in order to overcome the 'fragmentation trap' more systematically and create new (substantive and formal) knowledge of coordination more systematically, I engage in a reflective exercise as regards the process of theory development, i.e. how to study coordination.

3.1.3 Drawing upon a Philosophy of Science: 'Critical Realism'

Beforehand, however, I need to determine how I can engage in such an exercise and conduct a 'meta-theoretical' discussion. The most widely recommended method is to draw upon a credible philosophy of science.

Being a meta-discipline, philosophy of science enables us to engage in critical reflection on the practice of research. Philosophy of science tries to answer the following basic questions:

- (1) What *is* the purpose of research and what *should* be the purpose of research?
- (2) Which methodologies and explanatory strategies *are* and *should* be used by researchers attaining these purposes?

These questions allow us both to *describe* current practice of research and *critically prescribe* guidelines for conducting research. (Scherer, 2003, p. 312-313, emphasis original)

On the basis of recommendations such as the above, an increasing number of researchers have advocated that a 'critical realist' philosophy of social science

(Sayer, 1992; Archer, 1995) can facilitate much needed reflection in organisation and management studies (Reed, 2005a, b; Mutch et al, 2006; Fleetwood, 2005; Leca & Naccache, 2006; Delbridge, 2007). Contu and Willmott explained why this is the case:

The principle value of an engagement with Critical Realism, we suggest, comes from the stimulus it can give to reflection upon key ontological and epistemological issues – issues that are of great importance to debates within, and the development of, management and organization studies (MOS)... Critical Realism can assist in opening-up deep-seated issues in the philosophical standing of social and organizational analysis. (2005, p. 1646)

Sensitised by these observations, I have also found out that ‘critical realism’ is an alternative to the strong social constructivist philosophies (implicitly adopted by existing perspectives on coordination e.g. social practices and collective mind) and to the simplistic materialist ontologies (assumed by organisation design and economics perspectives). The main difference lies in that ‘critical realist’ philosophy of science grapples with the indeed controversial question of/for the ‘real’ (Contu & Willmott, 2005), which has not attracted the attention of organisation theorists of coordination; a fact to which the surfacing of theoretical challenges may be attributed (Thévenot, 2001a). Critical realism thus attempts to address that question and provide some sophisticated and very persuasive:

... guidelines for researchers grounded in ontological and epistemological arguments that avoid pitfalls of positivism on one side and idealism and relativism on the other. (Sayer, 2004, p. 16)

In light of these observations, I conclude that the philosophical framework of ‘critical realism’ (Collier, 1994; Archer, 1995) can facilitate a ‘meta-theoretical’ discussion and a process of addressing fundamental questions regarding how to conduct ‘substantive research’ on coordination – a prerequisite, as I argued, for developing new ‘formal’ theory of coordination.

I therefore adopt a 'critical realist' perspective in order to: (A) address 'meta-theoretical issues', (B) overcome the roots of a 'fragmentation trap' and (C) design further empirical research more systematically.

It should be stressed, however, that I do not regard 'critical realism' as panacea for creating superior 'substantive' knowledge. As Sayer warned, there are boundaries as to what 'critical realism' as well as any other philosophy of science can do:

Critical Realism is a philosophy of social science, not a social theory, like Weberianism or public choice theory. Like any philosophy, while it includes recommendations of how we should think and approach substantive subjects, it does so only in very broad terms... In any case, no philosophy can guarantee the truth of substantive research done according to it.... Social theories may therefore be consistent with critical realism, or indeed any philosophy of science, and yet turn out to be untrue – indeed they could meet the formal requirements (e.g. regarding explanatory forms) and yet be nonsense. In view of this, it is naïve and unreasonable to expect critical realism, any more than any other philosophy, to provide a litmus test for distinguishing true from false or better from worse social scientific accounts. (Sayer, 2004, p. 16)

The implications are that substantive organisational research is a distinct process and can only be informed and not determined by a philosophy of science. From a 'critical realist' perspective, such information regards consistency of assumptions across the following elements: (a) object of knowledge (ontology) and (b) method of approaching or probing that object (epistemology and research design)⁴ in relation to the (c) purpose of enquiry (Sayer, 1992). The following figure illustrates the idea that (a) – (c) are interdependent features of organisational research practice.

⁴ I refrain from using the term 'methodology' because it carries too much unwanted baggage. As Mingers argued, "It can be difficult to precisely delineate the boundaries between method and methodology at one end (e.g., which is administering and analyzing a survey?), or between methodology and a general research approach (e.g., 'qualitative research methodology') at the other". (2001, p. 242)

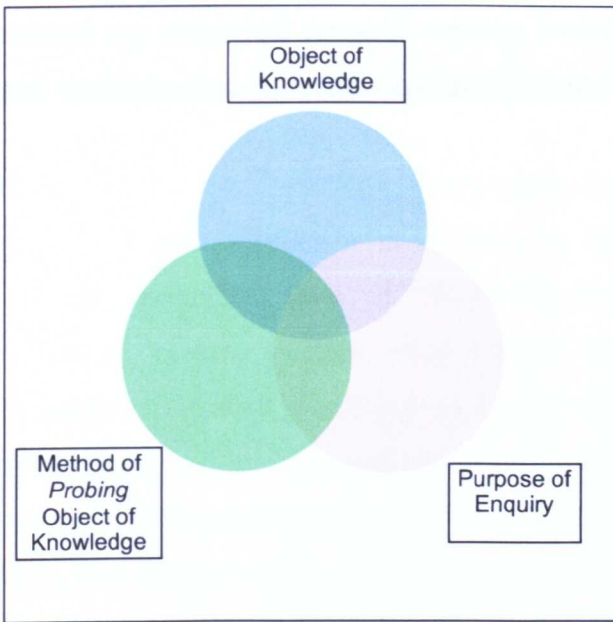


Figure 11. Addressing Meta-theoretical Issues

In conclusion, in response to the question, 'How should I pursue my research aim to explain the distinctiveness of coordination through empirical organisational research? (Q_1 in § 1.1.2)', my answer is that: a 'meta-theoretical' discussion should be conducted through the medium of 'critical realism' in order to clarify my ontological and epistemological assumptions and determine a suitable research design.

3.1.4 Chapter Structure

The chapter is organised in three overarching sections. In the first section, I explicate the key ontological commitments I have made in this thesis by drawing upon a critical realist philosophy of social science. The outcome of this reflective exercise is to address fundamental points of disagreement among organisation scientists regarding how research of organisational and coordinative phenomena should be conducted. In the second section, I outline the type of knowledge (explanatory) I aim to create and explicate the principles upon which the creation of new knowledge should be pursued. In the third and final section, I define my research design and describe how I

selected my empirical research setting. I conclude by outlining how I have used multiple data collection and analysis techniques.

3.2 FUNDAMENTAL ONTOLOGICAL ASSUMPTIONS

In this section, I will embark on my meta-theoretical discussion by drawing distinctions with regard to 'what it is', i.e. what the object of organisational scientific research is (and/or should be) on the basis of the philosophy of science of 'critical realism' (also known as 'realism'). This philosophy is primarily based on the writings of Roy Bhaskar (1978, 1989, 1998), who, as a philosopher, aspired to explore what it means for social science to be a science. For Bhaskar and others (Sayer, 1992; 2004; Archer, 1995; Mutch et al, 2006), ontological assumptions underpin all research projects, and the more clarified those assumptions are, the less confusion and ambiguity is created with respect to the end result, i.e. the knowledge claims. Critical realism raises awareness of and encourages reflection upon key questions, such as: what is our understanding of/assumptions about the nature of the objects, knowledge of which we aspire to gain? Instead of actually start observing coordination and trying to understand it (as if exposure to a phenomenon would automatically lead to enhanced understanding of it), it makes quite a lot of sense that I explicate my conceptions of the nature of organisational reality. Clarifying such conceptions will alert me of the possibilities of acquiring knowledge, i.e. of what and how coordination can or cannot be known. To begin with I briefly comment on the key philosophical ideas, which make 'critical realism' a distinctive and useful philosophy of science.

3.2.1 'Realism' and the Independent Existence of the World

The principal ontological assumption of 'critical realism', which I adopt, is that:

The world includes things, which can exist independently of any knowledge of them. This inference that there is something 'other' to our knowledge is again based on the resistance, which we sense from the world. (Sayer, 2004, p. 8-9)

From this idea, it also follows that the world has some enduring properties by virtue of its 'independent' nature, which we experience from resistances. When we engage with the world, we engage with some durable not easily (if at all) modifiable 'things'. By accepting the idea of the independent existence of the world, we also accept the causal efficacy of that world on our knowledge of it. That is, the differentiated properties of the world set limits and opportunities (or affordances) for how we come to know it without, of course, determining the content of our knowledge (Tsoukas, 2000). This becomes evident when we study the natural world, e.g. the earth, the planets, animals, etc. We can make a positive statement, for example, that it is the nature of water that makes walking on it impossible (Sayer, 1992).

The idea of independent existence can be extended to the social world (Bhaskar, 1979). That is, societies exist independently of our knowledge of them. From a critical realist perspective, social and thus organisational scientists should ascribe special ontological status to societies and/or other social forms. Whoever engages with (the study of) social objects, the argument goes, he/she is also confronted with something, which is endowed with specific 'ontic', i.e. relating to some real existence, characteristics. In order to avoid misunderstanding, I should clarify that by 'real', I mean 'relevantly real'. According to Sayer,

(Critical) realism does not claim privileged access to the real world: it rejects such 'foundationalism'. Its most basic claim is simply that there is a world, which exists largely independently of the researcher's knowledge of it. This independence implies not simple, direct access to the world but a more difficult relationship. Our knowledge of the world is always in terms of available descriptions or discourses, and we cannot step outside theses to see how our knowledge claims compare to the things they refer. (Sayer, 2004, p. 6)

Consequently, in view of my focus on a social phenomenon (coordination in organisations), in the following section, I will draw some important

implications from this principal ontological assumption. These implications will enable further my meta-theoretical discussion as to how I should pursue the study of coordination in concrete organisational settings.

3.2.2 On the Existence of the Social World

A key assumption of critical realism, which I adopt, is that societies are irreducible to people and to their individual activities (Bhaskar, 1998). That is, society is not simply an aggregate of human beings; it has durable properties that are distinct from the characteristics of its components. For instance, language, culture, discourse, religion, and, of course, the economy are 'social' and do not belong to a particular person or to sums of people; they are autonomous, one could say, objects. If we accept that, then we need to accept the pre-existence of the form of those objects. That is, the properties of societies predate the (birth and) actions of contemporary individuals, who compose today's society. In essence, organisational actors, who enact coordination at present, are also situated in a particular social context, which pre-existed their activities.

Furthermore, I assume that societies are concept-dependent (Bhaskar, 1998) or intrinsically meaningful (Sayer, 1992); they can only exist in and through the use of inter-subjective systems of meaning (Sayer, 2004). That is, people's conceptualisations and understanding of any aspects of the (social and material) world are based upon socially available 'semiotic resources' and become constitutive aspects of the social (Fairclough et al, 2002). Again, those conceptualisations are not the sum of the concepts of individual members of society, since meanings, concepts and any other semiotic elements are irreducible to how individuals or aggregates of individuals uses and pre-exist those uses (Fairclough et al, 2002). From this it follows that organisational actors enact coordination by using already available inter-subjective systems of meaning.

Equally significantly, I assume that the form of social objects is activity-dependent (Fleetwood, 2005; Bhaskar, 1998) in that it is intrinsically constituted by what people do; without people's doings, there cannot be any social form as well as any meaning systems. The constitution of social phenomena is an inherently ongoing process insofar as it happens through acting in the world; the properties of societies are only relatively durable and 'transfactual' or 'real'. In essence, when doing coordination, organisational actors re-constitute and/or modify the properties of the societies/social contexts, within which they are situated.

Furthermore, the 'material' (natural and artificial) world is constitutive of the activity-dependent 'social'; yet, the two worlds (natural and social) are distinct since the former exists independently of the latter and not vice versa. This also implies that inter-subjective meanings do not develop by contemplating, but mainly through acting in the world, i.e. material practice; and generating material practice is not possible without shared discursive resources (Sayer, 1992; Harré & Gillet, 1994; Harre, 2002). In short, social activities, such as coordination, in virtue of which social forms exist, are reciprocally discursive and material.

The implications are that organisational and coordination phenomena are essentially embedded in a social world, which should be conceived as a pre-structured and perpetually structured object. Social world is pre-structured because it has a structure that predates the happening of contemporary activities. At the same time, however, it is perpetually structured, because its structure is sustained only through activities that occur continuously (hence, activity-dependent). In other words, ongoing coordination activities reproduce and/or modify the pre-existing structure of the social world.

Furthermore, the social world has emergent properties irreducible to the doings of social and organisational actors (Archer, 1995). Properties are

emergent, because they can only exist in virtue of ongoing activities, and have specific enduring properties (and not others) as the cumulative results (material and discursive) of historical actions. In that sense it is:

... possible to talk about emergent properties and the results (or the results of the results) of past actions, which pre-date all current actions of contemporary agents and yet condition them – in the form of enablements and constraints, which are not dependent upon current activities nor influential because of their contemporary conceptualisation. (Archer, 1995, p. 148, parenthesis original)

Conclusively, broader social contexts are endowed with historically constructed properties (Tsoukas, 1989b), which tend to condition social activities (Mutch et al, 2006). In other words, it is important to understand what this conditioning influence refers to and how it may be exerted, if we are to examine and explain actual organisational and coordinative phenomena.

3.2.3 The Conditioning Influence of Context

In order to appreciate how context constrains and enables activities, it is crucial to conceptualise the nature of the relationship between context and activities. From a critical realist perspective, context is internally related to organisational phenomena (Tsoukas, 1989b). This may be explained on the basis of two interrelated assumptions. First, human agents, due to their nature, act in the world for some reason, e.g. to devise and accomplish a 'project' (in the broadest sense), to coordinate, to learn, to study, to work and so on. Second, a context is internally related to actual phenomena insofar as it has the indeterminate potential to both enable and constrain agents' endeavours to accomplish their projects (Archer, 1995). From this it also follows, that if people act without reasons, then talking about contextual influences is meaningless. In other words, it is the relationship between

people's 'projects', interests, intentions and visions and the 'affordances' of social conditions that,

... allows us to call their (the latter's) conditional influence a 'constraint' or an 'enablement'. It makes no sense to think of any emergent social property being constraining or enabling by nature or in abstraction. (Archer, 1995, p. 198, parenthesis added)

Coordination activities are thus inherently constrained and enabled by context (societal, industrial, organisational), insofar as these activities aim at supporting organisational 'projects' (Heath & Staudenmayer, 2000); that is, there are reasons to coordinate.

An example taken from my personal experiences may be useful here. For instance, my aspiration and efforts to pursue a PhD project were enabled and constrained by the academic social context; enabled by the existence of special PhD programmes in universities, enrolment practices, university's financial support and facilities, existing knowledge on a particular subject and so on; and at the same time constrained by the structure and content of PhD programmes, institutional research culture, conventions of research processes, library facilities, highly fragmented body of literature, available discursive resources of organisation theory. The very process of accomplishing my PhD, i.e. reading, reviewing, critiquing, brainstorming, writing, has, of course, been my personal achievement, which was, however, conditioned by the social context I found myself in; a particular North Western UK university and a distinctive academic social field. In short, if one wishes to explore why and how I have done and coordinated my PhD in a particular way, then one needs to investigate not only my own perspective and actions, but also how I have experienced and taken hold of social, material, cultural and discursive constraints and enablements emanating from the properties of this broader social context.

In essence, social contexts have structural properties, which are endowed with certain potentialities for 'making a difference' (Fleetwood, 2005) in the ways we experience, act in and engage with the world; in that sense,

... emergent structures represent objective limitations upon the situations and settings, which agents can encounter. (Archer, 1995, p. 196, emphasis added)

From this it follows that organisational and coordinative phenomena, experiences and events as well as any other observable feature of organisational reality are internally related to a broader context by virtue of the formers' embeddedness in the latter (Tsoukas, 1989b). This assumption has crucial implications as regards the study of coordination, insofar as the focus shifts towards relations across 'strata' of social and organisational reality (Sayer, 1992). The argument that social reality is stratified is grounded on the belief that social contexts are irreducible to actual events, and actual phenomena, e.g. coordination activities, are irreducible to their members or members' experiences (Bhaskar, 1998; Fleetwood, 2005). In other words, the examination of relations across ontological strata presupposes clarification of the 'ontic' properties of each stratum. I will therefore explicate in the following section my conceptions of the properties of social contexts, actual phenomena and experiences in order to postulate how these three strata may be related and to discuss further implications for coordination research⁵.

3.2.4 On the Stratification of Social Reality

Social Contexts

As I have already argued, I conceive contexts as pre-structured and perpetually structured objects (Manicas, 1997). For instance, the construction industry is a kind of 'structured thing', which is composed of a set of relations among myriad organisations e.g. construction clients, firms and

⁵ I use the terms 'research on coordination' and 'coordination research' interchangeably.

suppliers, and the actual practices of e.g. architects, quantity surveyors, site supervisors, etc. Yet, we cannot reduce the construction industry structure to the structure of individual organisations or even to the patterns of aggregate characteristics of the individuals, whose practices necessarily incarnate that structure. The industry structure has distinct properties and is something different from its components, i.e. organisations and organisational actors and practices. Effectively, social contexts have abstract properties; contrary to the properties of concrete material objects.

Furthermore, the 'ontic' properties of social contexts (Tsoukas, 1989a), within which organisational phenomena are embedded, have the potential or potentiality to impinge upon how current events happen and upon what individuals do or can do (Tsoukas, 1989b). For example, the fact that there is a limited number of large 'construction management' organisations experienced to deliver mega projects is a feature/property of the construction industry that has the potential to impinge upon e.g. a client's effort to select a supplier for a 'construction management' contract in connection to a major and complex project. Abstract potentialities of social contexts are irreducible to actual observable events (e.g. limited number of organisations expressing an interest in a contract) and to experiences of social actors (who e.g. may intensify their efforts to maintain the interest of very few interested suppliers). In essence, coordination activities (actual phenomena) can be potentially constrained and enabled by the abstract properties of their contexts.

Actual Phenomena

Observable patterns of organisational processes, structures, forms, events and outcomes, i.e. coordinative patterns, also belong to a different stratum of social reality. Actual phenomena have their own features. Fortunately, the features of those actual phenomena can be observed (Sayer, 1992). For example, the global 'credit crunch' crisis that began in 2008 could be

identified through systematic observations; e.g. flawed credit ratings, inability to pay back mortgages, the construction of complex financial products, etc could be investigated. Actual phenomena, however, need to be examined in relation to the abstract properties of social contexts in order to explain whether and how the latter have enabled and/or constrained the actualisation of the former. For instance, in the aforementioned example, it is important to conceptualise the structural properties of the global financial system, its material configuration, and, principally, the widely shared conventions, discourses and beliefs about 'how the system works' (or should work) drawn upon by a myriad of agents. Then, it would be possible to investigate why actual 'credit crunch' phenomena and patterns emerged in light of the abstract properties of social contexts. In essence, the realised potential (which has to be differentiated from unrealised potential), that is, the enabling and constraining effects of the properties of social contexts can be looked into observable phenomena (Tsoukas, 1989a; Archer, 1995). The implications are that in order to explain coordinative phenomena, it is crucial to not only observe them, but also investigate whether and how properties of broader social contexts have impinged upon them.

Experiences

Organisational actors' experiences also belong to a different stratum of social reality (Tsoukas, 1989b, 1994). Their 'practical reasons' (Bourdieu, 1998), i.e. their internalised dispositions, beliefs, and interests are the generative mechanisms of their actions. What people do necessarily depends on their 'perspectives'. Yet,

The games of the life-world (*Lebenswelt*) are always initiated, conditioned and closed outside the life-world itself. (Bhaskar, 1989, p. 77, cited in Archer, 1995)

This means that the 'natives' (organisational actors') point of view' needs to be explained and examined in relation to where, i.e. social context, this point

is situated (Bourdieu, 1988). Although people's perspectives of how to coordinate are important to understand their actions, the outcomes of those actions have their own 'ontic' properties, which escape the conceptualisation or experiences of contemporary agents. E.g. the risk manager, who drew upon discourses and/or narratives about the workings of the financial system, may have experienced the construction of his/her actions in particular ways, which, however, are ontologically distinct from the discourses themselves. The properties of social contexts indeed exist only in virtue of experientially generated actions, yet, they cannot be reduced to those actions. In essence,

People know what they are doing,
they know why they are doing it,
but they don't know what doing it does.

(Townley, 1993, p. 235, cited in Schultze & Boland, 2000)

In essence, organisational experiences that generate coordinative phenomena should be treated as only one stratum of organisational reality.

Relationships across Strata of Social Reality

I have so far argued that we need to differentiate ontologically across strata of social and thus organisational reality: the social contexts with distinct properties, which are endowed with certain potentialities; the actual phenomena and their observable features; and the experiences/'perspectives' of human agents – generators of their own actions. From this it follows that (a) coordination experiences of organisational actors constitute part of actual coordinative phenomena, and thus realise potentialities endowed in a social context; (b) the occurrence of actual coordinative phenomena is not just the result of experiences (a), but of many other combined observable features; (c) the existence of potentialities of social contexts (what I would like to call conditions for coordination) are

irreducible to how they are experienced and realised through the construction of actual coordinative phenomena.

Reversely thinking, (i) personal experiences of coordination and of conditions for coordination explain only partly coordination, (ii) actual coordinative events are observable elements, which instigate the influence of social contexts, and (iii) conditions for coordination may (or may not) be experienced by organisational actors and may (or may not) be realised through actual coordinative events; yet, they exist and have the indeterminate potential to constrain and enable the way they can be experienced and actualised. The following table illustrates the aforementioned ideas.

Table 7. Adaptation of Bhaskar's framework (in Tsoukas, 1989b, p.553)

	Strata of Social Reality (Ticked Boxes denote 'ontic' properties)		
	Social Contexts (Conditions for Coordination)	Actual phenomena (Observable Coordination)	Experiences (Coordination Experiences)
Potentialities	☑		
Realised Potentialities	☑	☑	
Experienced Potentialities	☑	☑	☑

The implications from the above meta-theoretical discussion are that further research on coordination should differentiate among conditions for coordination, actual coordination and experienced coordination. In order to avoid reification, however, it is crucial that 'conditions for coordination' be

distinguished analytically; that is, it is important to differentiate among types of social contexts. I will discuss this element in detail in the following section.

3.2.5 Types of Social Contexts

According to Fleetwood:

It is possible to identify (at least) four modes of reality, or four different ways in which entities may be differentiated: material, ideal, artefactual and social (2005, p. 199, emphasis added).

Following Fleetwood (2005) I therefore distinguish among types of social contexts; or, more accurately, among 'modes of reality' pertaining to a social context⁶. More specifically, 'Materially real' entities refer to material objects, whose existence does not depend on how humans conceptualise those (Sayer, 1992). For example, nature exists irrespective of the concepts we use to think of and/or engage with it. For the purposes of social and organisational analysis, the conceptualisation of 'materially real' entities is less important than that of the other three 'modes of reality'. I will thus clarify how I conceive the latter in some detail.

3.2.5.1 'Artefactually Real' Entities

'Artefactually real' entities refer to any kinds of artificial objects, which are involved and incorporated in the performance of social practices (Fleetwood, 2005). For example, computers, factories, highways, corporate headquarters, airports, and, indeed, railway stations. Those objects should be differentiated from materially-real entities, because they acquire their distinctive ontological status and properties by virtue of their embeddedness in social practices (Schatzki, 2006); that is, they are 'concept-defined' (Sayer, 1992). The properties of 'artefactually real' entities depend upon (i) people's particular conceptualisations, which constrain and enable how an object is incorporated in a social practice; and upon (ii) the material status of those

⁶ Again, I should clarify that by 'real', I mean 'relevantly real' (see § 3.2.1, p. 108).

entities; e.g. computers have material characteristics, which exist independently of how people perceive those. In essence, coordination can be conditioned by the properties of 'artefactually real' entities, if actual coordination phenomena depend upon and/or incorporate such entities in social activities.

3.2.5.2 '*Socially Real*' Entities: '*Regimes of Justification*'

In the vocabulary of most social scientists, 'socially real' entities refer to 'social structures' (Manicas, 1997), which exert influences on social practices generated by social actors occupying positions in a social structure (Bhaskar, 1989; Archer, 1995). Examples are: 'capitalist structure' (Sayer, 1992), 'industrial structure' (Tsoukas, 1989a), and 'social field' (Bourdieu, 1998; Levina, 2001). For instance, Tsoukas (1989a) argued that managers can potentially 'exert control over' and 'achieve cooperation with' employees by virtue of their embeddedness in an industrial structure and of their occupying a privileged (in relation to employees) position.

More recently, the vocabulary of social scientists (regarding 'socially real' entities) has been enriched with a very interesting concept: the notion of 'regimes of justification' (Thévenot, 2001a, 2001b, 2002). This concept has been proposed by the French sociological 'Convention School' (Thévenot, 1984, 2001a, 2001b, 2002, 2007; Boltanski & Thévenot, 1999) and has received increasing attention among social theorists (for an example in organisation studies, see Howard-Grenville & Carlile, 2006 and Leca & Naccache, 2006). I will briefly present the main points of this perspective because I believe it can lend to my notion 'conditions for coordination' more credence.

In particular, according to Thévenot (2001a), we need to situate human agency within a material environment, which can be differentiated. My interpretation of this principle is that we need to situate human agency

within a particular 'problem solving context' (in a broader sense). In addition, we need to assume that agents engage with that context through a particular mode (abstract framework) (Thévenot, 2001b). It should also be acknowledged that more local modes of engagement with the material contexts have gradually acquired a status of 'socially real' entities through a historical process of conventionalisation: hence, the genesis of 'regimes of justification' (Thévenot, 2001b).

Furthermore, 'regimes of justification' are endowed with certain potentialities for regulating, monitoring and governing the conduct of human agents, who are preoccupied with a 'problem solving' context of a conventional nature. For instance, in the context of justifying investment decisions, it can be assumed that a particular 'regime' exists and defines an abstract framework with regards to how the relationship between 'inputs' (resources to be invested) and 'outputs' (resources to be gained) can be established. In their efforts to justify their decisions to invest in e.g. a project, social actors draw upon that framework and are thus constrained and enabled by it. A 'regime of justification' may therefore be thought of as a 'condition for coordination', which supplies organisational actors with an abstract framework and gives them 'direction' and 'rules' as to how to coordinate in a problem solving context.

In addition, a regime has distinct properties by virtue of its evaluative characteristics; hence, 'regime of justification'. More specifically, for a regime to exert an influence on problem solving endeavours, information of certain format is required (Thévenot, 1984). For example, a 'regime of investment justification' requires that information about inputs and outputs be monetary and/or quantifiable; otherwise, the calculation of returns on investment is not possible. Also, the evaluative characteristics of 'regimes' relate to the inherent publicity of (organisational) actions, which creates a necessity for justifiability. For example, the process of justifying investment decisions needs to be safeguarded from potential critiques by others; decisions need to

represent investment merits, which can be attested. From this it also follows that the justifiability of actions depends on underlying widely shared principles pertaining to a specific regime. In other words, organisational actors engage with a problem solving situation of a conventional nature by monitoring and testing locally their conduct in accordance with the abstract justification principle (property) of a specific regime of justification. In other words, coordinative outcomes that enable solutions to problems are 'qualified' in some terms only and not others.

Boltanski and Thévenot further argued (1999) that justification principles are inherently tied to an underpinning notion of 'good'. On the basis of the previous example, the parameters of inputs and outputs cannot be 'engaged' in relation to their beauty, which they may evoke because this is simply not at stake. What is at stake is a different 'common good' (Thévenot, 2001a), e.g. investment merits and 'high' returns on investment. An investment decision is 'qualified' as appropriate, and indeed as 'right or wrong' on the basis of the particular notion of good ('ontic' property) of the particular regime of justification. In essence, as a possible condition for coordination, a regime 'qualifies' only certain coordinative actions and outcomes as 'proper' or 'justifiable'.

In order to substantiate and demonstrate the value of their framework, Boltanski and Thévenot identified (1999) six different universal 'regimes of justification' ('orders of worth'): inspired, domestic, civic, opinion, market and industrial (table 8). As the authors argued, these regimes exhibit different properties in relation to the: 'underpinning notion of good', 'format of information' and 'kind of qualifications' human agents need to have in order to 'problem solve' accordingly. Conclusively, conceptualising the properties of 'regimes of justification' (pertaining to a particular problem solving context) as 'socially real' (Fleetwood, 2005) entities entails delineating these particular dimensions.

	<i>General Regimes of Justification</i>	<i>Inspired</i>	<i>Domestic</i>	<i>Opinion</i>	<i>Civic</i>	<i>Market</i>	<i>Industrial</i>
<i>Which 'good' is engaged? With what evaluation?</i>	Collective (most legitimate) conventions of a common good	Grace, nonconformity, creativeness	Esteem, reputation	Renown	Collective interest	Price	Productivity, efficiency
<i>What is the format of relevant information?</i>	Codified, standardised, etc.	Emotional (related to passion)	Oral, anecdotal (related to trust)	Semiotic/symbolic (related to recognition)	Formal, official rules (related to solidarity)	Monetary (related to exchange)	Measurable, criteria, statistical (related to functionality)
<i>Which kind of agency is construed?</i>	'Qualified' person	Creative, Ingenuous	Authority	Celebrity	Concerned with equality among 'citizens'	Having purchasing power	Professionally competent, expert

Table 8. Adapted from Thévenot (2001b, p. 76) and Boltanski & Thévenot (1999)

The notion of 'regimes' essentially refers to:

Social devices, which govern our way of engaging with our environment inasmuch as they articulate two notions: (a) an orientation towards some kind of good; (b) a mode of access to reality. (Thévenot, 2001a, p. 75)

In other word, 'regimes' amount to complex social forces that shape social action (Howard-Grenville & Carlile, 2006). In that sense, regimes are not voluntarily malleable social artefacts:

I contend that the kind of pragmatic articulation between the two orientations, the engaged good and the engaged reality, is what makes for the force of each regime. The notion of good needs to be put to a reality test where it is realised in the evaluation of some performance. Symmetrically, the capture of relevant pieces of reality depends on the outline of some good. This interdependence is precisely what turns a mode of adjustment into a regime. And this is eventually the characterisation I would offer of the social. (Thévenot, 2001b, p. 69)

Effectively, regimes are conventions that address the need for extended coordination with a distant environment and 'anonymous others' (Thévenot, 2001b). Conventions differ from 'routines' and habitual practices in important ways. While routines refer to repeated patterns of social actions (e.g. routine of recruiting new staff and of training them) that are bound by rules and customs in local contexts (Feldman, 2000), conventions refer to situated actions that allude to a justification principle that is valid beyond local contexts; conventions govern actions that aim at claiming a general validity (e.g. complying with EU procurement regulations so that equal opportunities are given to suppliers across the EU area).

The implications are that differentiated problem solving contexts are endowed with the properties of differentiated regimes of justification ('socially real' entities). In essence, coordination phenomena in differentiated contexts can be potentially constrained and enabled by the properties of differentiated regimes as conditions for coordination.

3.2.5.3 'Ideally Real' Entities: Discursive Structures

From a critical realist perspective, 'ideally real' entities refer to 'discourses' and 'discursive structures' (I use those terms interchangeably), which have ontologically distinct properties (Fairclough et al, 2002; Fairclough, 2005;). Communicative actions are necessarily constrained and enabled by underlying discourses and especially in contexts where argumentation is a salient actual feature of organisational reality. In particular, discursive structures impinge upon the way interlocutors 'raise claims' and 'provide reasons' for the validity of their arguments, insofar as such structures define an 'argumentative framework' (Schreyögg & Geiger, 2007; Geiger, 2009). That is, if a claim is put forward by a social actor, it

... requires clarification, needs a reflection on whether the underlying propositions can be accepted or not. That means that we enter the sphere of argumentation with its own prerequisites and rules. In this view argumentation means '...that type of speech in which participants thematise contested validity claims and attempt to vindicate or criticize them through arguments' [Habermas, 1984, p.18]... Argumentation is a dialogue designed to examine reasons provided to defend a claim (Schreyögg & Geiger, 2007, p. 84)

This lens encourages us to imagine the accomplishment of 'qualified' communicative action through a 'mode of argumentation' (Geiger, 2009), i.e. enabled and constrained by the properties of discursive structures. Discursive structures are structures in virtue of specific criteria, which are widely shared within a collective domain of activity (Schreyögg & Geiger, 2007); for example, within an industry. In that sense, organisational actors in a particular situation may draw upon broader discourses in order to create an argument and justify explicitly a coordinative action (Fairclough, 2005).

In other words, 'modes of argumentation' (Geiger, 2009)/'discursive structures' (Fairclough et al, 2002) complement the notion of 'regimes of

justification' (Thévenot, 2001a, b). Complementarity lies in the observation that, the notion of 'regimes' refers to modes of engagement relating to organisational actions, i.e. socio-material activities, in particular problem solving contexts; while a discursive perspective focuses on modes of argumentation in connection to communicative action and 'textual practices' (Fairclough, 2005).

In conclusion, I differentiate among 'materially real', 'socially real' (regimes of justification) and 'ideally real' (discourses) entities in order to conceptualise specific types of social contexts (conditions for coordination). By making these fundamental distinctions, I can postulate more systematically the relationships across different strata of organisational reality, i.e. across: (a) the potentialities of 'real entities' as conditions for coordination (b) actual coordinative phenomena and (c) coordination experiences. From that perspective, features of actual coordinative phenomena, such as organisational structures and procedures, may be conceived as 'design manifestations' of properties of 'real' entities (Tsoukas, 1989b). Also, the influence of 'real' entities may be mediated by institutionalised strategies (Leca & Neccache, 2006). E.g. institutional guidelines and concrete organisational frameworks concerning investment decision making may be design manifestations of an abstract 'regime of investment justification'.

At this point, I should clarify that by 'institution' I mean an established organisation, which is dedicated to a particular mission in an explicit way; e.g. universities, ministries, local authorities. In that sense, my use of the word should not be related to conceptions of institutions elaborated by institutional theories, e.g. as socially recognisable and persistent patterns of behaviour (Barley & Tolbert, 1997). From my (narrow) perspective, organisational actors are institutional agents if they work for certain institutions and act on the basis of and in pursuit of their organisation's explicit goals. For instance, the leader of a city council, when talking to the

public or when considering investment opportunities for the council, acts as an institutional agent, who orients his/her action towards addressing the interests his/her institution.

Effectively, by developing this advanced vocabulary with reference to my conceptions of organisational reality, I have completed my meta-theoretical discussion. I will now move on to the next section in order to discuss in further detail how research on coordination should be conducted on the basis of these conceptions.

3.2.6 How to study coordination? Fundamental Conclusions from Reflection

In this paragraph, I will outline normative statements with regards to how coordination should be studied. In particular, I put forward the argument that further research should:

(a) Discard a narrow and unproductive exclusive focus on what actually happens or on what is experienced by organisational actors. Since social and organisational reality is ontologically stratified, it is important that relationships across different strata be postulated. In short, it is crucial that further research conceives coordinative phenomena and experiences as internally related to broader social contexts, whose properties necessarily impinge upon these phenomena and experiences (Tsoukas, 1989b); the currently prevailing belief that experiences or actual events are the only 'objects' of understanding coordinative phenomena should be rejected and replaced by a more holistic conception of organisational reality.

(b) Re-evaluate the significance of different types of contexts as an intrinsic element of organisational reality. That is, further research

should explore different 'modes of reality' (Fleetwood, 2005) that may pertain to a particular social context and provide the conditions for coordination. By doing so, it will be possible to explore how such conditions constrain and enable the emergence of coordinative phenomena; the currently prevailing belief that 'context' refers to recognisable features of an empirical setting - e.g. 'container' or external environment to be taken for granted (Kellogg et al, 2006) - should thus be rejected.

(c) Theorise the heterogeneity of organisational settings (which coordination aims to grasp) in a more holistic manner. As previously argued, heterogeneity may be more than different communities, information, task features, objects, language etc. More decisively, it may be about the heterogeneity of conditions for coordination that may enable and constrain actual phenomena. Further research thus needs to appreciate how organisational elements are different by virtue of their embeddedness in different social contexts, to which differentiated 'modes of reality' (Fleetwood, 2005) may pertain, e.g. different artefacts, discourses or regimes; the currently prevailing belief that heterogeneity refers exclusively to actual features, such as different groups, tasks, and organisational components should be rejected.

(d) Include a historical perspective in the theorising of contemporary conditions of organisational phenomena. The 'fragmentation trap' (Knudsen, 2003) in existing organisation theory of coordination may partly be explained due the fact that organisation scientists have implicitly adopted the problematic aphorism: 'this organisational situation, because of the actions and experiences of these people here present' (paraphrasing Archer, 1995). In line with Archer (1995), I argue that this is a problematic assumption because social reality is characterised by intrinsic historicity; conditions for coordination pre-

exist actual coordinative phenomena. Organisational actors are 'thrown into' a historically moulded situation unvoluntaristically. For example, discourse, regimes of justification, and, 'artefactually real' entities, such as railway stations, pre-exist contemporary actors, who may be impinged by the properties of those entities in their effort to coordinate. In essence, further research should conceive conditions for coordination as the product of historical processes.

(e) Advance a focus on the processual constitution of organisational reality. If we accept the 'intrinsic historicity' of social phenomena (Archer, 1995), then we should also accept the processual character of social reality, i.e. its flux. The pre-existence of 'modes of reality' (Fleetwood, 2005) implies that 'continuously evolving human actions' (Tsoukas & Chia, 2002), i.e. actual processes, can only reproduce and/or modify the properties of social contexts over time. That is, organisational phenomena are embedded in historically conditioned 'structuring phases', i.e. inter-temporal interactions across strata of reality.

Pre-existence and autonomy (of properties of social contexts) [parenthesis added] denote discontinuities in the structuring/restructuring process which can only be grasped by making analytical distinctions between the 'before' (Phase 1), the 'during' (Phase 2), and the 'after' (Phase 3). (Archer, 1995, p. 138 - 139)

'Historicity' and 'processuality' thus go hand in hand, insofar as human agents interact with pre-moulded conditions for coordination, which through agents' actions are eventually reproduced and/or re-moulded (in some ways only). Future research should thus conceive actual coordination processes of actual events and activities (Pettigrew, 1997) as embedded in particular structuring phases, i.e. interacting inter-temporally with conditions for coordination.

On the basis of the above conclusions, I argue that further 'substantive' research can now be designed more methodically so as to address the three broad ('formal theoretical') research questions, I identified in chapter 2. In particular, future empirical research should not only account for (a) – (e) principles, but also: (i) examine how coordination addresses 'heterogeneity' in relation to the properties of conditions for coordination (referring to research question [A], p.94); (ii) explore teleological dimensions of coordinative phenomena in relation to the constraining and enabling influences of conditions for coordination (referring to research question [B], p.94); and (iii) frame coordination processes and outcomes in terms of 'structuring phases' (referring to research question [C], p.94).

3.2.7 Fundamental Ontological Assumptions: Summary

In conclusion, in this first section of this chapter, I used the 'critical realist' philosophy of science in order to engage in a 'meta-theoretical' discussion. Through this discussion I clarified that further research on coordination should focus on the internal relations between context and actual phenomena and should differentiate among conditions for coordination, actual coordination and experienced coordination. I also argued that the three basic 'modes of reality': 'artefactually real', 'socially real' (regimes of justification) and 'ideally real' (discourses) may be thought of as distinct conditions for coordination. Finally, I concluded my meta-theoretical discussion by outlining some normative statements as regards 'how coordination should be studied'; namely, to reframe heterogeneity, historicity, and processuality in organising context and including a notion of 'evaluative' action.

Having clarified my assumptions regarding 'what objects' further research on coordination should probe into (see p. 105), I move to the next section to discuss what knowledge of such objects should be pursued and how.

3.3. EPISTEMOLOGICAL ASSUMPTIONS

3.3.1 What Kind of Knowledge Should Coordination Research Aim at?

In this section, I will clarify what kind of knowledge I should pursue on the basis of my ontological assumptions. In particular, I argue that future research should generate knowledge of distinct 'strata' of organisational reality (Sayer, 1992), i.e. of coordination conditions, coordinative phenomena and coordination experiences. In order to explain relationships across different strata, investigation should move beyond 'what happens in organisational arenas here and now'. Concrete phenomena and experiences need to be explored in relation to the properties of broader social contexts, or more accurately of the 'modes of reality' pertaining to such contexts, such as specific regimes of justification and discursive structures. This, I argue, can be done in two steps.

As a first step, 'real' entities in a social context should be identified: 'artefactually real', 'social real' and 'ideally real' entities should be explored as distinct objects of knowledge (Tsoukas, 1989b). Furthermore, the abstract properties of those objects should be postulated and conceived as the properties of conditions for coordination, within which coordinative phenomena are embedded. Again, consider, for example, the actual phenomenon of the global 'credit crunch' crisis that started in 2008. In order to identify the properties of the context of the crisis, it is important to create abstract conceptualisations of the properties of e.g. the financial system, underpinning 'regimes of justification' and 'discursive structures'. The properties of social contexts should therefore be examined as durable objects of knowledge (Tsoukas, 1989b), which have the potential to impinge upon how and why actual events and/or processes unfold. Furthermore, these properties could be investigated in terms of their heterogeneity, historicity and processuality (see § 3.2.6, p. 125-127). In essence, the first step of

knowledge generation is completed through systematic abstract conceptualisation of conditions for coordination.

As a second step, the features of actual coordinative phenomena and experiences should also be examined and explained in relation to the properties of conditions for coordination. In practical terms, this step implies investigating: (i) 'why certain processes and events unfold (or have unfolded)⁷ in particular ways', (ii) 'what conditions enable and constrain (or have enabled and constrained) their unfolding over time' and (iii) 'what kind of outcomes are (or have been) produced'. The core epistemological interest lies in the contemporary (and/or historical) processes of interaction across different strata of organisational reality over a particular period; what I propose to call 'structuring phase'. It is only through investigating a structuring phase that my research questions can be explored on the basis of my ontological commitments (see § 3.2.6, p. 127).

As an example, again, actual features and events of the 'credit crunch crisis', such as 'toxic assets', 'stock exchange busts', and 'bailouts' should be explained in relation to the structural properties of the global financial system, its material configuration, and, 'regimes of justification' (a particular 'structuring phase'). In essence, the second step of knowledge generation is completed through systematic concrete conceptualisation/explanation of the ways conditions for coordination and coordinative phenomena/experiences interact over a period of time.

From this perspective, the creation of substantive theory requires two steps and is explanatory in nature. Furthermore, explanatory knowledge of organisational phenomena acquires its generalisable characteristics, i.e. becomes externally valid, because empirical phenomena are explained in relation to the properties (potentialities) of enduring social conditions, which

⁷ I have added the parenthesis in order to emphasise the idea that this step could and/or should involve historical analysis.

have durable properties (Tsoukas, 1989b). In other words, the purpose of explanatory knowledge creation is more about enhancing awareness of the properties of conditions for coordination and of the nature of their relationship with actual coordination phenomena, than about predicting how such conditions reproduce concrete patterns of processes and events in a population (Sayer, 1992, 2004; Tsoukas, 1989b).

In conclusion, knowledge of coordinative phenomena should be explanatory and its creation requires two steps: (a) abstract conceptualisation of the properties of conditions for coordination, e.g. of a regime of justification, and (b) concrete conceptualisation of the relationship between such conditions and actual coordinative phenomena, i.e. the constraining and enabling influence of the former on the latter throughout a 'structuring phase' (Tsoukas, 1989b). It is now clear that acquiring knowledge of solely organisational experiences, situated interactions, group processes, boundaries, intersections of communities, and organisational structure in order to explain coordination is inadequate. The distinctive features of coordination can be explored more methodically if epistemological commitments concern the creation of explanatory knowledge (of the above kind).

Evidently, the chief and formidable challenge for researchers studying coordination relates to the process of producing explanatory knowledge; that is, the process by which empirical observations are transformed into knowledge claims and especially with regards to the abstract properties of social contexts (Sayer, 1992; Danermark, 2001; Collier, 1994). It is crucial that 'data' about empirical phenomena are 'processed' and developed further through appropriate reasoning in order to acquire a status of knowledge claims (Tsoukas, 1994). It is only through reasoning that scientists can 'move' from concrete experiences to generalised statements. In order to determine what kind of reasoning is suitable for the creation of explanatory knowledge (of the kind discussed above), I shall address the following questions: How

should new concepts and relationships between concepts be constructed? How can one acquire knowledge about general things from knowledge about particular phenomena, i.e. observations?

3.3.2 Considering Modes of Inference

In this paragraph, I discuss the intricacies of creating explanatory knowledge by exploring 'modes of inference', that is:

... descriptions of various procedures, ways of reasoning and arguing applied when we in science relate the particular to the general. Characteristic of inference is that from one thing, conclusions are drawn about something else... (it) involves on the one hand formalised and strictly logical rules for deduction... (and on the other hand) to denote various thought operations which are neither formalised nor strictly logical conclusions, but suggest a form of argument advancing from one thing to something else, e.g. arguing from individual observations to gain knowledge about general basic structures. (Danermark, 2001, p. 75-76)

I first outline the characteristics of the available four different modes of inference (reasoning): deductive, inductive, abductive and retroductive (Danermark, 2001). Through this discussion, I explain why retroductive reasoning should be used for the creation of new explanatory knowledge.

Deductive reasoning

It refers to a thought process by which one draws, in a strictly logical fashion, new conclusions from given premises (Danermark, 2001). For example, a simple exemplification of this would be: 'humans need food to survive' (given premise), 'I am human' (observation), and therefore 'I need food to survive' (logical conclusion). Deductive reasoning presupposes the existence of universal laws. The main feature of deduction is that empirical observations do not lead to the creation of new rules or conceptualisations of the qualitative characteristics of objects and entities. Deductive reasoning is

useful if the main interest lies in confirming some hypotheses, rather than in identifying and conceptualising 'not known' aspects of e.g. conditions for coordination. Conclusively, this mode of inference is not suitable for the creation of new explanatory knowledge of coordination.

Inductive reasoning

This mode of inference entails that new *general* conclusions are drawn from a number of observations or samples:

In inductive inference the conclusion does not necessarily follow from the premise. On the contrary, this conclusion entails the addition of new knowledge beyond what is in the premise. We start from something known and given and draw conclusions which reach beyond this. (Danermark, 2001, p. 85)

For example, we begin with the premise that 'increase of wealth leads to an increase in consumption'. Then, we make several observations of 'rich people experiencing decrease of their wealth without reducing consumption levels'. If we use inductive reasoning, we would eventually draw a new conclusion that 'in the case of rich people, wealth and consumption are not related'. In other words, this mode of reasoning does not explain why certain empirical phenomena emerge because it is incompatible with a conception of social reality as stratified. Rather, knowledge claims refer to generalisations, which are drawn from a sample of empirical observations about the entire population of possible observations, e.g. all rich people. Induction therefore is not suitable for the creation of new explanatory knowledge, since it does not enable the abstract and concrete conceptualisation of the properties of different strata of organisational reality and of their intrinsic relationships.

Abductive reasoning

The term 'abduction' was first introduced by the American pragmatist Pierce (Hookway, 1998). He argued that abduction is not only a scientific mode of

inference, but is also fundamental to all perception. The key characteristic of abductive reasoning is that it enables the drawing of new conclusions or inferences by re-describing and interpreting 'in a new light' observations of a particular phenomenon (Danermark, 2001). For example, consider the following statements: 'human activity for transforming nature and producing goods is work' (rule); 'producing scientific knowledge is an activity' (observation); therefore, 'producing scientific knowledge is work' (new qualitative characteristic of the observed phenomenon).

Abduction differs from induction in that we start from the rule describing a general pattern, and it differs from deduction in that the conclusion is not logically given in the premise. Abduction is neither a purely empirical generalisation like induction, nor is it logically rigorous like deduction. (Danermark, 2001, p. 90)

Abductive reasoning entails that an empirical phenomenon (or more accurately a researcher's accounts of it) is re-contextualised within new frames of interpretations (Hookway, 1998). The process of abductive reasoning involves the gradual and systematic isolation in abstract terms of only certain aspects of the observed phenomena. Such isolation aims at gaining a deeper understanding of the qualitative characteristics of the 'objects' we engage with. In essence, abduction affords scientists the opportunity to be creative and through exposure to empirical phenomena to make new conceptual distinctions and develop new theories. Although abduction is suitable for creating new knowledge, it does not specify for which objects or why should abstractions be pursued. That is, it does not explicitly account for a social ontology.

'Retroductive' Reasoning

On the contrary, 'retroduction', though similar to 'abductive reasoning' (Contu & Willmott, 2005), takes into consideration assumptions about a stratified social ontology (Danermark, 2001). The distinctive feature of retroduction is that it is a process by which scientists move to the general

from the particular in a way that sheds light on different strata of social reality and their relationships (Bhaskar, 1998; Sayer, 1992). Retroduction aims specifically at developing concepts of the most durable ('ontic) characteristics of social conditions. For instance, retroduction involves asking questions such as the following: 'what makes a 'regime of justification' be a regime of justification?' 'If makes a railway station a distinctive object?' The operation of 'retroduction' can also be enhanced by following the canons of the RRREI (C) model of applied scientific explanation (Bhaskar, 1989; Collier, 1994). In particular, this model involves the following processes:

- a. Resolution (RRREIC) of an event or process and of any actual phenomenon into its components (more accurately some *observed* components)
- b. Re-description (RRREIC) of these components in a theoretically significant way, i.e. creating some more general concepts to characterise the elements of an event,
- c. Applying retroductive reasoning (RRREIC) on and moving beyond those re-descriptions to seek abstract explanations of broader societal conditioning (e.g. regimes)
- d. Eliminating (RRREIC) alternative (abstract) explanations
- e. Positive identification (RRREIC) of the generative causes (i.e. enablements and constraints) of the phenomenon and thus explanation
- f. Corrective (RRREIC) work in the produced explanation (one could think of that optional stage as going through (a)-(e) iteratively).

Effectively, I draw the conclusion that retroduction and the application of the principles of the RRREI (C) model constitute the most suitable mode of reasoning for creating new explanatory knowledge, since it enables organisation scientists to conduct: (a) abstract research, i.e. pursuing the conceptualisation of broader social contexts and of conditions for coordination, and (b) empirical research, i.e. elucidating how these contexts

relate to observable coordinative phenomena/experiences throughout a 'structuring phase' (Danermark, 2001; Tsoukas, 1989b).

Notwithstanding the superiority of 'retroduction' as a mode of inference, I should clarify that I, by no means, assume that explanatory knowledge represents accurately the 'real objects' it refers to or that it is eternally true. This is because all knowledge is inescapably fallible. The key issue is to develop 'practically adequate' theories (Sayer, 1992), which are only relatively true. In the following paragraph, I will explain this point further.

3.3.3 Fallibility of Knowledge

Knowledge of organisational phenomena is fallible insofar as we necessarily approach the world in and through using particular concepts. In addition, concepts and theories are qualitatively different in nature from what they refer to; 'thought objects' (concepts) refer only to particular aspects of 'real objects' (Sayer, 1992); e.g. the concept of 'water' and the water as real entity are different. Essentially, the relationship between 'thought objects' and 'real objects' is indeterminately revisable. Knowledge is connected to 'real objects' in some ways only and not others; it should be treated as a relational outcome, rather than an absolute representation of the world (Tsoukas, 2000). We can always observe something and think of it in alternative ways. In essence, we cannot construct 'objective' relations of causality between the world (social or natural) and our knowledge of it (Tsoukas, 2000). The very process of abstraction does not allow us to make claims of eternally true knowledge, since truth is partly a matter of consensus:

It is not about more than can be justified, but less that can be justified. (Sayer, 1992, p. 69)

Yet, not all knowledge is 'equally fallible' (Sayer, 1992). For scientific knowledge to be possibly evaluated the internal conceptual consistency as

well as the adequacy of the developed theory to be useful in practice (in this case explaining a phenomenon or event) will be determinants of the quality of a new theory; what Sayer called (1992) 'practical adequacy'. It is in that sense that meta-theoretical reflection is needed, since conceptual consistency can be achieved by aligning consciously ontological and epistemological assumptions (Sayer, 1992; Tsoukas, 1994). Whereas confirming the 'practical adequacy' of a new theory can only be achieved, if it is 'tested' successfully in practice, i.e. in explaining concrete organisational phenomena convincingly.

3.3.4 Epistemological Assumptions: Summary

In this section, I clarified that, on the basis of the foundational conclusions I drew from my meta-theoretical discussion (see § 3.2.6, p. 125-127), future coordination research should pursue the creation of explanatory knowledge. I also specified that explanatory knowledge of coordinative phenomena should be developed through the creation and synthesis of abstract and concrete conceptualisations of such phenomena. Finally, I argued that the use of 'retroductive' reasoning can enable the methodical creation of new explanatory knowledge.

Having clarified my assumptions regarding 'what objects' further research on coordination should probe into and through 'what method' (see p. 105), I move to the next section to discuss how I designed and conducted my empirical coordination research.

3.4 RESEARCH DESIGN

3.4.1 Intensive Design: Enabling Abstract and Concrete Research

I have aimed to develop a research design that enables investigation and analysis at two levels: abstract and concrete. I argue that this is important in order to be able to complete the two steps required for the generation of new explanatory knowledge: (a) abstract conceptualisation of the properties of conditions for coordination, e.g. of a regime of justification, and (b) concrete conceptualisation of the relationship between the coordination conditions and actual coordination phenomena, i.e. the constraining and enabling influence of the former on the latter through a 'structuring phase' (Tsoukas, 1989b). A number of scholars (Leca & Neccache, 2006; Fairclough et al, 2002; Tsoukas, 1989a) have made this useful distinction. Sayer (1992) explains the rationale behind this classification:

Abstract theoretical research deals with the constitution and possible ways of acting of social objects, and actual events are only dealt with as possible outcomes... Concrete research studies actual events and objects as 'unities of diverse determinations', each of which has been isolated and examined through abstract research. (p. 236)

In other words, abstract research refers to the efforts of the analyst to conceptualise conditions for coordination, while concrete research aims at elucidating how the influence of such conditions becomes implicated in concrete organisational situations, e.g. in actual activities and practices. I have also considered that empirical research would be particularly enhanced if historical analysis could be conducted for reasons outlined in § 3.2.6 (p. 125-127). In addition, I have aimed at a research design that has the capacity to yield new insights in connection to my 'formal theoretical' research questions; namely: (1) 'How does coordination address heterogeneity in organisational situations?' (2) 'How can coordination be framed in

teleological terms?' (3) 'How does the process of coordination relate to certain outcomes?' (see § 2.3.2, p.94)

In view of these requirements, I have adopted an in-depth case study or 'intensive design' approach, since:

... the primary questions concern how some causal process works out in a particular case or limited number of cases (Sayer, 1992, p. 242).

Intensive research designs are suitable for applying the principles of the retroducting reasoning and conceptualising the various properties of social contexts (abstract research) because the research focus can be sharpened towards gathering qualitative information. It is also possible to elucidate the relationships across strata of social reality throughout a particular structuring phase (concrete research) (Sayer, 1992; Leca & Naccache, 2006). Intensive research designs have the capacity for detailed examination of such relationships, i.e. between actual patterns of coordination and conditions for coordination. This is possible because 'rich' information can be collected with regards to how organisational phenomena actually unfold over time. From this it also follows, that my research questions, all of which refer to a 'how' (processual) element, can be addressed by adopting an intensive research design (Yin, 1994).

Furthermore, through intensive research design, I can take advantage of the 'methodological primacy of the pathological':

By seeing how something goes wrong we find out more about the conditions of its working properly than we ever would by observing it working properly... An economy in crisis is more 'transparent' than a smoothly functioning one - it 'reveals codes', shows its works like the pipes in the Pompidou Centre⁸. Mechanisms which are normally disguised by their close interaction with other ones break loose and so are actualised, whereas they normally operate unactualised - just as the law of

⁸ Pompidou Centre is a complex in the Beaubourg area of Paris and was designed in the style of high-tech architecture. (<http://www.centrepompidou.fr>)

gravity operates unactualised in your house until one day the roof falls down on your head. (Collier, 1994, p. 165)

In other words, intensive design maximises opportunities to examine the relationship between actual events and social conditions due to its focus on processes of change and/or transition (Bhaskar, 1989). Conclusively, I have adopted an intensive research design because it enables interrelation and synthesis between abstract and concrete research and therefore creation of new explanatory knowledge of coordination.

3.4.2 Research Design Considerations

In order to maximise opportunities for successful 'substantive' coordination research, I selected my research setting on the basis of some sampling criteria (Miles & Huberman, 1994), which I had developed in accordance with my research questions and the requirements of an intensive research design. In particular, those criteria were:

- (a) The desirability to study coordination in a context where organisational phenomena could be examined in relation to their production trajectory and outcomes (i.e. in teleological terms). For such examination to be possible, given also practical constraints, I concentrated on projects of medium-/short-term time frame, which I could also observe longitudinally.
- (b) The need to investigate the way organisational endeavours unfold over a period of time, i.e. the process (Pettigrew, 1990, 1997) and produce certain outcomes. In conjunction with the previous point, I thus sought to observe the process of project accomplishment.
- (c) The interest in exploring and explaining heterogeneity of production requirements and activities. This implied that I needed to look for complex projects where coordination can be expected to be a key issue.
- (d) The need to conduct abstract and concrete research. The implications were that I needed to consider multiple levels of analysis and focus on the actual project tasks in relation to a broader context, e.g. the industry and the general 'regimes of justification'.
- (e) The desirability to situate an organisational endeavour historically. This meant that I would prefer projects where I could have access to historical information and conduct historical analysis.
- (f) The possibilities for retroducting from actual organisational phenomena. That is, I considered the opportunities for utilising

existing theories or studies relating to e.g. the context of a project in order to be able to synthesise apply the principles of the RRREIC model.

3.4.3 Empirical Setting

Taking into consideration the above parameters, I adopted a pragmatic approach to select an empirical research setting. I was aware that organisations are frequently not willing to dedicate time and allow free access to researchers, unless tangible benefits are reciprocated (Saunders et al, 2003). After a number of unsuccessful (and frustrating) attempts (made via corporate enquiry letters) to gain access to various companies, I was introduced to the Project Director of a major construction project, which was in its pre-construction phase (beginning of 2007). The Project Director expressed an interest in my research and agreed that I could observe the project. I signed a confidentiality agreement and offered to reciprocate by providing feedback during my research and a 'lessons learnt report' at the end of my research (which I did do).

The project (ongoing at the time of writing) concerns the redevelopment of a very busy railway station in the centre of a large metropolis in the European Union (EU). With an estimated budget of approximately €400million (scaled down slightly for purposes of anonymity), the project satisfied almost all sampling criteria. Funded by multiple stakeholders with diverse objectives, the project is ambitious and complex and characterised by a unique feature specific to railway station redevelopment projects (RSR); namely, their 'chaotic' nature:

To those involved in any of the ambitious station area redevelopment plans sprouting across Europe, the word 'chaos' must have often come to mind. Euralille's (a RSR project) master planner Rem Koolhaas defends his choices there by arguing that "We are not deliberately introducing chaos; it is the contemporary system that

is doing so, with its contradictory assemblage of architectural wills, populist sensibilities, financial polices, triumphant dreams and so on. (Bertolini & Spit, 1998, p. vii, references omitted)

In light of my sampling criteria, I sought to identify and sharpen my focus on one subproject of the overall project. At the time of my involvement in the project as an independent researcher (summer 2007), one very important subproject was about to commence: the project of selecting a 'Construction Consultant' (CC), i.e. a construction management organisation, which would provide professional services throughout the delivery of the project. In the beginning of summer 2007, I managed to negotiate successfully with the executive project team (Director of Design, Construction, Programme and of Procurement) my regular observation of that subproject.

The project of awarding the CC contract (of an estimated value of €20 million) represented a very interesting setting where I could maximise opportunities to conduct my empirical research successfully. In particular:

- The CC contract was of strategic importance for the project, since the CC team would provide the necessary strategic capabilities for designing, planning and construction delivery,
- The type of contract was very novel and of 'partnering' nature (Bresnen, 2007) - very different from traditional contractor contracts,
- The novelty of the contract content created unprecedented demands for those undertaking the procurement process,
- The process of contract award entailed significant interaction with other subprojects, e.g. funding finalisation, outline design completion, etc.
- The conduct of intensive research and of longitudinal observation of the process seemed manageable, since the project would last for approximately 8 months,
- Due to the nature of the project, a lot of decisions and processes had to be documented, something which provided opportunities for archival (historical) research,

- The contract award process was quite complex in that a heterogeneous array of factors (e.g. award criteria, legislation demands, consistency with prior strategic project decisions, etc.) had to be carefully considered throughout its accomplishment.

Observing the CC contract award process proved particularly conducive to exploring my research questions, since I was able to use a multitude of research techniques. In the next paragraph, I outline my 'data collection' methods, which I used between summer 2007 and May 2008.

3.4.4 Research Techniques (Data Collection)

Gathering of qualitative information has been vital in order to address my research objectives and the demands of an 'intensive' research design strategy. Aware of the challenges of doing qualitative research in practice (Bryman & Bell, 2003; Bailey, 1982), I pursued to get some training prior to doing this research and acquire hands-on experience. I conducted a pilot study, where I was a participant observer for six months (Oct 2005 - Apr 2006). That experience was invaluable for developing my skills as a qualitative researcher (making observations and conducting interviews).

I was also aware that making ethical considerations was crucial, since the use of qualitative research techniques entails high interaction with human subjects and intrusion into their working lives (Bryman & Bell, 2003). Because this research commenced at Aston University, I sought and received ethical approval from the ethics committee of Aston Business School in 2006 (for further information, see: <http://www.abs.aston.ac.uk/newweb/research/ethics>, accessed on 09/05/09). At a practical level, I ensured that my approach was ethical by: getting informed consent from participants, clarifying how I was using my

'data', restricting access to 'data' to myself and supervisor, liaising with participants as regards anonymity and confidentiality issues.

Effectively, from May 2007 until May 2008, I used the following techniques in order to conduct intensive research in the CC contract award project.

Observations

I was physically present in a number of meetings and workshops where I was able to observe, listen to and document what project members were discussing and how they were making decisions; I was a non-participant in all those situations. I could study ongoing behaviour in a natural environment. Observations constituted the richest and most direct way of gathering information about project work accomplishment. They revealed the issues that were most salient for the project members as they went about doing their work. A great advantage was also that I as an observer could be more integrated in the social context. Observations also provided access to the most implicit features of social life, e.g. misunderstandings, while the less structured nature of the method allowed me to be more receptive to emergent and unexpected topics.

Since summer 2007, I was physically present at 10 meetings (of an average duration of approximately 2 hours), 8 project workshops (usually full day), while I was able to visit project offices (to e.g. study tender submissions) for 5-6 times and this also gave me the opportunity to observe project members in their working environment. After each 'observation episode' I typed my handwritten notes into an electronic document. I also managed to digitally record and transcribe verbatim the conversations that took place in one team meeting. It should be noted that my observations were not ethnographic, i.e. with the aim to elicit cultural knowledge characteristics (Spradley, 1980), since I was more interested in capturing how exactly project members went about accomplishing the contract award process over time. For instance, I

aimed to find out how they used particular documents during meetings and how they structured their conversations. That invaluable information provided the basis upon which I designed my interviews and the study of other materials.

I should mention that being a non-participant observer was extremely time consuming and laborious (travelling, physical presence, etc.). I had to make considerable effort to socialise with the members of a completely different culture (both national and occupational) and to build rapport and trust in order to interact with them (Lecompte & Schensul, 1999). Sometimes, misunderstandings between project members and myself created tensions, which, however, were resolved easily throughout the research process.

Interviews

The purpose of the interviews was to elucidate the reasons of project members' decisions and actions (King, 2004). Combined with observational information, personal interviews provided complementary insights into complex issues, which e.g. I couldn't comprehend during meetings (Sekaran, 2003). I had the opportunity to probe more specific answers about things I documented during meetings and workshops and about project documents as well as to clarify ambiguous responses of interviewees (Bailey, 1982). I also sought to gather information about past events/decisions, which had affected contemporary activities (Bryman & Bell, 2003).

I conducted a total of 10 formal interviews (lasting from 1 to 4 hours). All formal interviews were digitally recorded and transcribed verbatim. I also grasped myriad opportunities to have informal conversations (roughly estimated at 30) with project participants. The latter kind of interviews proved invaluable due to the site of discussions. That is, conversations held after a workshop on the train or during meetings and site visits, when e.g. I studied tender submissions, were particularly insightful because they were

made in context; similar to what Barely and Kunda (2001) referred to as 'real-time interviewing'. Interviewees were in a much better position to provide explanations for their actions when they were given the opportunity to refer physically to the objects/artefacts of their work (Bechky, 2003a).

Project Documents

I got access to all documents relating to the accomplishment of the contract award process; e.g. contract advertisement, questionnaires, planning documents, Gantt charts, invitation to tender documents, submissions, tender clarifications, post-tender submissions, contract forms etc. Those materials were extremely useful for my research. This was not only due to richness of information contained in those documents, but primarily due to the fact that (and in combination with the previous research techniques) I was able to contextualise their meaning. For instance, I was able to relate the production and content of a pre-qualification questionnaire (PQQ) to the conversations that took place and influenced its construction. I treated all those project documents as material traces and artefacts constituting a (textually based) 'material culture':

Different types of texts have to be understood in the contexts of their conditions of production and reading. For instance the analyst will be concerned with whether a text was written as a result of firsthand experience or from secondary sources, whether it was solicited or unsolicited, edited or unedited... and so on... (Texts) can be understood only as what they are – a form of artefact produced under certain material conditions (not everyone can write, or write in a certain way, or have access to relevant technologies of reproduction) embedded within social and ideological systems (Hodder, 2003, p. 157).

Ultimately, material culture has to be interpreted in relation to a situated context of production, use, discard and reuse. (ibid, p.160)

In some cases I also had the unique opportunity to get access to different versions of the same document, i.e. while it was being developed. This was

invaluable, since I was able to understand the courses of actions and decisions made that shaped the final version of a document. For instance, I had access to 8 different versions of the PQQ document as well as to the associated conversations (and/or disputes) relating to proposed changes to the document content. I was thus able to analyse the process that progressively led to the production of the final document (outcome). Such analysis was also enabled by access to emails. Although it was difficult to get access to all emails that were exchanged during the procurement process, I managed to get a copy of most email communication of some stages, especially at the beginning of my observation. The way I probed those emails was to ask questions, such as: 'why was that email sent? At what time? For what purpose?' In short, I tried to appreciate how electronic communication influenced project accomplishment.

Project Archives and Company Policies

I was granted access to almost all historical and formally documented project information; project reports, executive summaries, business case, outline design solution, architectural and other drawings, planning application, formal design development meetings, risk register and cost reports, etc. (approximately 200) This information was particularly useful not only in terms of providing general 'background information', but also because I could conduct historical analysis of the project's most important events and decisions and satisfy my objectives for concrete and abstract research. I also used general company policy information, e.g. documents describing how procurement processes should be conducted, as well as information referring specifically to the project (approximately 100). I particularly focused on how project members used (or actually chose not to use) documents and policies and explored and sought clarification of such decisions during interviews.

Publicly Available Project Information

Due to the high publicity of the project, I created large records of newspaper articles and other media publications (approximately 200) referring explicitly to the project and to the involvement of local authorities, of the ministry of transportation and various other governmental and non-governmental organisations. From those publications, I took advantage mostly of the online and freely accessible reports and meeting minutes published by all project funders (public institutions). For instance, the local authority published regularly reports referring to important project decisions e.g. when the required public spending in the project had to be increased. I was thus able to appreciate holistically and examine thoroughly the project's socio-historical context.

Industry reports and journals

Industry strategy reports were particularly useful in order to investigate trends in construction and particularly in relation to procurement. I sought to understand whether and how procurement practice as documented in industry publications bore similarities or differences to what I actually observed at the time. I was also sensitised by some informants' reference to various industry reports' recommendations, which, they claimed, they drew upon one way or another. I looked carefully into those documents to identify how project members incorporated elements of such recommendations. In addition, I created a file of highly circulated magazines, which referred to the CC procurement process, to the project as well as some project members (e.g. the project director), who had high reputation in the industry.

Secondary Sources

Along with all the above research techniques and sources of data, I used extensively secondary sources, especially studies on the following topics: railway station redevelopment, construction management, procurement process, contracting, EU procurement directives, partnering. Existing

literature on those topics was particularly useful for the purposes of abstract research.

3.4.5 Analysing Empirical Observations (Data Analysis)

The demanding task of interpreting, systematising, analysing and synthesising all the available information was based on the: (a) research design parameters, (b) procedures of 'grounded theory', and (c) principles of the adopted retroductive mode of inference. I used a number of practical 'data analysis' techniques, which facilitated the various process of re-contextualising observations of actual organisational phenomena within new frames of interpretations; e.g. resolving, re-describing and 'retroducting' process of the RRREI (C) model. In order to do that more effectively, I followed recommendations by Miles and Huberman (1983, 1994) and used a number of 'data structuring' and 'data display' techniques:

- Data Management: I was generally very mindful of organising my data in order to ensure effective search and retrieval of information. Particularly useful for that was a Knowledge Modelling Toolkit (CMAP), where concept maps were created and linked with various resources (e.g. an article, website or document). The following diagram illustrates how I organised some information regarding building procurement systems; at the bottom of the 'building procurement system', for example, there are links to resources (in this case a picture and a related concept map).

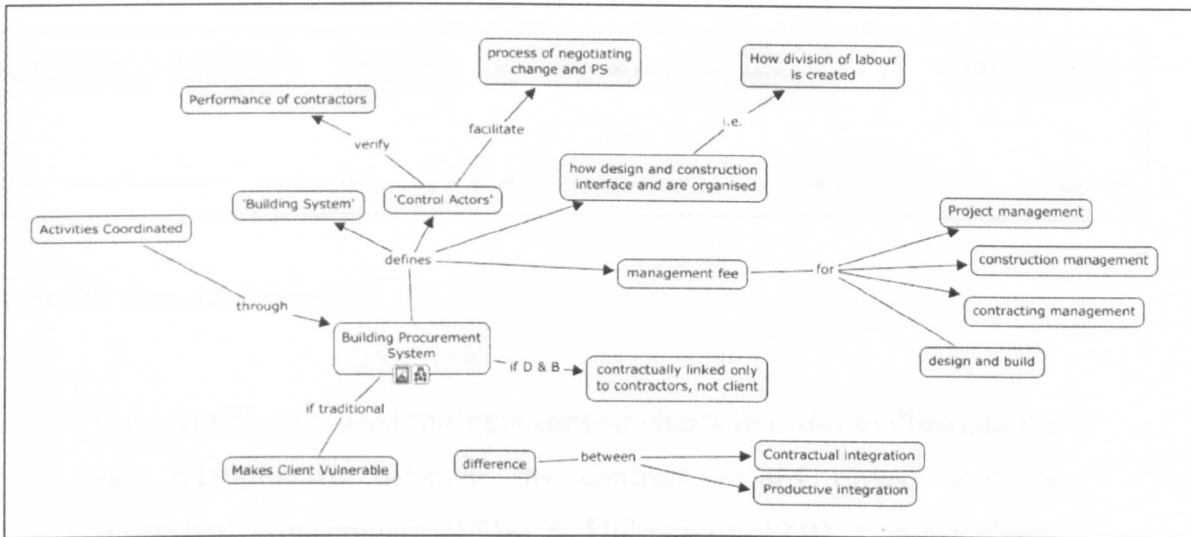


Figure 12. Data Management Example

- Matrices; I used matrices to organise the ‘data collection’ process and to facilitate theoretical sampling. The following matrix is an example of how I represented the contract award process stages and associated activities and conducted ‘gap analysis’, i.e. investigation of missing key information.

	CONTRACT NOTICE	PQQ PREPARATION	PQQ ISSUE	PQQ EVALUATION
activities - WHAT	preparing/ reviewing information in the document	establish information content	publishing	developing scoring matrix
	approvals	reviewing information in the document	queries by organisations	reviewing evaluation process
	queries by organisations	agreeing on final version	responses to organisations	agreeing on evaluation approach
	publishing	approvals (?)	Return of PQQ	evaluating PQQ submissions approve tender shortlist
Accomplishing activities - HOW	emails	emails	emails	formal/informal meetings
	meetings/workshops	formal/informal meetings	phonecalls	emails

Figure 13. Matrix example

- Time charts; I used time charts to display the sequences of key events. An example is provided below.

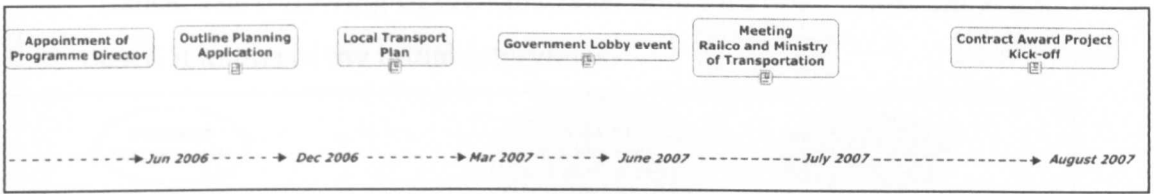


Figure 14. Time chart example

- Context Charts; I used multiple context charts in order to illustrate the key relationships between the contract award project and its contextual environment (Miles & Huberman, 1994). Context charts facilitated both abstract and concrete research.

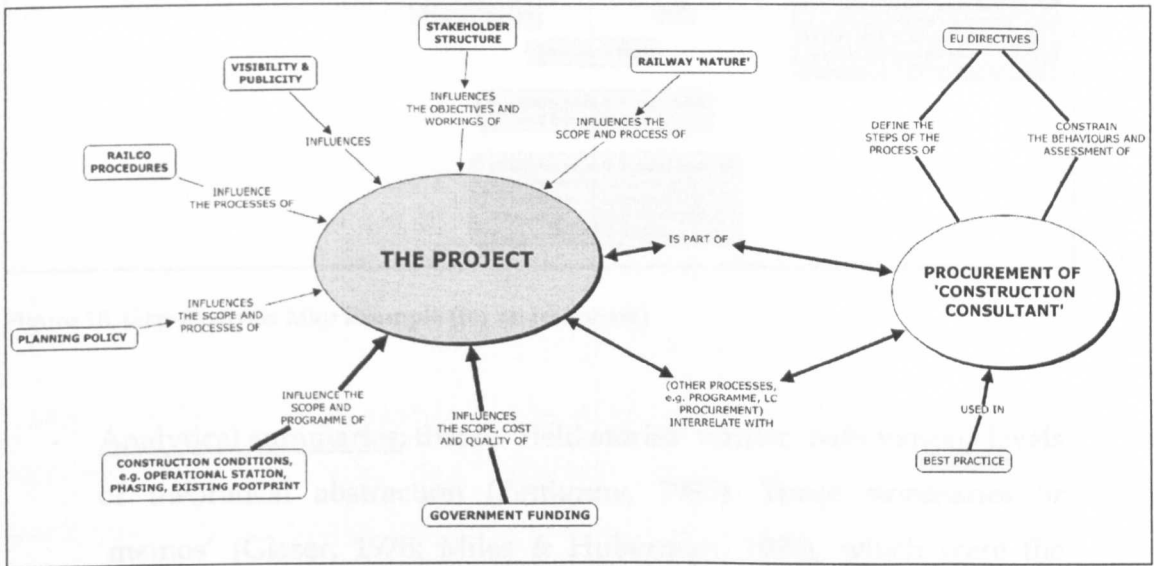


Figure 15. Context Chart Example

- Gap Analysis maps; I used such maps to organise information and to guide further data collection by identifying gaps in my understanding of actual events and/or processes. This approach has been particularly useful in my preparation of interviews, where by using maps that clustered concepts or interview themes (Kvale, 1996) I could easily probe informants' answers in relation to theoretically significant

issues. The following figure illustrates how I mapped information and used it in one of my initial interviews.

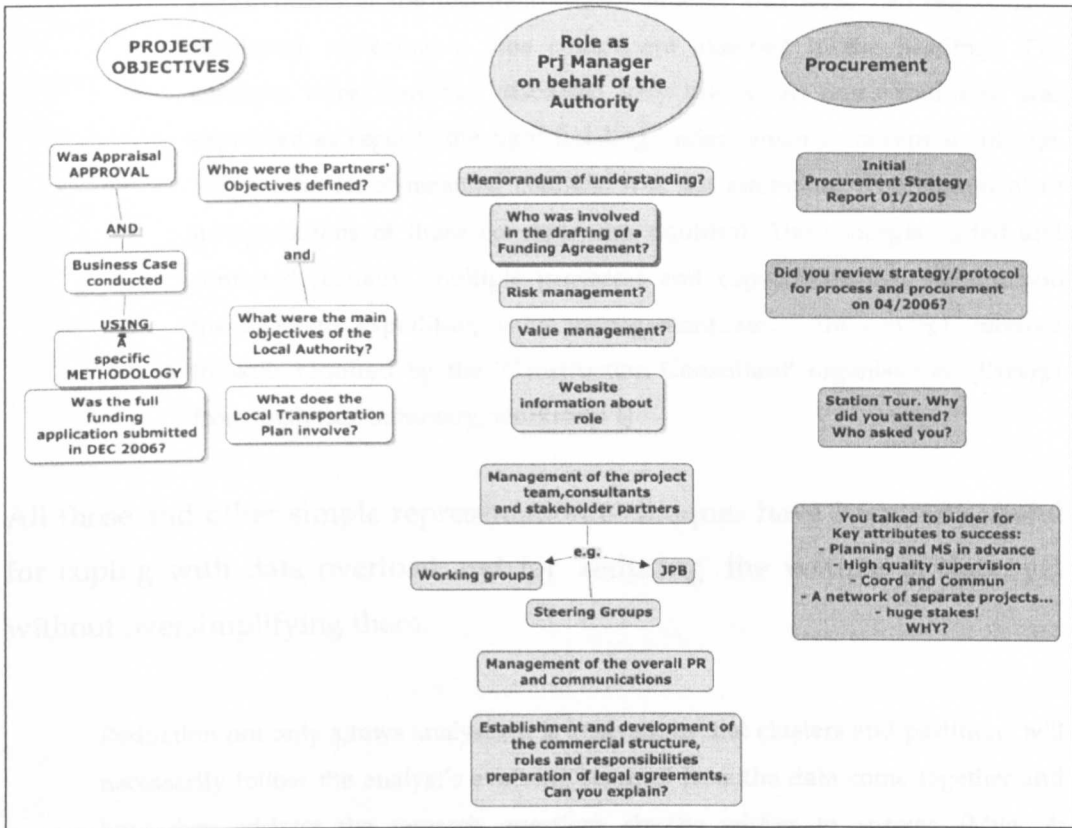


Figure 16. Gap Analysis Map Example (for an interview)

- Analytical summaries: that is, 'field stories' written with various levels of theoretical abstraction (Pettigrew, 1990). Those summaries or 'memos' (Glaser, 1978; Miles & Huberman, 1994), which were the main means of 're-description' (see RRREIC model), were normally written after the documentation of project events and processes. Hence, after almost each meeting, workshop and interview, I produced an analytical summary, which aimed to re-describe the actual event in more abstract terms. For instance, in the first workshop held for the contract award procedure, I re-described project members' conversations referring to the contractual scope of services as brainstorming of abstract concepts:

Various concepts were shouted and categorised under various headings. Those headings were directly related to the particular information requirements of the (contract award) process and were also sequentially displayed, indicating a time component attached to the headings. The concepts were, however, discussed very briefly. At times confusion was expressed as regards the right heading under which a concept should go. Yet, resolution of meaning conflicts was not attempted. The alignment of interpretations of those concepts was doubtful. The concepts varied and connoted (usually) multiple processes and capabilities; e.g. construction management, expediting, value management, etc.... The concepts referred to skills required by the 'Construction Consultant' organisation. (Excerpt from analytical summary, workshop 1)

All those and other simple representation techniques have been very useful for coping with data overload and for 'reducing' the volume of data, yet without oversimplifying them:

Reduction not only allows analysis, it is analysis, in that clusters and partitions will necessarily follow the analyst's evolving sense of how the data come together and how they address the research questions she/he wishes to answer. (Miles & Huberman, 1983, p. 285)

'Data reduction' added significant value to an amorphous body of unrelated information. In my view, 'data reduction' should be regarded as 'data transformation' techniques enabling (rather than restricting) the research process because they facilitate: 1) concept development, 2) creation of concept relationships, 3) constant comparison across situations to validate concept development, 4) theoretical sampling, i.e. collection of additional information in terms of developing further theoretical concepts, 5) the development, verification and revision of emerging hypothesis.

An example of how theoretical sampling was facilitated may be helpful here. In connection to the previous illustration of the use of 'analytical summaries', the creation of a theoretical narrative of events and processes alerted me to future events that might be relevant. For instance, the aforementioned

analytical summary sensitised me to look for subsequent interpretative differences in relation to the meaning of the 'scope of services' required by a 'Construction Consultant'. Not surprisingly, I soon found out that significant project delays regarding the production of the prequalification questionnaire were caused by attempts to resolve misunderstanding about such categories.

With respect to the operation of 'retroduction', I will provide an example of how I approached its implementation. The example relates to the emerging concept of 'conventions of accomplishing contract award processes'. After comparing and contrasting the views expressed and activities enacted by each project member in connection to these processes, I formulated a set of concepts, such as 'attracting the right suppliers', 'selecting criteria', 'comparing bids', 'assessing reputation of suppliers' as well as their relationships. I then wanted to appreciate the area of validity of those concepts. I thus compared and contrasted how the same processes were reported in industry-related journals and in the respective practitioner-oriented literature. The results of this exercise led to the identification of key 'common abstract themes', such as the fact that in all contract award procedures the 'creation of suitable competition' is desirable as well as 'ensuring comparability among bids'. I further explored how the mode of accomplishing a procurement process represented a distinctive mode of engaging with, what appeared to be, a generalised problem solving context. For this reason, I turned to secondary sources on the topic to deepen understanding of contract award procedures. This led me to add new categories to the emerging core 'convention' category, e.g. 'properties of contract', 'contract award procedures', 'contract types', etc. Eventually, I developed a concept of 'convention' in order to identify analytically a generalised mode of engagement enacted by the project members in their effort to accomplish that particular project; a mode of general validity, i.e. ascribed with the ontological status of a 'socially real' entity with certain properties and potentialities.

Commentary on the Analysis of 'Textual Practices'

A significant amount of observational information referred to 'textual practices', i.e. communication practices and uses of various texts as particular kinds of artefacts. 'Inter-textuality' and 'inter-discursive' analysis was conducted in order to: (a) elucidate relations between actual texts, on the one hand, i.e. common themes or shared 'wording' resources, and (b) combination of discourses, on the other hand, i.e. the co-appearance and co-existence of different kinds of argumentation principles in the same text or in a multitude of documents (Fairclough, 2005). For instance, inter-textual analysis revealed the connections between key project texts; relationships which were created by way of copying sections from one document and pasting it into another, i.e. 'cloning text' (please see § 8.3.3.2, p. 276 for an illustration of document relationships).

This 'textual practice' of 'cloning text' was deconstructed through 'inter-textual' and 'inter-discursive' analysis (Fairclough, 2005). The latter approach of probing textual material was particularly useful for 're-describing' and 'retroducting' textual practices. For instance, 'inter-discursive' analysis elucidated what discourses constituted the 'textual practice' of 'cloning text' and facilitated analysis of the causes of that practice. 'Inter-discursive' analysis was also useful for probing into the gradual (i.e. processual) construction of one document. The following table represents an example of how 'inter-discursive' analysis was conducted. I compared the versions of the document produced by different project members and then identified the changes that had been made by each of them. Deletions of text were highlighted, while additions were represented with different colour. By doing so, I was able to uncover which issues each project members focused on.

Table 9. Example of 'Inter-discursive' Analysis

SECTION of SCOPE	Susan (version 1)	John (version 2)	Mathew (version 3)
Co-ordination of Site Labour Arrangements	<p>Forecast, plan and oversee the management arrangements of the project workforce, as will be employed by the Work Contractors.</p> <p>Where possible ensure that the terms and conditions for labour agreements for the various individual work packages are the same across similar trade in order to avoid unfair pay and work conditions for similar trades.</p> <p>Employ such resources as may from time to time be appropriate to form a project multi-service team.</p> <p>.....</p>	<p>Forecast, plan and oversee the management arrangements of the project workforce, as will be employed by the Work Contractors.</p> <p>Gary (project member) to provide wording re collation of man hours for AFR purposes.</p> <p>.....</p>	<p>Forecast, plan and oversee the management arrangements of the project workforce, as will be employed by the Work Contractors.</p> <p>In connection with H&S reporting, the team shall institute appropriate recording and reporting arrangements such that all statutory returns are made as appropriate. The team shall also establish such arrangements as are necessary are put in place so as to ensure that examples and advice on matter relating to both industry and site based best practice are made available to all project participants.</p> <p>.....</p>

For example, the original table (an excerpt of which is the above table), enabled me to create key themes – codes in connection to the deletions, additions and other changes made by each project member. E.g. the project director was making such changes to different versions of the document so as to highlight the importance of a genuine commitment to ‘collaborative working’.

Finally, special attention was paid to the conditions relating to the variation, selection and retention of discursive features (Fairclough et al, 2002); that is, to processes which explain the emergence of particular discourses and not

others. For instance, I re-interpreted 'building procurement models' as 'discursive objects', i.e. as objectifications and filtering devices for the selection and retention of a dominant industry-wide 'project delivery discourse'. I was also attentive to other features of discourses, such as genres and styles (Heracleous, 2006; Fairclough, 2005).

3.5 CHAPTER SUMMARY

In this chapter, I considered what kind of further research is needed in view of my research aim to explain the distinctiveness of coordination. In particular, in the first section of this chapter, I used a 'critical realist' philosophy of science in order to engage in a 'meta-theoretical' discussion. Through this discussion I clarified that further research on coordination should focus on the internal relations between context and actual phenomena and should differentiate among conditions for coordination, actual coordination and experienced coordination. I also argued that the three basic 'modes of reality': 'artefactually real', 'socially real' (regimes of justification) and 'ideally real' (discourses) may be thought of as distinct conditions for coordination. I concluded my meta-theoretical discussion by outlining some normative statements as regards 'how coordination should be studied'; namely, to reframe heterogeneity, historicity, and processuality in organising context and including a notion of 'evaluative' action.

In the second section, I clarified that, on the basis of the conclusions I drew from my meta-theoretical discussion, future coordination research should pursue the creation of explanatory knowledge. I also specified that explanatory knowledge of coordinative phenomena should be developed through the creation and synthesis of abstract and concrete conceptualisations of such phenomena. I concluded this section by arguing that the use of 'retroductive' reasoning can enable the methodical creation of new explanatory knowledge.

Having clarified my assumptions regarding 'what objects' further research on coordination should probe into and through 'what method', I discussed in the third section how I designed and conducted my empirical coordination research. In particular, I adopted an intensive research design approach, which, I argued, could facilitate the conduct of abstract and concrete

research. I also explained how I have used the practical canons of 'grounded theory' in order to create the new explanatory knowledge. With an enhanced awareness of what kind of empirical research I should pursue and how, I made an informed decision to conduct an in-depth study of a construction project in connection to the redevelopment of a major railway station in an EU metropolis (hereafter identified with the pseudonym 'Theta Project') and to focus on a contract award project. I selected that research setting on the grounds that I could use multiple qualitative research (data collection and analysis) techniques for the purposes of abstract and concrete research. I concluded the chapter by presenting those techniques in detail.

I should point out that from my empirical research, I have been able to generate manifold new insights regarding coordination, which I will discuss extensively in the next five chapters.

CHAPTER 4

INTRODUCTION TO RESEARCH RESULTS: THE GENESIS OF A PROJECT VISION

4.1 INTRODUCTION

In the next five chapters, I will present the main research findings of my thesis, upon which I will raise claims for the creation of new explanatory knowledge of coordination.

At this point, I should restate that the empirical setting of my research has been a construction project concerning the redevelopment of a major railway station located in a big metropolis in Europe. For purposes of anonymity and confidentiality, I have used the pseudonyms 'Nopolis' to refer to the big metropolis, 'Nopolis Station (NS)' to refer to its railway station and 'Theta Project' to refer to the construction project in connection to the redevelopment of NS. In view of my 'intensive research' approach, I have also sharpened my focus to investigate coordination on a subproject of the Theta project: the contract award project for selecting a 'Construction Consultant' (CC, title of contract disguised). Therefore, my findings refer to the CC contract award project and its context, i.e. the wider 'Theta Project' context. In the following paragraph, I will explain the architecture of my results presentation.

4.1.1 Rationale of Research Results Presentation

On the basis of my ontological, epistemological and research design commitments, I report on my research findings by taking two steps. As a

first step, I elucidate the properties of the context of the CC contract award project. As a **second step**, I illuminate how those properties are involved in and impinge upon the efforts of organisational actors to accomplish the project and coordinate over time.

With regards to the **first step** (Part A), I show that the project context has two kinds of properties: (A) those historically inherited and (B) those pertaining to the nature and locus of the problem at hand (procurement). It should be noted that all results relating to part 'A' are founded on data from archival information in project documents, publicly available information, secondary sources and interviews (see § 3.4.5, p. 147).

Properties (A) exist, since the contract award project is essentially the historical outcome of three phases: (i) the genesis of an integrated idea for the 'Theta project' (chapters 4), (ii) the development of project objectives and design solution on the basis of justified investment decisions (chapters 5), and (iii) the formulation of the overall procurement strategy (chapter 6). My findings confirm that properties (A) become more and more complex over time, insofar as in each phase the products of previous phases are used. The following figure (No.18) illustrates a chronology of the major project events that preceded and created the context for the CC procurement process.

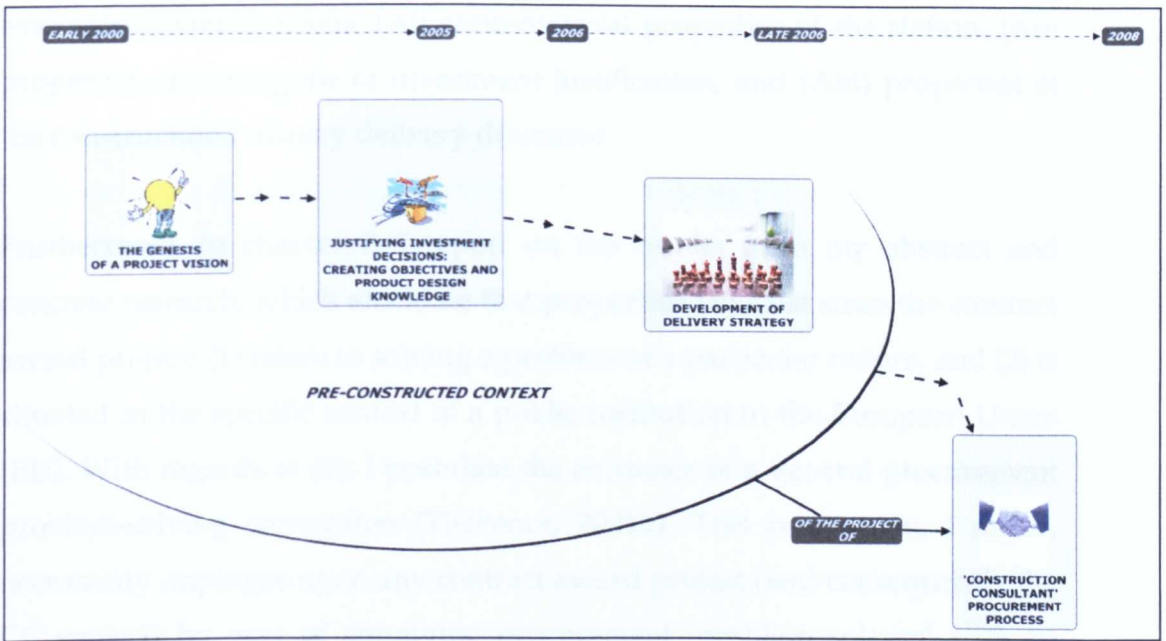


Figure 17. A chronology of major project events

I report on the results from abstract and concrete research into these phases and shed light on the ways the complexity of these properties developed historically. In light of my ontological commitments as regards the intrinsic historicity of organisational reality, I elucidate the historical processes that resulted in the possibility for a CC contract award project. In particular, in chapter 4, I show that, as regards phase (i), the socio-material properties of the railway station conditioned how a future station was imagined and consequently the way a project idea/vision was generated. In chapter 5, I show that, in phase (ii), the development of the project objectives and design solution was constrained and enabled by the properties of a 'regime of investment justification' (general evaluative framework); upon which the project funders drew in order to justify their decisions to invest in the project idea (created in phase [i]). In chapter 6, I show that, as for phase (iii), the properties of a general construction industry 'delivery discourse' conditioned the formulation of the procurement (delivery) strategy, suitable to address the project objectives and design solution (created in phase [ii]); and making the CC contract award possible. Effectively, research findings indicate that the complexity of properties (A) pertained to the historically

assembled heterogeneous: (Ai) socio-material properties of the station, (Aii) properties of the regime of investment justification, and (Aiii) properties of the construction industry delivery discourse.

Furthermore, in chapter 7, I report on the results from my abstract and concrete research, which elucidate that **properties (B)** exist since the contract award project: (1) refers to solving a problem of a particular nature, and (2) is situated in the specific context of a public institution in the European Union (EU). With regards to (1), I postulate the existence of a general procurement problem-solving convention (Thévenot, 2001b). This convention, I argue, necessarily impinges upon any contract award project (and consequently the CC project) by way of supplying procurement 'problem solvers' with an abstract evaluative framework. The distinct properties of this framework, I further argue, enable and constrain how 'most suitable' suppliers/contractors can be selected. With regards to (2), findings indicate that the EU legal discourse is necessarily incorporated into the abstract evaluative framework of the procurement convention because the 'Theta project' client is a public institution of the EU area. As a result, there is a necessity to guarantee the creation of a single market in the EU area during contract award projects. Essentially, the complexity of properties (B) pertains to the heterogeneous properties of: (B1) the procurement convention and (B2) EU legal discourse.

With the **completion of the first step**, I argue that the CC contract award project is embedded in a context characterised by a plurality of properties (Ai, Aii, Aiii, B1, B2).

With regards to the **second step** (Part B), in chapter 8, I report on results I obtained from my in-depth and longitudinal investigation of the procurement process. I illuminate how the project context properties are involved in and impinge upon what actors coordinate and how over a period of time (Chapter 8). Impingements, I argue, manifest themselves to

organisational actors as heterogeneous demands, which they need to address for the purposes of successful project accomplishment. In essence, organisational actors coordinate by 'engineering' compromises among these heterogeneous demands in order to get their job done. I discuss in detail how this happens in all stages of the project: from advertising the contract and preparing a pre-qualification questionnaire to assessing bidders' 'partnering capabilities' and evaluating their bids.

Findings also indicate that heterogeneous demands influence the accomplishment of coordination in a differentiated fashion. That is, the properties of the project context are not only heterogeneous, but also exert differentiated influence on the procurement process accomplishment over time. For example, when organisational actors 'engineer' compromises, i.e. coordinate, they are always constrained and enabled by properties (B), which pertain to the nature and locus of procurement problem solving; while properties (A), especially (Ai) and (Aii) impinge upon organisational actors only at certain stages. Yet, all context properties, I argue, have the potential to impinge upon project accomplishment. With the **completion of the second step**, I assert, it is possible to draw general conclusion and explain why and how coordination is a distinctive organisational phenomenon (discussed in chapter 9).

The figure (19) in the next page illustrates the architecture of the presentation of my research results.

4.1.1 Structure of Research Results Presentation

The presentation of the research results is organised in two parts. Part 'A', consists of chapters 4, 5, 6 (historical analysis of context) and 7 (analysis of problem context). Part 'B' consists of chapter 8. In this last results chapter I elucidate how emergent coordination of situated and organisational activities

to accomplish the contract award process was necessarily conditioned by the heterogeneous properties of the project context (discussed in part 'A' contributed).

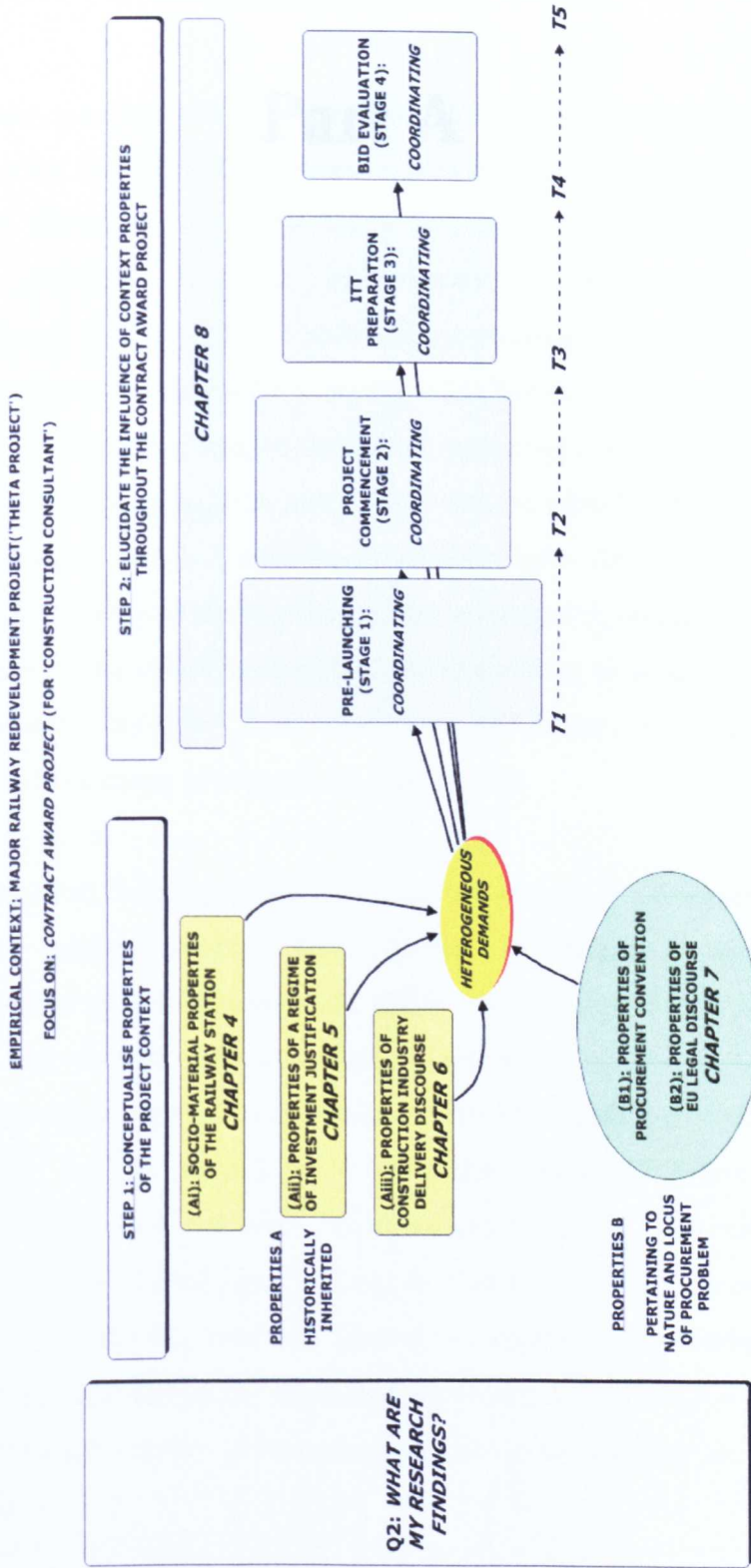


Figure 18. Architecture of research results presentation

Part A

4.2 THE GENESIS OF A PROJECT VISION

In this chapter, I explicate the processes that led to the genesis of a particular idea – vision for the NS redevelopment project; all results in the following sections are founded on data from archival information in project documents, publicly available information, secondary sources and interviews (see § 3.4.5, p. 147). I provide an exegesis of how and why the project was eventually funded by multiple stakeholders, whose distinctive objectives in combination conditioned the creation of a joint imaginary for a future NS. By shedding light on why and how the idea for the project came about in particular ways, I essentially explain how the properties of the project context developed during this initial ‘structuring phase’. This chapter is the first part of my effort to elucidate the historical processes that resulted in the possibility for the CC contract award project and therefore for coordinative phenomena to happen on that project.

In order to do that, I first present results from my abstract research, which indicate that railway stations have distinctive enduring properties as ‘artefactually real’ entities (Fleetwood, 2005). Those properties, I argue, refer to the ‘dual identity’ of railway station as ‘nodes’ of railway networks and ‘places’ in city areas and have the potential to constrain and enable how a railway station can be probed for a particular social purpose. This ‘dual identity’, however, does not exert its influences naturally, but only through the medium of institutional agency (Leca & Neccache, 2006). I then report on results from my concrete research (based on archival information), which indicate that the institutionally mediated influence of NS’ dual identity was manifested throughout the ‘structuring phase’ of developing an integrated project vision.

4.2.1 Railway Stations as 'Nodes' and 'Places'

I begin with the premise that for an idea for redeveloping a railway station to be possible, the existing station itself constrains and enables what actors can think of and do with it. My argument is that there are distinctive enduring characteristics of railway stations, which condition decisively any engagement with them - in this context for imagining a future NS. I regard railway stations as objects, which, though empirically easily recognisable, also possess abstract durable properties; that is, they are 'artefactually-real' entities (see § 3.2.5.1, p. 116). Stations are 'artefactually real' entities not only because they are very robust building structures, but primarily because they have long-lasting identity stemming from persisting patterns of human engagement with them (Bertolini, 1996); i.e. from being historically, symbolically and materially incorporated into people's everyday practices.

As part of my abstract research, I have utilised recent planning studies in order to explain the unique identity (property) of railway stations, i.e. their properties as 'artefactually real' entities, and especially of central stations in EU metropolises, such as NS. In particular, Bertolini and Spit (1998) wrote:

As a geographical entity, a railway station has two basic, though partly contradictory, identities, it is a node: a point of access to trains and, increasingly, to other transportation networks. At the same time, it is a place: a specific section of the city with a concentration of infrastructure but also diversified collection of buildings and open spaces. (p. 9, italics original)

A node is a point at which subsidiary parts originate or centre. Together with 'lines' or 'channels' (or 'arches' or 'links'), nodes (sometimes called 'points' or 'vertexes') are the basic components of a network - the points where the lines are 'knotted', 'secured', 'interconnected' or 'interrelated'. (p. 10)

On the other hand, by thinking of railway stations as places:

...the focus here is on the *piece of city* incorporating the station – on what is sometimes called the *station neighbourhood* or the *station district*. (Bertolini & Spit, 1998, p. 11, italics original)

Stations are defining locations or gateways to big cities, a fact that highlights the nature of stations as more than just transport links. Edwards also argued (1997, cited in Haywood, 2005) that:

...the modern railway station is a dramatic and powerful statement of transport provision – more ambitious and with greater potential for celebrating the public realm than most building types. (p.27)

In the following figures, I provide an illustration of the dual identity of the Westminster tube station in London.

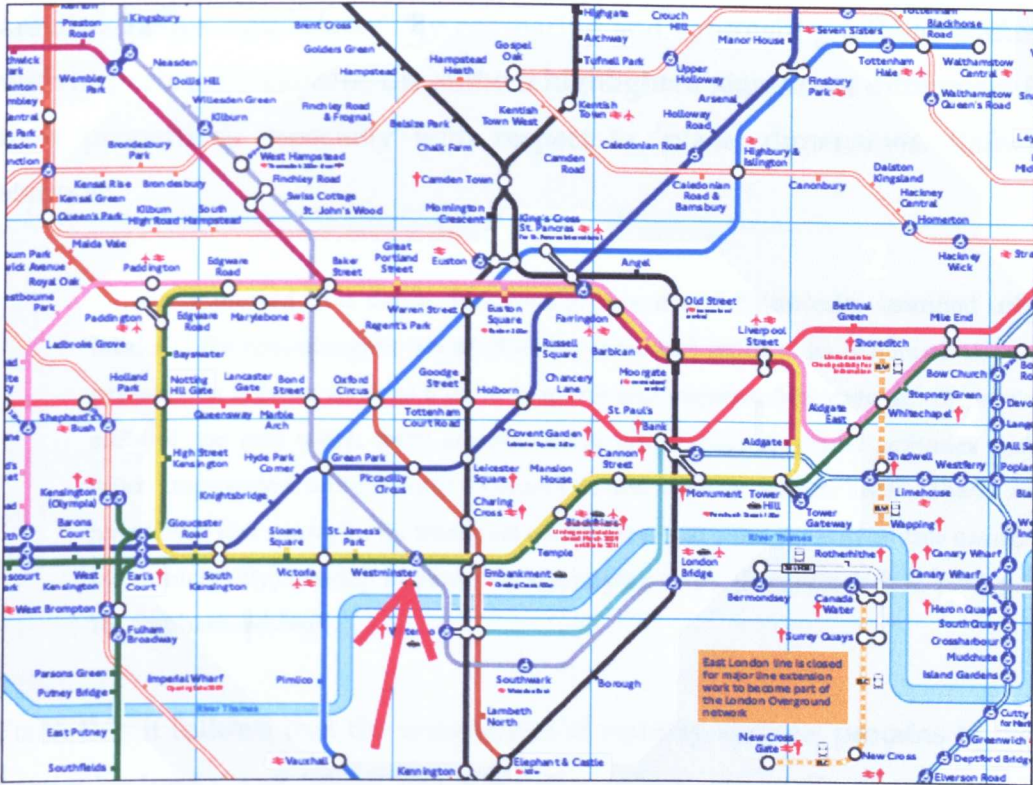


Figure 19. Westminster station as a node in the London tube network

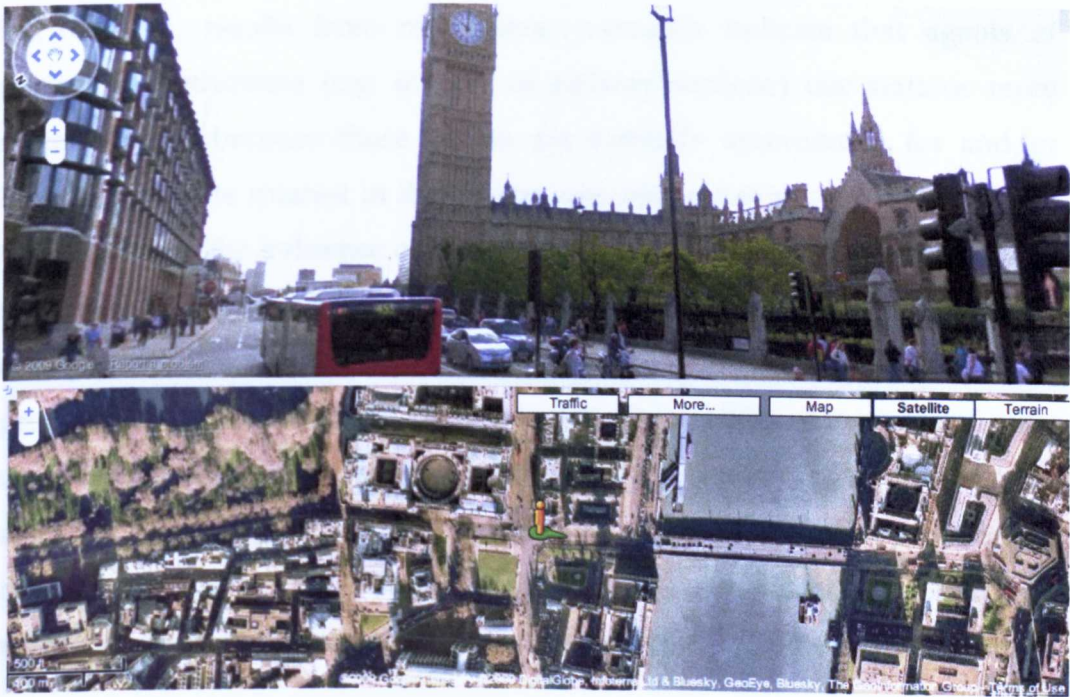


Figure 20. Westminster station as a place in London city centre. (© 2009 Google)

Furthermore, Bertolini and Spit observed (1998) that airports and seaports are also 'nodes' and 'places'. By comparing and contrasting railway stations with airports and seaports, the authors highlighted significant differences (in their properties), especially with respect to 'place' dimensions. Railway stations:

... are immersed in a dense, functionally mixed and historically stratified urban fabrics... the non-transport world (the 'city close by') tends to have a much stronger presence in railway stations than in seaports and airports. Not only are there more sorts of use and users; there are also more non-transport related activities and a more fragmented administrative context in the railway station areas. There, *node jurisdiction* (for example, by transport companies) and *place jurisdiction* (for example, by municipality) overlap in particularly complex ways. (Bertolini & Spit, 1998, p.15-16, emphasis added)

From this it follows that the uniqueness of railway stations pertains to their particular 'node' and 'place' characteristics, which are qualitatively different from the characteristics of other transportation modes.

Furthermore, results from my abstract research indicate that agents of particular institutions (e.g. owners of railway stations) use stations more systematically because those agents are formally accountable for and/or have a legitimate interest in the design, use, and functioning of the stations. Consequently, the influence of the 'dual identity' of stations is institutionally mediated (Leca & Neccache, 2006) as regards particular forms of engagement, because institutional interests are internally linked to specific properties of the stations (Bertolini and Spit, 1998). More specifically, companies operating in railway industries have major stakes in the node elements of stations, while local authorities, responsible for the provision of civic goods, e.g. enabling social mobility, stimulating local economies etc., regard stations as important neighbourhoods in cities⁹. On the basis of this

⁹ From this, of course, it does *not* follow that there are *no other* actors with active involvement in and stakes for a station's operations (in the broadest sense). On the contrary, the very

'theoretically sensitive' finding, I explore in the following paragraph how the influence of the 'dual identity' of stations is institutionally mediated in these two contexts (railways & local governments).

4.2.2 Institutionally Mediated Influence of Railway Stations

Railway infrastructure companies have vital institutional interests in the node dimensions of stations in the railway network as owners of railway stations (Bertolini, 1996); e.g. exploiting stations as sources of property income, maintaining and improving their functionality. In addition, these companies may have jurisdiction over stations, yet their institutional interests are interlocked with the interests of many other industry stakeholders and predominantly of the ministry of transportation (Bertolini, 1999); e.g. training operating companies, rolling stock companies, and maintenance companies. Also, the railway industry structure is usually vertically integrated and coordinated by central government and the respective ministry of transportation (Haywood, 2005). As a result, the railway infrastructure companies are generally heavily dependent upon central government's railway planning and general transport policies and priorities (Haywood, 2005).

On the other hand, station areas are of great institutional interest to local authorities, a key task of which concerns the effective and modern design of urban environments (Bertolini, 2006). City councils and municipalities recognise central railway stations as important elements of urban development and regional economic redevelopment plans. It should be noted that their institutional interests also depend on other institutions; particularly, on central government, which defines the national planning and thus the overarching framework for local government policies (Bertolini, 1996).

users of stations as well as visitors of the city are particularly, if not more actively, affected by its node-place characteristics.

Furthermore, the jurisdictional powers over a railway station may not be equally distributed to railway companies and local authorities. For example, local authorities, though legitimate stakeholders of station areas, may not have sufficient jurisdictional rights to implement their policies (Haywood, 2005), which are internally related to the 'place' identity of stations. In that sense, railway stations may be situated in multiple institutional contexts, which may or may not share equal jurisdictional powers over stations (Peek et al, 2006) and therefore be more or less able to pursue their institutional interests.

To conclude, the main findings from my abstract research indicate that railway stations are neither points of interconnection (like bus stops), nor buildings in city centres (like city halls). Rather, the distinctiveness of railway stations as 'artefactually real' entities emanates from their dual identity. Furthermore, particular engagements with railway stations pertain to specific institutional contexts. This characteristic, I argue, implies that some influences of stations on social practices are institutionally mediated; or, more accurately, mediated by 'jurisdictionally empowered' institutions. On the basis of this framework, I elucidate in the next section how the institutionally mediated socio-material properties of NS conditioned the genesis of a project vision, upon which all subsequent project activities were founded; including, of course, the CC contract award project (discussed in detail in chapter 8).

4.2.3 Institutionally Mediated Influence of Nopolis Station (NS)

NS is used by dozens of thousands of people everyday who travel to and from the city centre. It is a public place, recognisable by millions of people. NS is one of the busiest stations of the country's vast and dense railway network. It was first built in the 19th century, and was completely rebuilt in

1960s (Nopolis Local Government, Planning Committee Report, 2006). Until late 1990's, the physical characteristics of NS had remained largely the same. Yet, the uses of the station by railway passengers had changed dramatically. With a rapid growth in demand for rail transport (of about 30% over the last 5 years of 1990s), the station increasingly became overcrowded and exceeded its original design capacity (NS Redevelopment Project, Business Case Report, 2006). This change in the way the travelling public used the station by at the end of 1990's, i.e. much more heavily and frequently, gradually became of great concern to different institutions for different reasons.

As part of my concrete research, I first discuss how exactly and why institutional interests (pertaining exclusively to the 'node' properties of NS) of the Ministry of Transportation Rail Department (MOTRD) and Railco (Railway infrastructure company) were 'aroused' due to the deteriorating situation at NS. Effectively, 'arousal of institutional' interests refers to the process through which the agents of an institution recognise an opportunity/risk that connects to the interests of their institutions. In this context, I show, that arousal of institutional interest of MOTRD and Railco forced them to act and imagine the station as an 'improved node' only. I then elucidate how, due to lack of funding opportunities in the railway industry, MOTRD and Railco turned to a number of local government institutions and sought funding. This development resulted in 'arousing' additional institutional interests (pertaining principally to the 'place' properties of NS) and in identifying accordingly investment opportunities. I effectively elucidate that institutional interest 'arousal' originating from an expanded partnership among multiple institutions led to imagine collectively the station not only as an 'improved node', but also as an 'improved place'.

4.2.3.1 NS from the Perspective of the Ministry of Transportation (MOT)

Institutional interests

The Ministry of Transportation Rail Department's (MOTRD's) role is (at the time of writing) to oversee the railway network – part of public infrastructure, to develop strategic plans and to provide leadership for the maintaining and improving the quality of that infrastructure (MOT, Rail department, annual report, 2002-2003). As a leader of the railway industry, the MOTRD sets the strategic direction for the development of the railways on the basis of various strategic studies (MOTRD, annual report, 2002-2003), which aimed to:

- ✓ Enhance understanding of how the rail network in a given area could be developed in support of the anticipated growth in passenger and freight services;
- ✓ Identify options at a strategic level for addressing capacity constraints;
- ✓ Agree with regional partners the priorities to be progressed.

'Arousal' of Institutional Interests

Consequently, in late 1990's a 'Station Capacity Study' was launched to examine and assess capacity challenges at all stations of the network. The broad conclusions of this work were that:

Network growth during and beyond the Ten Year Plan period (upon which the MOT based its strategy for the railways) will result in increased and in some cases unacceptable levels of passenger congestion at stations unless improvements were made to them. Typical congestion related findings were:

- inadequate passenger queue management
- inadequate passenger flow capacity in key circulation routes, both vertical and horizontal; and
- inappropriately located train information screens and other facilities, causing passenger congestion to occur. (Railco, Capacity & Enhancement Report, 2003)

Congestion can often be managed safely without any significant effect on the convenience or passenger amenity, but in some cases enhancement investment in station improvements will be necessary. At major stations, which are managed by Railco (such

as NS), the findings are more severe and are likely to impact on the overall capacity of the network to carry forecast growth in passenger volumes.

MOT's Rail department, through the production of valid evidence, officially attested the problematic situation at NS. The ministry decided to collaborate with industry stakeholders and especially the railway infrastructure company, Railco, in order to explore options to tackle those challenges. While network capacity issues at NS were crucial for Railco's operations as well, the latter was primarily concerned about NS for different reasons.

4.2.3.2 NS from the Perspective of Railco

Institutional interests

Railco owns the entire railway infrastructure, signals and stations of the country. Although not privatised, Railco has to run on 'commercial business lines'. The main business objectives of Railco are to ensure safety of the travelling public, to invest in the railway system, to improve operational performance, to guarantee financial control, and to rationalise asset exploitation. The main funder of Railco is MOTRD, which is also responsible for providing strategic leadership and direction to Railco (Railco website).

An important part of Railco's business and source of income is the exploitation of major stations, such as NS. In order to do that more effectively, Railco has created a special department responsible: Railco Property (Railco Management Plan, 2005). One of the key activities of Railco Property is major stations based trading. According to Railco's business plan (2007), the department had a clear mission.

Railco Property is focused on supporting the operational railway by optimising value from the company's estate portfolio so that this can be invested in the operational railway.

'Arousal' of Institutional Interests

Not surprisingly, the changing circumstances at NS were of great concern to Railco and Railco Property.

Many managed stations are reaching a point of utilisation by passengers in the peak where intervention is required to prevent passenger crowding exceeding acceptable levels. The intervention would usually take the form of closing off platforms and / or the concourse.... The situation is more acute at some stations than at others. For example, NS is particularly at risk of this situation.... The long-term solution for all of the stations is likely to involve a substantial enhancement scheme, for which there is currently no funding.

A key risk to the sustainability and growth of income from major stations based trading income is the forecast growth in passenger numbers which, if not met by commensurate investment to create larger stations, can only be accommodated, in the short-term, by the selective or wholesale removal of retail facilities. The loss of such property revenues from the travelling public and other station users would lead to additional costs for the rail industry through the loss or reduction of the property support for access charges (Railco Management Plan, 2005)

Evidently, Railco, and especially Railco property, regarded the current conditions as a big threat to achieving key future business objectives. There were not only safety risks, but also the possibility of a significant decline in future revenue.

4.2.3.3 Exploring Options to Improve NS as a 'Node'

As a result of the 'arousal' of their institutional interests, MOTRD and Railco reacted jointly to the deteriorating node circumstances at NS. They decided that a systematic examination of options to improve the situation at NS

should be pursued. They jointly set up a committee in consultation with local stakeholders, such as the Nopolis Local Government (NLG) and the Nopolis Regional Transport Authority (NRTA) in order to explore possibilities for intervening at NS. In 2001, the committee (led by Railco) published their first report, which concluded that NS was of strategic priority to the national and regional network and that enlargements in the railway capacity had to be made. It was also recognised that the cost of any interventions would be very high. Eventually, it was agreed that a strategy for enhancing capacity at the existing station should be further developed in order to assess more rigorously the particular scheme development issues, e.g. technical and economic feasibility.

As a result, in 2001, Railco (sponsored by MOTRD) procured external consultants to explore enhancement options. An approximate €4 million technical study was completed by a leading engineering company in 2003. The outcome was a scheme proposal of a total estimate cost of approximately €200 million. The MOTRD also concluded that the proposal, known as 'NS Improvement Scheme' (a pseudonym), could not be funded by the railway industry (NS Redevelopment Project Design Report, 2006). The government budget for the railways was too tight to provide the necessary funds. Addressing the (node-related) capacity and congestion issues, though very crucial for achieving both MOTRD's and Railco's objectives, could not be materialised through railway funds only. Under the pressure to improve the increasingly problematic situation at NS, they explored alternative options to finance a future redevelopment scheme.

4.2.3.4 In Search for Project Investors

The MOTRD and Railco sought support from their regional stakeholders; the Nopolis Local Government (NLG), the Nopolis Development Agency (NDA) and the Nopolis Regional Transport Authority (NRTA). All those groups

were invited to not simply participate in a consultation process for a scheme (as they were in 2001), but to explore, as legitimate stakeholders, the possibility of contributing financially to an enhancement project. In other words, they had to identify and assess investment opportunities for a future enhancement scheme. Resultantly, each of them envisioned a new NS, which would improve not only its 'node', but primarily its 'place' characteristics, which hadn't been considered before by the railway industry stakeholders. In view of my abstract research results, this differential 'envisioning' can be explained as the influence of the institutionally mediated dual identity of NS, through the 'arousal' of institutional interests. In what follows, I elucidate how exactly this 'arousal' occurred and why.

4.2.3.5 NS as an Investment Opportunity for Nopolis Local Government (NLG)

Institutional interests

NLG's strategic objectives are outlined in local planning policies, which predominantly put emphasis on targets to enhance transportation infrastructure, and to strengthen the economic prosperity and competitiveness of the city. According to NLG's policy-driven plans, such as the development plan, transport plan, and performance plan, NLG should aim at reducing congestion, and improving accessibility, air quality and road safety (NLG Cabinet Report, 2004). NLG has an institutionally defined vision to make Nopolis a global competitive city, to make attractive the urban environment and infrastructure, and improve the local economy. Investing in transport projects is of great interest for NLG, since recent transportation studies highlight the multiple economic and social benefits of improved transportation systems (Government Transport Study, 2006).

'Arousal' of Institutional Interests

For NLG, a potential NS redevelopment scheme could address most of its objectives, since it provided multiple institutionally defined benefits: improved railway facilities, 'mode shift' from road to rail transport (reducing traffic congestion), enhanced accessibility to the station for pedestrians as well as 'walk time benefits', economic revitalisation, triggering growth and other development opportunities, and enhancing economic, social and environmental sustainability (NS Redevelopment Project Business case, 2006). Also, the NS station area was underdeveloped and right at the heart of the city; regenerating that area represented a strategic opportunity (Outline Planning Application, NS redevelopment project, 2006).

In short, when NLG was invited to participate as an investor in a potential NS redevelopment scheme, NLG's institutional interests were 'aroused' to envision a future NS both as better 'node' and 'place'.

4.2.3.6 NS as an Investment Opportunity for Nopolis Development Agency (NDA)

'Arousal' of Institutional Interests

The Nopolis Development Agency's (NDA's) role is to take initiatives to stimulate economic growth in the region and to create the conditions for enhancing regional competitiveness and inward investment. Strikingly, NDA became very keen on becoming a funding partner of an NS redevelopment proposal, even though its official remit did not include investment in transportation hubs (NDA Corporate Plan, 2005-2008). When invited to participate, NDA welcomed the proposal due to its great potential to deliver regeneration benefits. In fact, the NDA was willing to make a major contribution of about €130million! In NDA's CEO's words, the proposal:

...marks a significant step forward towards developing a new look station for Napolis. NS is the main gateway to our city, and it is important that people's first impressions when they arrive in the region are the right ones... If the region is to achieve its vision of becoming a world-class region - as set out in the Regional Economic Strategy - then it has to have a world-class transport infrastructure to match. (Napolis Local Newspaper, 2005)

NDA's vision for a new NS was to become the catalyst for regeneration according to what the economic strategy defines as regeneration, namely the creation of new jobs and businesses, reclaiming brownfield land, private sector leverage and 'visual amenity benefits'. The following excerpt from an interview with Pat, NDA's project manager for the NS enhancement scheme, exemplifies how NDA's institutional interests were roused:

Question: In NDA's website, there are certain principles, pillars, delivery vehicles, and core outputs... I was just wondering how does the NS redevelopment project fit within those?

Pat: a good question. You've gathered from a lot of the projects that the agency involves itself in... fill into the specific delivery vehicles, which were purposely set up to deliver against the headline or strap line of government's remit to the agency, like regeneration zones, high technology corridors, those sort of things. But that didn't preclude other interventions outside of those delivery vehicles that could demonstrate benefits to the wider economic regeneration agenda. That is very much the case with the NS project. It cuts right across most of what the agency does at a high level. Yes, we have had to identify certain specific impacts, which were expected to come from the scheme ... better access to jobs, skills, training... So, by better stations serving higher numbers of rail travellers in a better way... It can get people in and out of the city and by inference the region through a better transport hub. So, you can improve the chances of inward investment, leisure and tourism... all the things that drive economic growth can come from improved transport hubs

In short, when NDA was invited to participate as an investor in a potential NS redevelopment scheme, NLG's institutional interests were 'aroused' to envision a future NS as better 'place'.

4.2.3.7 NS as an Investment Opportunity for Nopolis Regional Transport Agency (NRTA)

Institutional Interests

NRTA's role is to promote and develop public transport across the wider Nopolis area. NRTA's mission is to transform public transport so that people living in the area have a 'world-class' public transport system and to ensure that everyone in the region benefits from an effective public transport system that meets the economic, social and environmental needs (NRTA, 20 year transport strategy, 2003). Also, the institutional interests of NRTA, like the previously mentioned institutions, could be 'aroused' only in particular ways:

It is vital that the resources available to NRTA, both revenue and capital, are applied in support of agreed policies and priorities. This requires a well-developed process for generating new initiatives, especially for the capital programme, together with detailed monitoring and project management, to allow adjustments to be made if necessary to maximise the effective use of resources. (NRTA performance plan, 2006)

'Arousal' of Institutional Interests

Accounting for its strategic targets, NRTA identified that NS represented an investment opportunity, since NS's diverse nodal characteristics, i.e. in term of both the railway network and other local public transportation networks, e.g. bus and tram could be improved. For NRTA, a new station could be transformed into a 'multi-modal' integrated transport interchange by improving accessibility to other transport systems.

In short, when NRTA was invited to participate as an investor in a potential NS redevelopment scheme, NLG's institutional interests were 'aroused' to envision a future NS as better 'node' of multiple transportation systems.

4.2.4 The Genesis of an Integrated Project Vision: NS Imagined as an Improved 'Node' and 'Place'

Until 2003, redeveloping NS was considered only a 'railway endeavour', since the institutional interests of only the MOTRD and Railco were 'aroused'. If anything were to change at NS it would relate to its 'node identity', e.g. increasing passenger capacity, reducing congestion, increasing passenger circulation, maintaining and/or improving property gains for Railco. However, the invitation of MOTRD and Railco to NLG, NDA and NRTA to contribute financially to a redevelopment project made NS more than a 'railway issue'. Eventually, in 2004, the funding partners utilised the ideas of the initial 'NS Improvement Scheme' (outcome of MOT's and Railco's joint study in early 2003) and expanded those in order to address both 'rail passenger capacity issues' and 'urban design, regeneration and connectivity aspirations' for the station. Their joint proposal was estimated (at that time) at €400 million (NLG cabinet report, 2005).

In fact, that invitation would alter the distribution of jurisdictional powers over the station among a multitude of institutions. This resulted in 'arousing' NLG's, NDA's and NRTA's institutional interests, which were internally related to both the 'node' and 'place' socio-material properties of NS. NS was thus envisioned as improved prominent and regenerated location in the urban configuration, with enhanced urban design and connectivity, with better accessibility to the city, as well as with upgraded 'transport interchange' facilities.

It was through the medium of the not initially intended and atypical partnership among MOT's rail department, Railco, NLG, NDA and NRTA

that the (institutionally mediated) influence of the dual 'node-place' identity of NS could be manifested and objectified in the creation of an integrated project vision.

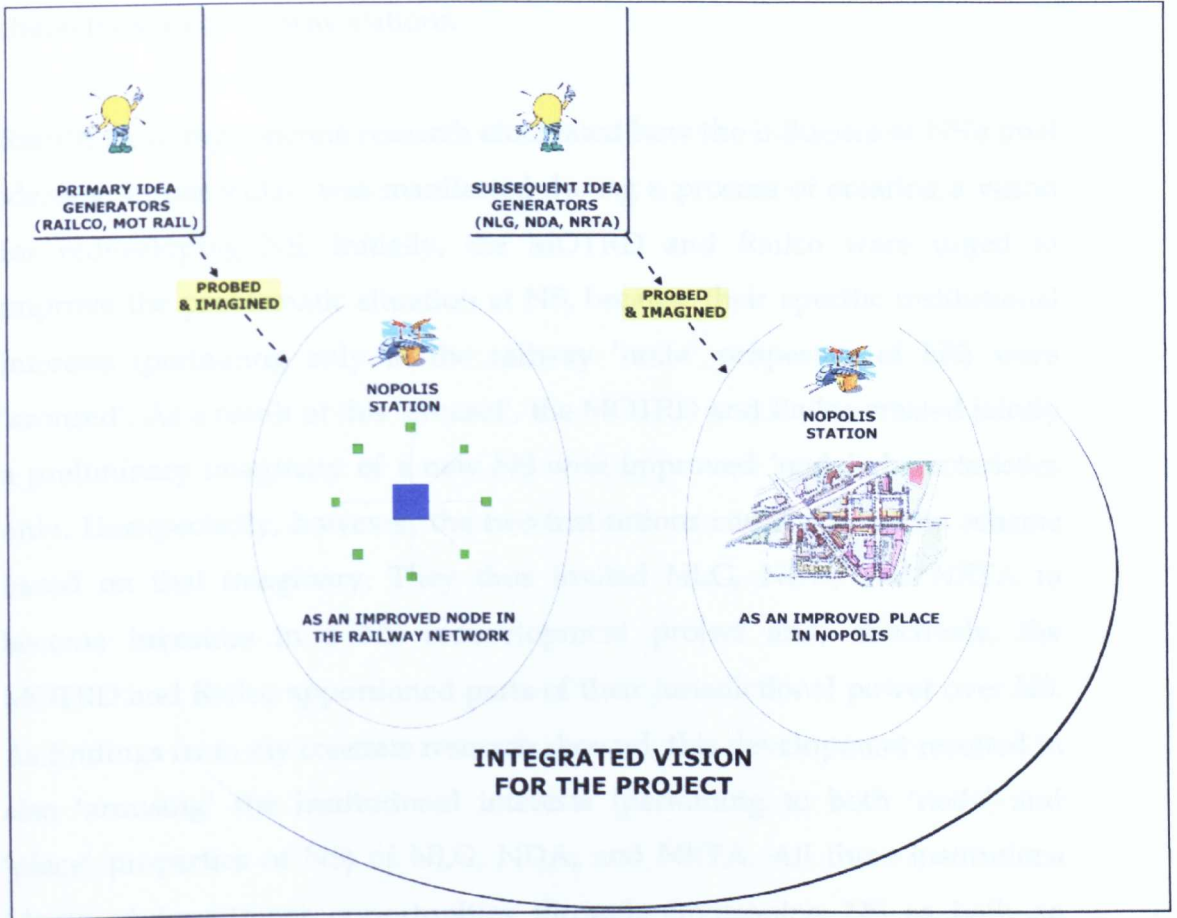


Figure 21. The Genesis of an Integrated Project Vision

4.2.5 The Genesis of a Project Vision: Conclusions

In this section, I explained how the idea for the redevelopment of NS came about and thus completed the first part of my effort to elucidate the historical processes that resulted in the possibility for a CC contract award project and therefore for coordinative phenomena to happen on that project. Results from my abstract research indicated that railway stations are 'artefactually real' entities endowed with enduring distinctive properties; that is, a dual

'node-place' identity. I also clarified that the influence of this dual identity can be institutionally mediated, insofar as the interests of jurisdictionally powerful institutions, predominantly railway companies and local governments, are internally related to the 'node' and/or 'place' characteristics of railway stations.

Results from my concrete research elucidated how the influence of NS's dual identity, in particular, was manifested during a process of creating a vision for redeveloping NS. Initially, the MOTRD and Railco were urged to improve the problematic situation at NS, because their specific institutional interests (pertaining only to the railway 'node' properties of NS) were 'aroused'. As a result of this 'arousal', the MOTRD and Railco created jointly a preliminary imaginary of a new NS with improved 'node' characteristics only. Unexpectedly, however, the two institutions could not fund a scheme based on that imaginary. They thus invited NLG, NDA, and NRTA to become investors in a NS redevelopment project and, effectively, the MOTRD and Railco apportioned parts of their jurisdictional power over NS. As findings from my concrete research showed, this development resulted in also 'arousing' the institutional interests (pertaining to both 'node' and 'place' properties of NS) of NLG, NDA, and NRTA. All three institutions identified investment opportunities through envisioning NS as both an improved 'node' and 'place'. With the increase in the number of 'funding partners', the influence of NS as an 'artefactually real' entity was manifested through institutional mediums (or more accurately through jurisdictionally empowered institutions); and made the creation of an integrated vision for the redevelopment of NS possible.

In essence, through the production of a specific outcome, an integrated project vision, this 'structuring phase' culminated in the development of specific properties of the context for all subsequent project activities: the (institutionally mediated) socio-material properties of NS as an 'artefactually real' entity. As I will show, in all 'structuring phases', which followed, the

manipulation of and/or reliance on the project vision was perplexed, precisely because engagement with the vision entailed the potential manifestation of NS's dual identity. The integrated vision for a new NS was more than a concept or a creative idea. Rather, it was an imaginary contingently produced by institutional agents, who were constrained and enabled by NS's dual identity. Conclusively, any further usage of or reliance on the vision would be necessarily conditioned by the socio-material properties of NS as an 'artefactually real' entity, which made that vision possible in the first place.

In the following chapter, I will exemplify the significance of this finding further by examining a subsequent 'structuring phase': how institutional agents took hold of the joint imaginary in specific ways in order to guarantee investment justification and develop the necessary product design knowledge. I will show how each partner elaborated the 'investment opportunities' stemming from such vision and clarified its 'investment merits'. The outcome of the subsequent discussion of this 'structuring phase' will be to elucidate how additional properties of the context for the redevelopment of NS developed and resulted in the construction of further possibilities for a CC contract award project and therefore for coordinative phenomena to happen on that project.

CHAPTER 5

JUSTIFYING INVESTMENT DECISIONS & DEVELOPING THE PROJECT'S OBJECTIVES AND DESIGN SOLUTION

5.1 INTRODUCTION

As indicated in the previous discussion, the creation of an integrated vision for the NS redevelopment project was fundamentally based on the assumption that different sources of finance would be utilised. More specifically, the NLG would seek to source 70% of the total public funds required for the project. Approximately 45% of that amount would be secured through funding provided by the Ministry of Transportation (MOT) in connection to the Nopolis Regional Transportation Plan (NRTP). While 25% of the funds would be obtained from NDA, which in turn had to get final approval from the Ministry of Economic Development (MOED). Railco would secure 25% of the total funds through a specific (to railway projects) procedure from the MOTRD. Finally, NRTA would contribute 5% from its own funds. The estimated full budget was approximately €400m.

In addition, the heterogeneous funding portfolio for a future NS redevelopment project necessitated the development of a governance structure, which defined relationships among partners. The NLG became the 'Project Leader', since it would assemble project funds from all sources (with the exception of Railco's) (NLG committee report, 'memorandum of understanding', 2006). Whereas Railco became the 'Project Deliverer' - the main procurement body during the 'design development stage'. This decision was made due to the fact that Railco owned the station and reserved the statutory rights for authorising and commissioning various technical surveys and other engineering work at the station. They also had better

understanding of crucial interfaces with railway and other (adjacent land) stakeholders, who were to be consulted during the design solution development (ibid). The following figure illustrates the funding portfolio and the project governance structure.

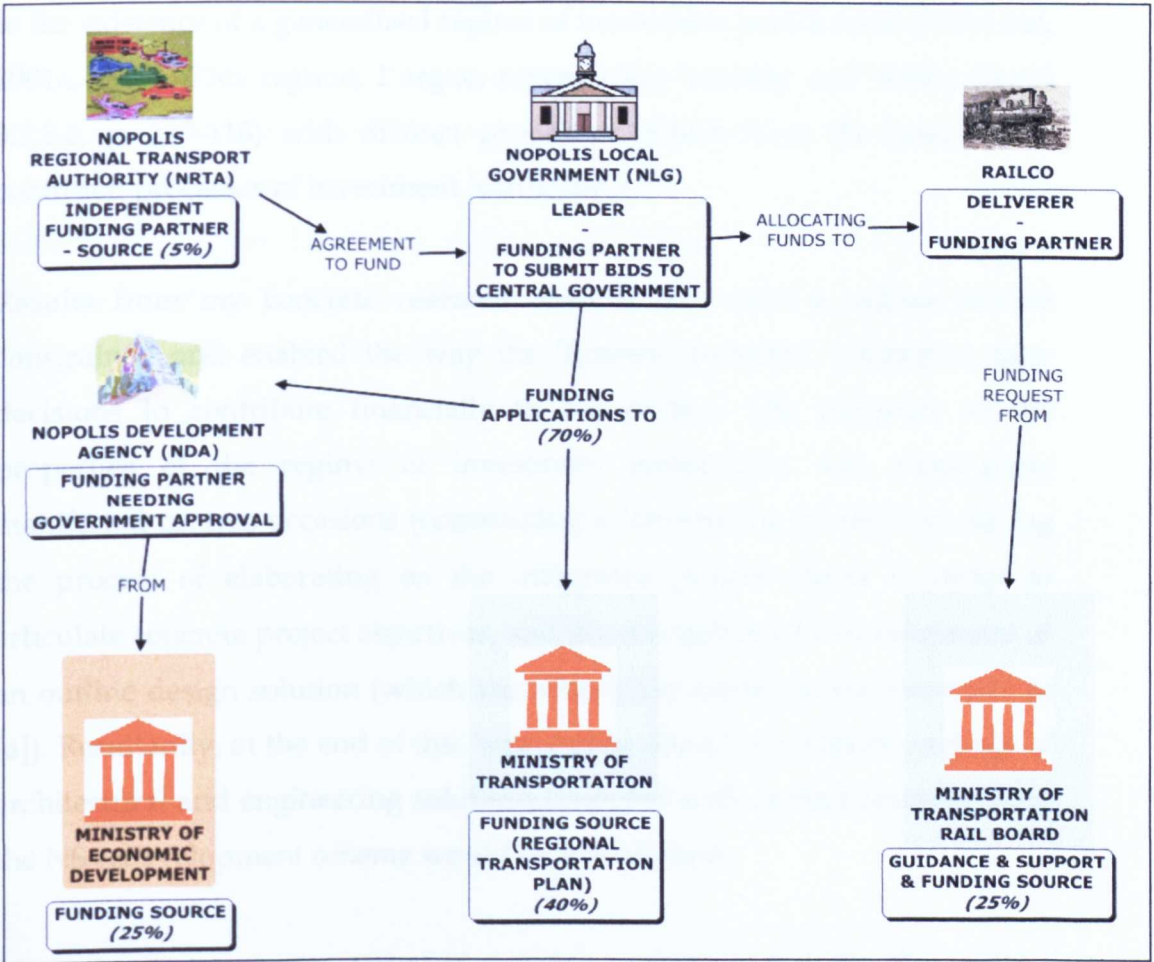


Figure 22. Project Funding Portfolio and Governance Structure

In view of these formal arrangements, materialising the integrated project vision and redeveloping NS as both an improved ‘node’ and ‘place’ required that investment decisions taken by each project funder be justified thoroughly. Accounting for the heterogeneity of the funding portfolio, one would imagine that processes of investment justification would be very diverse in nature. Surprisingly, however, I found out that NLG, NDA, NRTA

and Railco justified their investment decisions in a remarkably similar fashion.

In this chapter, I report on the results of my abstract research, which indicate that this actual phenomenon was not accidental but was made possible due to the existence of a generalised regime of investment justification (Thévenot, 2001a, 1984). This regime, I argue, represents a 'socially real' entity (see § 3.2.5.2, p. 117-118) with distinct properties, which have the potential to condition processes of investment justification.

Results from my concrete research confirm that such a regime indeed constrained and enabled the way the 'funding partners' vindicated their decisions to contribute financially to the project. The influence of the properties of the regime of investment justification was particularly manifested on two occasions (constituting a 'structuring phase'): (a) during the process of elaborating on the integrated project vision in order to articulate concrete project objectives, and (b), throughout the development of an outline design solution (which was essentially based on the outcomes of [a]). Resultantly, at the end of this 'structuring phase', a complete package of architectural and engineering solutions rendered with greater precision how the NS redevelopment scheme would be materialised.

More than a composite technical solution, however, I argue that such a package objectified the influence both (i) of the social material properties of NS (an 'artefactually real' entity), and (ii) of the properties of the regime of investment justification (a 'socially real' entity). In essence, through the production of specific outcomes (project objectives and design solution), this 'structuring phase' culminated in increasing the contextual complexity of the project; that is, in assembling the heterogeneous properties (i) and (ii). Conclusively, any further usage of and/or reliance on the project objectives and the design solution in subsequent project activities would be necessarily conditioned by the heterogeneous contextual properties ([i] & [ii]) that made

those actual products possible in the first place. By the end of this chapter, I will have completed the second part of my effort to elucidate the historical processes that resulted in the possibility for a CC contract award project and therefore for coordinative phenomena to happen on that project.

In what follows, I first present findings from my abstract research and postulate through retroductive reasoning the 'ontic' characteristics of a 'regime of investment justification'. I then report on the results from my concrete research and provide an exegesis (positive identification, 'I' of the RRREIC model) of how that regime constrained and enabled partners' concrete efforts to justify their investment decisions by way of articulating their project objectives and of developing an outline design solution.

5.2 REGIME OF (FINANCIAL) INVESTMENT JUSTIFICATION

On the basis of my abstract research, I postulate certain 'ontic' properties of a regime of (financial) investment justification; that is, characteristics, which pertain to a particular mode of engagement (abstract framework) governing problem solving in this particular context (investment justification). As I argued in chapter 3 (see § 3.2.5.2, p. 118), in order to conceptualise the properties of a regime of justification as a 'socially real' entity, I need to identify (through retroductive reasoning) how such a regime is endowed with (i) a commitment to a 'common good' and (ii) a requirement (demand) for a particular format of information (required for problem solving). With respect to (i), findings of my abstract research confirm that a 'regime of investment justification' engages with and aims to guarantee returns on investment (common good). 'Good' solutions to an investment justification problem, i.e. solutions with investment merits, are those that produce high returns of investment. This underpinning notion of good is fundamentally based on a particular conceptualisation of 'investment':

Economists have usually conceived of investment as depending directly on a definition of the capital whose growth is measured (p. 10)... Such imagery makes a clear distinction between capital and consumer goods... the modern definition of investment excludes working capital and only takes account of the growth of fixed capital, that is durable production assets... However, *lifespan* does appear to be a fundamental characteristic since it is this which determines whether capital is fixed or working. It would therefore appear that the productivity which should derive from the "sacrifice of consumption"... depends on this very *engagement* of temporary liquidity in a durable asset... Immobilisation (...) permits the fixing of relation that can be reproduced between, for example, certain forms of input and output... From this point of view, (...) investment (...) is a costly operation to establish a *stable* relation with a certain *lifespan*. (Thévenot, 1984, p.10-11, emphasis original)

The implications are that, for the 'common good' to be guaranteed, the 'fixing' of a relationship between certain dedicated inputs (funds) and

outputs (deliverables) is required; that is, a particular format of information is necessitated ('ontic' property [ii]). Furthermore, investment decisions are made at a temporal point (present), which predates the realisation of deliverables (future), in and through which the growth of funds is aimed. In the world of financial investment, where the 'common good' relates to the growth of funds, the 'investment opportunity principle' should be fully respected and attested by converting present revenue into future returns (Thévenot, 1984). In essence, the justification of an investment decision should be based on the construction of stabilised relations between the amount of financial resources dedicated to an investment project and the future project results. The outcome of this artificial operation should guarantee now the augmentation of such amount.

Effectively, linking inputs and outputs, funds and deliverables, present and future creates information of a particular format and thus effectuates problem solving; and such linking conventionally entails the creation of monetary equivalents (Thévenot, 1984). Outputs and deliverables need to acquire a monetary value that enables an articulation of how much the dedicated inputs will grow. This articulation of a rate of return is vital in order to determine whether an investment decision is 'right' or 'wrong'; whether it produces high or low returns on investment (common good).

Finally, results from my abstract research indicate that the aforementioned properties of the 'regime of investment justification' endure as properties of a 'socially real' entity by virtue of their incorporation and objectification in 'actual' concrete, and institutionalised 'instruments'; e.g. models, formulas, frameworks, procedures. It is through using such 'conventionalised equipment' (Thévenot, 2001b) that the regime of investment justification exerts any influences on processes of vindicating investment decisions.

5.3. THE INFLUENCE OF THE REGIME OF INVESTMENT JUSTIFICATION ON PROJECT ACTIVITIES

In this section, I report on the results I obtained from my concrete research into the particular 'structuring' phase through which project partners justified their investment decisions and hence elaborated on specific project objectives and had a unique design solution developed. The products of this phase, I argue, would subsequently make a series of other project activities possible, and most importantly (for my analysis) of the CC contract award project and therefore for coordinative phenomena to happen on that project.

5.3.1 Justifying Investment Decisions

In order to scrutinise the general investment opportunities identified in the previous 'structuring phase' (genesis of integrated project vision), project partners used their institutional 'investment decision making' frameworks and procedures. All those instruments, my findings indicate, objectified the properties of the regime of investment justification. As a result, through using those frameworks, project partners constructed their problem solving activities in accordance with this regime. The following excerpt from my conversation with Pat (NDA's project manager) illuminates that NDA identified investment merits in their decisions to fund the project because such decision enhanced certain 'outputs' (produced 'good' returns on investment):

Pat: we would have got that (regeneration and economic benefits) anyway without putting a cent into an improved station... because MOT would have funded it; we would have just taken the benefit. But because of this once in a lifetime opportunity to get more impact from this scheme, our funding helps with the physical regeneration impact, in and beyond the project redline boundary.

Question: You said that even if you didn't fund the project, you would get the benefits. Yet, you wouldn't be able to claim the benefits, would you?

Pat: There is that risk. We ultimately have to do annual returns to the Ministry of Economic Development (MOED) against the various outputs, collected together on annual basis... what have you spent? And what quantum of outputs have you delivered? Very high level, as the other development agencies have to do. Yes, there is always a risk... we could stand on the touch line watching a new station getting developed... we could watch the new flow of people into and around the station, which would help the economic growth through better business performance... but it would be a lesser impact than what we are doing... we wouldn't (be able to claim benefits) because that would be a MOT element. We would expect the MOT then be claiming that as part of their reason for investing.

Evidently, the 'target setting' procedure (required by the MOED) ensured that NDA regulated and monitored their activities in accordance with the 'regime of investment justification'.

In addition to NDA, all institutions-to-become-funding-partners were conditioned by the regime of investment justification, since they used similar institutional instruments and criteria to evaluate their investment decision. For instance, for investment proposals made by NLG to be given priority (through the MOT's local transportation plan programme), they had to: (a) provide good value for money (usually in the form of benefit-cost ratio), (b) clearly state targets and measures based upon evidence, and (c) to have demonstrable contributions to priority outcomes (NLG Draft Transportation Plan, 2005). The decision to invest in the NS redevelopment scheme was therefore justified, since NLG's agents managed to conform to (a) – (c) and thus render the demonstration of a high return on investment possible.

Notably, in virtue of the 'conceptual' boundaries of the regime, i.e. linking inputs and outputs, present and future, the decisions to justify investments were also inherently risky, since the delivery of outputs, which would guarantee returns on investment, was pending:

Pat: Challenges remain because with any project, success only comes with delivery! A lot of what's been done so far (articulation of objectives), let's be honest, it's theoretical... it is work done on the desk. Or in the machine; that is absolutely essential. Because you can never deliver a project, if you don't do your 'ground work' first. But at the moment, the project is in its pre-construction phase. So until somebody goes on site and starts physically doing work, it is in its pre-construction phase. Until the construction works are finished, the project isn't successful!

Most significantly, however, justifying investment decisions was based not only on 'fabricating' investment merits, in general, but also on manipulating the integrated project vision, in particular. That is, in their efforts to vindicate their decisions to make financial contributions to a redevelopment scheme, project partners were constrained and enabled by the properties of both (i) the regime of investment justification, and (ii) the NS' dual identity of 'node' and 'place'; insofar as the influence of the latter had been objectified in the integrated project vision, which should be attested as a 'good investment'. This 'dual' influence of ([i] and [ii] of) the project context was manifested in the way project partners experienced their role as 'funders'.

Pat: we now have a rationale for intervention, which we have to monitor and evaluate (influence of regime), which are the physical impacts of the NS scheme on the immediate area around and catalysing development from the private sector in the city core (influence of NS' identity). And we expect MOT and the transport partners to effectively be monitoring and evaluating (influence of regime) the transport outputs, both from the railway station in terms of trains and passenger flow, but also any other issues that unlock the transport funding, which is better permeability of the station for the city centre (influence of NS' identity). The NRTA: they are looking for the multi-modal interconnection with other forms of public transport (influence of NS' identity). All of those demand a monitoring regime and evaluation regime for the forecast and the investments that were prepared to get us the approval to spend (influence of regime). They could continue for decades! (emphasis and parenthesis added)

5.3.2 Articulating Project Objectives

Findings from my concrete research further illuminate that the articulation of project objectives by the partners was also constrained and enabled by the two kinds of project context properties. For instance, all partners established 'monetary equivalents' by linking outcomes (future physical characteristics) and strategic institutional objectives (basis for calculating return on investment). The following table (table 11) is an excerpt from the actual 'integrated project objectives' table produced collectively by the partners, which illustrates this feature (of linking objectives and features).

Table 10. Articulation of 'Integrated project objectives'

Objectives	Intermediate objectives	Final Outcomes	Features
(Rail) - Improve passenger Capacity	- Alleviate passenger overcrowding - Improve passenger flow management, etc.	- Enhance efficiency and performance, ...	- Bigger concourse, platforms - More escalators and lifts....
(Integrated Transport) - Improve interchange between transport modes ...	- Journey time savings	- Facilitate the transport mode shift to rail and other forms of public transport ...	New routes ...
(City/regeneration) - Transform appearance of station - Improve urban environment	- Enhance development potential - Enhance image of the city ...	- Support inward investment, etc.	- Improved external appearance (façade) - Transform the visual appearance of the station and act as a catalyst for regeneration ...
(Commercial) - Maximise commercial value of scheme...	- Attractiveness to market for redevelopment ...	- Improved land value...	- Optimum construction phasing given commercial impacts...

In view of the findings of my abstract research, I argue that the tabular format of itemised objectives and features was a contingent outcome, yet not arbitrarily created by the representatives of the funding partners. The construction of such a table should not be conceived as and/or reduced to a construction of an aggregate of individuals, who happened to be there. Although it was the partners' representatives (at that time) who did the actual articulation of specific project objectives and of desired future station features, such articulation was made possible by the regime of investment justification. And that justification processes of all organisations had very similar format cannot be attributed to the 'same mindedness' of partners' representatives, but to the very similarity of the nature (i.e. constructed in accordance with the conventionalised regime of investment) of their instruments. These findings demonstrate the value and need for a 'stratified ontology' perspective, which differentiates between social contexts and actual events.

In essence, the above table constitutes a representation of the investment justification outcomes. That is, the articulations of an imagined finished NS (i.e. a future station that has already been constructed) are artificially linked with diverse investment objectives in order to explicate how returns shall be achieved. In fact, it was only through imagining final, measurable and monetised outputs - features of the future building structure - that investment justifications could be provided. Strikingly, if project objectives did not have those characteristics (measurability, monetisability), they were indeed considered risky items (NS Enhancement Scheme, Risk Register Report, 2006)! On the basis of this table, the project partners further pursued the development of architectural and other engineering solutions, which were required in order to make the fulfilment of integrated project objectives possible.

5.3.3 Developing the Project Design Solution

The results I obtained from my concrete (archival) research indicate that development of an outline design solution for the NS redevelopment project was constrained and enabled by the project objectives (and the objectified in those objectives context properties) on an ongoing basis. This was necessary because the outline design solution was a prerequisite for finalising the project's business case (Railco project management guidance, 2006). In other words, investment justification processes had to continue during the development of product design knowledge. Getting the business case 'right' entailed a balancing act of weighing the 'investment merits' of design solutions against their cost; of trading off specific project objectives against the total amount of the required financial resources. This balancing act was made possible through the translation of design options into estimates of cost and benefits ('monetary equivalences').

I will provide an example to illustrate how this occurred. The size of the proposed atrium had to be reduced in order to make the project cheaper and to improve the benefit-cost ratio (BCR), which, if shown to be high enough, would enable the project to get 'priority funding' status by the government (NS Enhancement Scheme, Design Solution Report, 2006). At the same time, removing the atrium completely from the design solution, though cheaper, would violate NDA's principal condition for contributing financially to the project (institutionally mediated influence of NS's 'place' identity) and reduce the amount of their contribution (thus worsen the BCR). In the words of the Project Director, aborting the atrium solution completely would make the scheme "cheaper, but more expensive", since the absolute amount of public funds would be contracted at the expense of decreasing the BCR for NDA, which would see this as shrinking of the returns of their potential investment (Project Design Meetings, September 2005). In the end, a 'middle-ground' solution was found: to create a smaller in size atrium.

From archival records of project reports, I found out that numerous ‘middle-grounds’ solutions were improvised until the selected single option (for the NS Enhancement Scheme) was elaborated “to the point of ‘engineering scope freeze’ and in sufficient detail to allow finalisation of the business case and the scheduling of implementation resources” (Railco Project Management Guide, policy manual, 2006). The point of ‘engineering scope ‘freeze’ (outline design solution) entailed the creation of a complete package of technical solutions: architectural and engineering plans, construction methodology and phasing, fire engineering, cost and risk analysis as well as town planning decisions and approvals. The ‘single option development’, which was completed in the middle of 2006 represented a tested (for its technical and economic feasibility) imagery of the NS, which was collectively justified and unanimously approved by the partners and since then became known as the ‘Theta Project’ (a pseudonym):

The ‘Theta’ option meets the project partners’ transportation and regeneration objectives and, as it has their full support, enables access to the Regional Transportation Plan and regeneration funding via NLG and NDA.

The Theta scheme will deliver a high value for money project that will achieve the highest level of net economic benefit and most strongly meet the objectives determined by the project partners. It is therefore the preferred scheme option for the transformation of NS. (Theta Single Option Development Report, 2006)

More than an assemblage of technical solutions, however, I argue, the ‘Theta scheme’ package objectified the influence both (i) of the social material properties of NS (an ‘artefactually real’ entity), and (ii) of the properties of the regime of investment justification (a ‘socially real’ entity). This was particularly manifested in the executive project report, for instance, in which readers are guided to consider specific aspects and benefits of the new station: e.g. to see the existing congestion problems at NS as ‘a poor advertisement for the city’ and as an indication of ‘insufficient capacity to meet the forecast passenger demand’ (representing two of partners’

objectives); or, to view the new NS concourse as enabling 'urban connectivity and accessibility' to other modes of transport (NRTA's objective). The report also invited the readers to imaginably experience a new finished NS, as if it had already been constructed. The brand new design features of the imaginary station were illustrated vividly in order to enable the reader to fictionally appreciate the improvement to the station facilities and the great investment merits. An excerpt from the report epitomises this style.

From the platforms passengers are transported to concourse level by lifts, escalators or stairs, arriving in one of two paid concourses of generous proportions. From these arriving passengers can pass quickly and easily to the city centre via both north and south concourse entrances and via the escalators... A large part of the public concourse is lit by natural daylight via the new atrium penetration.... This atrium also extends over part of the eastern paid concourse... The external façade... is glazed... to provide additional light and views beyond the concourse. The façade along the north and east sides is set on the outside face of retail and station operation offices respectively. (Theta Single Option Development Report, 2006)

5.4. JUSTIFYING INVESTMENT DECISIONS: CONCLUSIONS

In this chapter, I completed the second part of my effort to elucidate the historical processes that resulted in the possibility for a CC contract award project and therefore for coordinative phenomena to happen on that project. In particular, I showed how the project's funding partners justified the investment merits of a NS redevelopment scheme and developed a complete package of outline design solution. Although the identification of investment opportunities (discussed in the previous chapter) was conditioned by the dual identity of the NS (as a 'node' and 'place'), the justification of such opportunities was constrained and enabled by the 'socially real' regime of investment justification. After I postulated the properties of this regime (abstract research), I elucidated how its influence was manifested in the articulation of integrated project objectives and of the 'single option development', i.e. the 'Theta option'.

In essence, through an ongoing process of investment justification and through the production of a consolidated design solution, this 'structuring phase' culminated in increasing and reaffirming the contextual complexity of the project; that is, in assembling the heterogeneous properties (i) of the regime of investment justification, and (ii) of NS' dual identity of 'node' and 'place'; insofar as the influence of the latter had been objectified in the integrated project vision, upon which the identification of the 'Theta' project's investment merits were founded. Conclusively, any further usage of and/or reliance on the project objectives and the design solution in subsequent project activities would be necessarily conditioned by the heterogeneous contextual properties ([i] & [ii]) that made those actual products possible in the first place.

In the following chapter, I will exemplify the significance of this finding further by examining a subsequent 'structuring phase': how a suitable procurement (delivery) strategy for the project was developed on the basis of the Theta outline design solution. I will show how a newly appointed (by Railco) Theta team took hold of the design solution (and the objectified contextual properties in this solution) in particular ways and argued for the suitability of an 'integrated team' procurement route. The outcome of this discussion will be to elucidate how additional properties of the Theta project context developed; and how that historically constructed context eventually made the CC procurement process and therefore the happening of coordinative phenomena on that project possible.

CHAPTER 6

DEVELOPING THE PROCUREMENT STRATEGY

6.1 INTRODUCTION

During the design development stage (middle 2005), all partners (Railco, NLG, NDA, NRTA and MOTRD) agreed that Railco should become the 'Project Deliverer' throughout the life of the Theta project (estimated at approximately 6 years). Richard, the NLG representative, explained to me how consensus regarding Railco's appointment as a 'Project Deliverer' was reached in early 2005:

Richard: At the beginning, as we were doing the work on the design development with Railco in 2005, obviously the stakeholders started having thoughts on the procurement strategy and how the project could be delivered. Before we got to the procurement strategy there is more: what would the commercial structure for the project look like. A big consultancy firm was engaged in 2005 and they produced a fairly high level report with a couple of workshops with the stakeholders on the delivery vehicles for the scheme. There were number of different options we considered at a reasonably high level. Everything from PFI (Private Finance Initiative), PPP (Public Private Partnership), special purpose vehicle, Railco doing it themselves; (we had) a number of different options looked at. That's where the sort of commercial structure for the project was born really. Having looked at those options, it was felt that Railco was very keen to sort of take on and deliver this (project) themselves, you know... And acting the role of almost developer and contract with various parties to move things forward... with the other stakeholders providing the funding... and having a role to play as well. It was felt that it was Railco's infrastructure and they would be the best-placed people to sort of manage the redevelopment of it.

Also, Pat from NDA, explained how the partners envisioned the delivery of the Theta project in light of the governance structure (see § 5.1, p. 187):

Pat: Railco as the asset holder and the contracting implementation body would work with NLG through a formal agreement, whereby the city (NLG) would effectively be the accountable body for a lot of the project funding... and be able to channel that funding through that arrangement to Railco; that's the implementer and contractor.

....

Railco have the systems and the expertise to deliver physical works. It is their asset... it always seemed obvious to us that, they were best placed to be the 'project client'.

At this point, I should clarify that Railco had expertise and experience in managing project delivery, that is, in managing contractors as an 'intelligent project client' (Railco Management Plan, 2005). For all investment projects, Railco had to procure design and construction services required for actual delivery. Therefore, since appointed 'Project Deliverer', Railco sought to establish an executive project team to 'mastermind' the project (spring 2006). The first major task of the newly appointed Theta Project Director, Mathew (pseudonym), was indeed to develop the detailed procurement strategy for the project (Risk Register Report for Theta Project, 2006). Mathew, who, according to the local press, "...has a reputation for delivering high-profile and complex construction projects" (local newspaper, May 2006), had to define what kind of design and construction services would be needed for the Theta project and how those services should be organised contractually and in production terms. In essence, he and the rest of the executive team he was leading had to determine Railco's position as a 'buyer' in the construction industry, to identify possible delivery options and to justify a most suitable delivery solution; in short, develop a procurement strategy.

In this chapter, I shed light on the process through which a comprehensive procurement strategy for the Theta project was developed. In order to illuminate adequately this 'structuring phase', I have conducted both abstract and concrete research (archival and interviews). Hence, I first report on the results of my abstract research, which indicate that the process of

devising a procurement strategy in the construction industry context is necessarily conditioned by properties of that context. Through retroductive reasoning, I postulate that such properties pertain specifically to the properties of a broader discursive structure – what I propose to call ‘delivery discourse’; which is also objectified in the widely known ‘procurement models’. In that sense, objectification refers to the transmutation of discursive (ideational) elements into objects – in this case models. Fairclough et al (2002) argued that through objectification the selection and retention of certain discursive structures is facilitated insofar as objects are used repeatedly in particular social contexts. For example, the ‘delivery discourse’ is selected insofar as construction industry professionals use the procurement models.

I then report on the results I obtained from my concrete research. These results confirm that the ‘delivery discourse’ impinged upon the process of identifying and assessing ‘procurement models’ – possible delivery options. In particular, I show that such impingements referred to the way Mathew and his team (i) re-contextualised and re-interpreted products from previous ‘structuring phases’ (principally, the Theta outlined design solution), and (ii) engaged in an argumentation process that resulted in a comprehensive procurement strategy: the justified rejection of some ‘procurement model and the vindicated adoption of a so-called ‘integrated team’ delivery model. It was the procurement strategy report that eventually legitimated the CC procurement process and made it possible.

More than a document, however, I argue that the strategy objectified the influence not only (i) of the ‘delivery discourse’ (an ‘ideally real’ entity), but also (ii) of the social material properties of NS (an ‘artefactually real’ entity), and (iii) of the properties of the regime of investment justification (a ‘socially real’ entity). My argument is founded on the observation that the strategy was made possible and incorporated all the key features of the Theta design solution (vision, objectives, and investment merits) into the rationale for adopting an ‘integrated team’ delivery model. In essence, through the

production of a specific outcome (procurement strategy), this 'structuring phase' culminated in increasing the contextual complexity of the project; that is, in assembling the heterogeneous properties (i), (ii) & (iii). Conclusively, any further usage of and/or reliance on the strategy in subsequent project activities would be necessarily conditioned by the heterogeneous contextual properties ([i], [ii] & [iii]) that made the construction of the strategy possible in the first place. By the end of this chapter, I will thus have completed my effort to elucidate the historical processes that resulted in the possibility for a CC contract award project and therefore for coordinative phenomena to happen on that project; insofar as the ensuing procurement strategy advocated for the necessity that the services of a 'Construction Consultant' (CC) be procured.

In what follows, I first present the results of my abstract research and conceptualise the properties of the construction industry 'delivery discourse'. Second, I elucidate how the formulation of the procurement strategy unfolded in light of the increasing contextual complexity of the Theta project. It should be noted that all results in the following sections are founded on data from archival information in project documents, publicly available information, secondary sources and interviews (see § 3.4.5, p. 147).

6.2. THE CONSTRUCTION INDUSTRY CONTEXT

6.2.1 The Properties of Industry Structures

The construction industry, like every industry, has its own market structure, which is relatively stable and characterised by various elements: suppliers, buyers, threat of new entrants and substitute products, as well as the intensity of rivalry among competitors (Porter, 2004). Furthermore, economists have argued that industries have a 'vertical structure', i.e. a limited 'transactional menu of choices' for firms (Jacobides & Billinger, 2006; Jacobides & Winter, 2005; Williamson, 1975). That is, firms cannot freely decide whether and how they will e.g. purchase a product or service, because there are limited possibilities to do so, such as the number and kind of 'sellers' or the nature of the purchasing request. In other words, within a particular industry structure, a firm is necessarily embedded in a context where pre-existing conditions constrain and enable what can be bought and how the production and integration of the value chain can be accomplished. When becoming part of an industry structure, e.g. as a buyer, a firm effectively becomes part of an inter-locking system, which is constituted by the complex relations of a myriad of different institutions; what Jacobides et al (2006) called 'vertical architectures'.

In the construction industry context, 'vertical architectures' refer to the possibilities for configuring the structure of the construction project, which is the predominant organisational form for organising and coordinating value chain activities (Cacciatori & Jacobides, 2005; Eccles, 1981). The uniqueness of the construction project stems from the distinctive features of the construction technology.

Construction projects require a unique combination of labour and material inputs, performed and coordinated on-site. This results in transaction implications different

from mass assembly and process technologies typically found in manufacturing. Construction projects require a large number of labour specialties... These trades differ in terms of work activities, training, skill level, and assessed value in the labour market. Coordinating the work of these labour specialties over the course of a project is a complex task (Eccles, 1981, p. 337).

Findings from my abstract research hence indicate that clients, i.e. buyers, of construction projects, such as Railco, consider their purchasing options in terms of options for 'suitable' contractual and value chain configuration of the construction project. That is, when buying a building, procurers not only buy particular design and construction services, but also determine the contractually based organisational structure of the project: the procurement route (Tookey et al, 2001). Furthermore, for construction procurers or clients¹⁰ to be able to do things like 'exploring the elements of their purchasing request' and 'defining the purchasing model, which will determine the organisation of the construction project', they have to be able to identify and make judgements regarding their options. In light of this observation, I employed retroductive reasoning in order to postulate further how 'vertical architectures' are capable of enabling and constraining construction clients efforts to argue for a suitable procurement option. In essence, I conceptualised the properties of an 'ideally real' entity (see § 3.2.5.3, p. 122) pertaining specifically to the construction industry structure: its discursive structure.

6.2.2 The Construction Industry Discursive Structure

I argue that the construction industry has a discursive structure (Fairclough, 2005; Heracleous & Barrett, 2001; Schreyögg & Geiger, 2007) that stands in dialectical relationship with other socio-material features of industry structures (Fairclough, 2005), i.e. firms, suppliers, technologies, etc. The dominant construction industry discursive structure, I posit, provides social

¹⁰ I use the terms 'client', 'buyer' and 'procurer' interchangeably.

actors with guidelines about 'proper argumentation' (Heracleous, 2006) with regards to determining the 'right' procurement route. In that sense, I call the construction industry discursive structure 'delivery discourse'.

The key elements (ideas) of that discourse are: time, cost and quality.

These three factors are commonly referred to in the industry as the three-legged stool. (Jackson, 2004, p. 37, emphasis original)

Furthermore, another indispensable feature of the 'delivery discourse' refers to the notion of risk. Risk may be thought of as representing the possibility of failing to meet the desired time, cost, and quality objectives of a construction project and is inherently linked to procurement risk, i.e.:

Those events that may affect the realisation of the contractual performance, and whose occurrence cannot be accurately predicted and influenced by contracting parties. (Alvaro, et al. 2006, p. 83)

More recently, it appears that the construction industry 'delivery discourse' has been enriched through the incorporation of a new discursive element (idea): the overall value for money (Holt, 2001; Green et al, 2008). This enrichment has resulted in outlining new directions and rules for how construction projects should be delivered and organised. This is manifested, for instance, in the growing emphasis on: integration during the design phase, the impact of the delivery methodology on whole-life issues, various 'delivery modalities', such as examining buildability of design, sustainability, value engineering, value management, risk management, adoption of IT-enabled practices, whole life costing, innovation process. (OGC, 2007; Jackson, 2004; Nicolini et al, 2000)¹¹.

¹¹ Noticeably, some authors have seriously critiqued the emergence of 'lean construction' and a heightened focus on 'delivery modalities'. (Green & May, 2003, 2005; Green et al, 2008)

In light of the construction industry delivery discourse and its interconnected discursive categories, the most appropriate contractual and value chain configuration of a construction project can be explored by 'profiling' a project (Fairclough et al, 2002). Clients can 'profile' a construction project in terms of e.g. its time, cost, and quality characteristics. By profiling a project, procurers can assess possibilities for how a project can be delivered. For instance, a project of absolute deadline, such as the construction of the 2012 Olympic Stadium in London, would suggest that the delivery of that project is 'time-driven' and that a suitable contractual structure should reflect that (Tookey et al, 2001). On 'profiling' a project, clients draw upon widely recognisable rules – properties of the 'delivery discourse' (in this case, representing a project in terms of time, cost and quality), which support or rebuke particular action-oriented justifications (e.g. organise the construction of the Olympic Stadium as a 'time-driven', rather than 'cost-driven' project).

In other words, the decision of how to deliver a construction project entails a process of identifying and assessing procurement possibilities (conditioned by the properties of the industry discursive structure). Notably, in the construction industry context that process is facilitated by the widely recognisable (in the industry) generic procurement models (Winch, 2000). I submit that those models objectify the 'delivery discourse' and put contested validity claims (Geiger, 2009) as regards their suitability for project delivery. In the following section, I describe the characteristics of each model and argue that they can facilitate a client's argumentation process of developing a procurement strategy.

6.2.3 The Construction Procurement Models

A finite number of generic procurement models has been documented in the construction management literature (Winch, 2000, 2001; Cacciatori &

Jacobides, 2005). Jackson argued (2004) that the different procurement routes differ in fundamental ways (p.43):

- Number of contracts an owner executes
- The relationship and roles of each party to the contract
- The point at which the contractor gets involved in the project
- The ability to overlap design and construction
- Who warrants the sufficiency of the plans and specifications (in other words, risk allocation)

Those dimensions differentiate the following generic procurement models that are commonly used in practice (Tookey et al, 2001).

Firstly, there is the 'traditional model', where the client contracts with one designer (architect-engineer), who first develops the design specifications; and with a main contractor, who does the physical construction and subcontracts some of the work to other firms. In this scenario, the contractor is appointed only after the architect and engineer complete the design, and hence the contractor is allocated the entire risk for the physical construction (see figure 24).

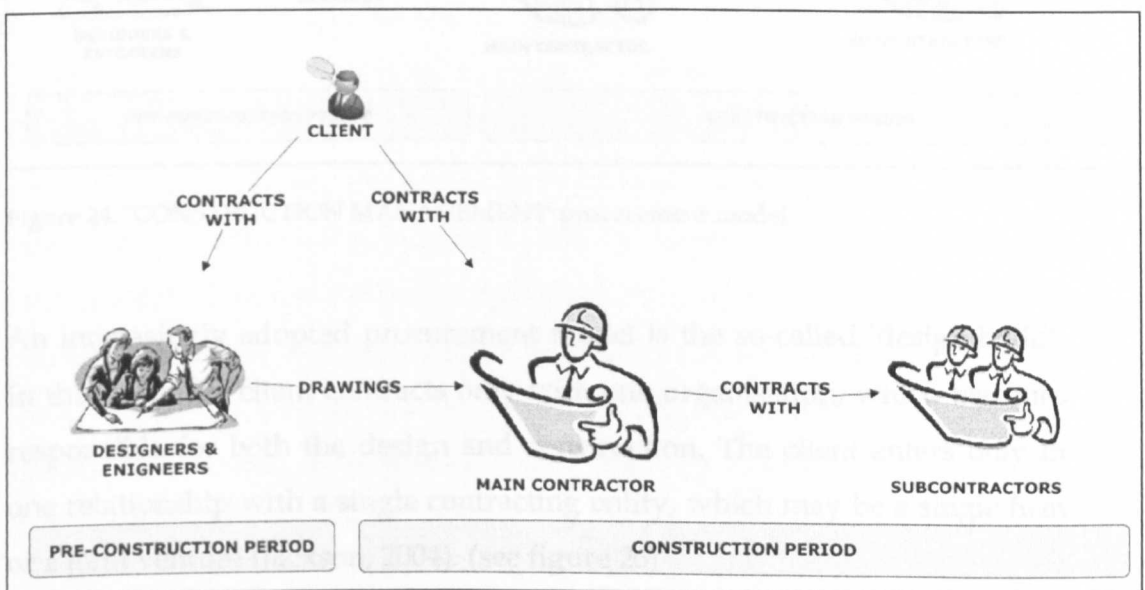


Figure 23. 'TRADITIONAL' procurement model

Another generic model is 'construction management' or 'management contracting' (Cacciatori & Jacobides, 2005). According to that arrangement, the client contracts not only with a designer and main contractor, but also with a 'construction manager' or 'management contractor', to whom a professional fee is provided for offering advice and project management services (Jackson, 2004). The main difference with the traditional procurement model is that the 'construction manager' or 'management contractor' usually becomes involved in the project at a pre-construction phase, engages in dialogue with designers and provides input in the design (Sebestyen, 1998). (see figure 25)

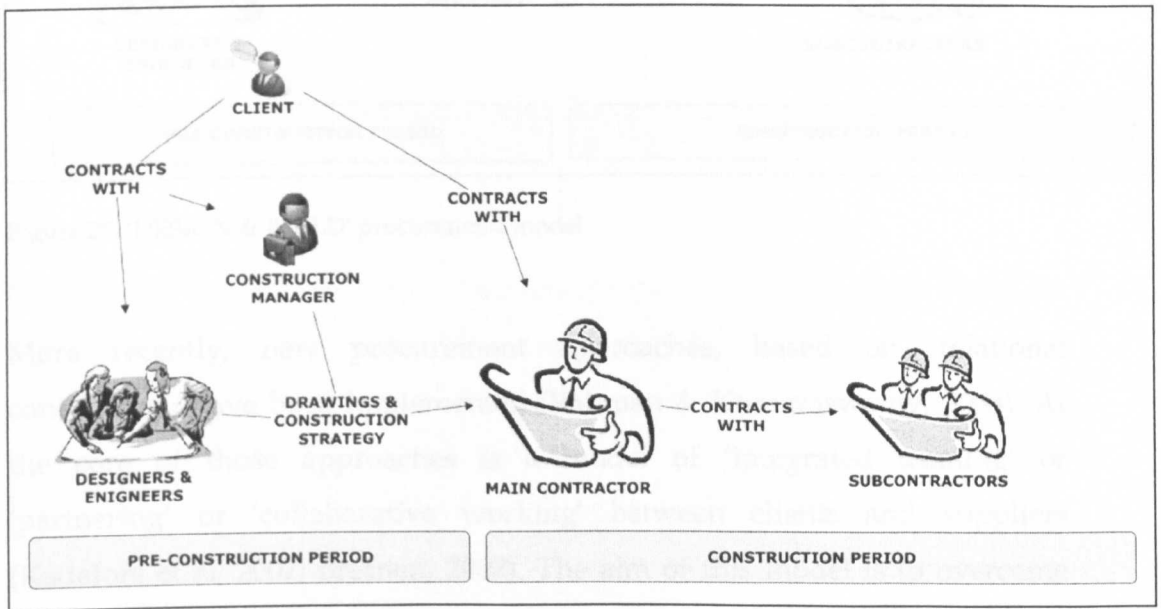


Figure 24. 'CONSTRUCTION MANAGEMENT' procurement model

An increasingly adopted procurement model is the so-called 'design-build'. In that case, the client contracts only with one organisation, which becomes responsible for both the design and construction. The client enters only in one relationship with a single contracting entity, which may be a single firm or a joint venture (Jackson, 2004). (see figure 26)

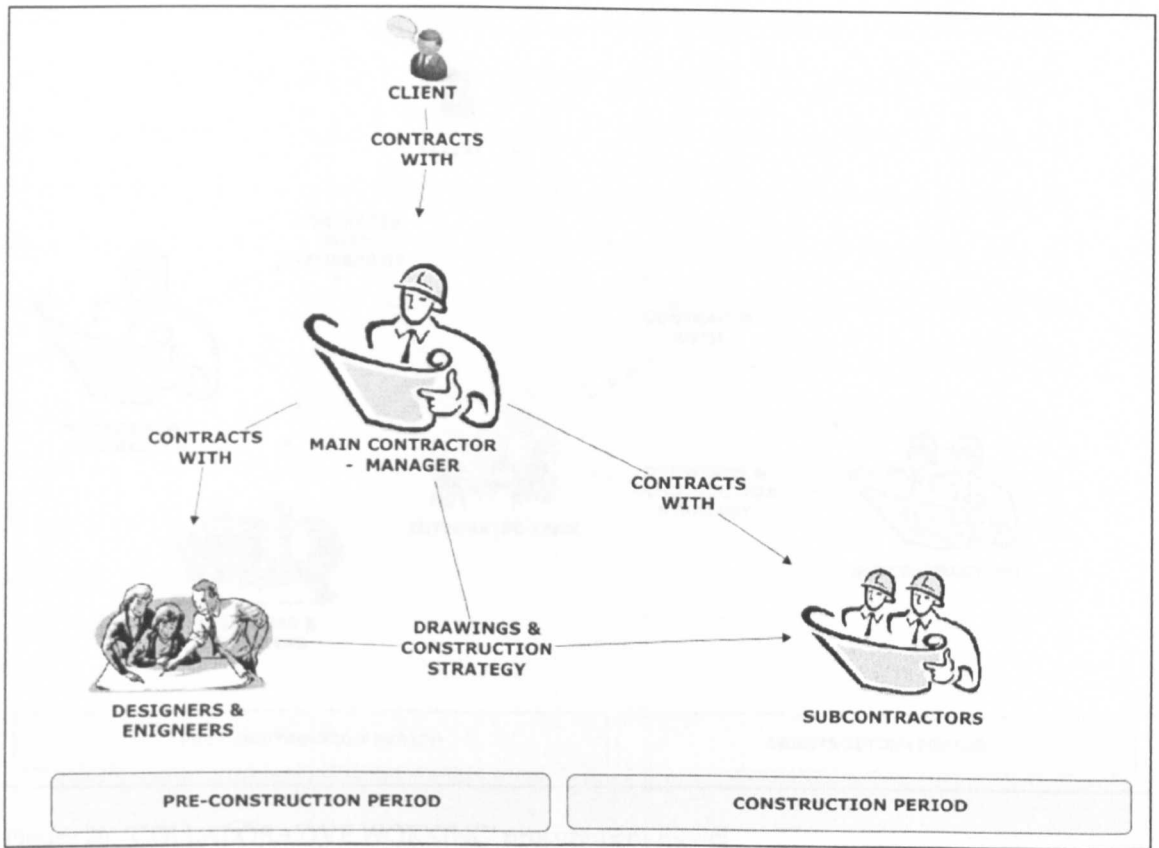


Figure 25. 'DESIGN & BUILD' procurement model

More recently, new procurement approaches, based on 'relational contracting', have been implemented (Rahman & Kumaraswamy, 2008). At the core of those approaches is a model of 'integrated teaming' or 'partnering' or 'collaborative working' between clients and suppliers (Kadefors et al, 2007; Bresnen, 2007). The aim of this model is to overcome traditional adversarial practices, such as throwing architectural and other engineering drawings 'over the wall' to the constructors and to focus on the examination of issues, such as 'constructability' of design, 'whole life value', 'value engineering', i.e. on 'delivery modalities'. A key characteristic of the model is also the 'incentivised' forms of contract used to enable collaboration among the members of 'integrated teams' (Rahman & Kumaraswamy, 2005). (See figure 27)

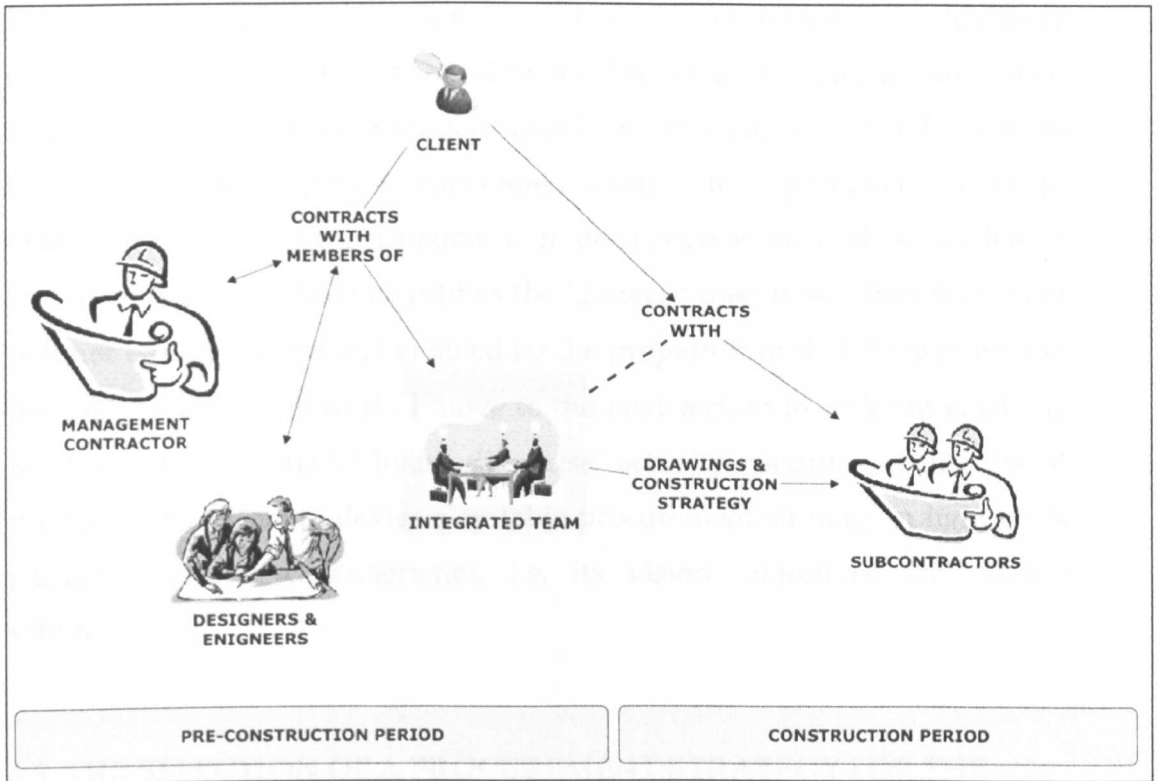


Figure 26. 'COLLABORATIVE WORKING' procurement model

I would like to argue that the above models may be conceived as discursive objects, which have been historically developed and objectify the construction industry 'delivery discourse'. In the context of any project, the various procurement models prescribe a proposition for how the procurement route of a construction project should be designed. Hence, each model puts forward a specific claim for how the procurement risk can be managed. In order for such claim to be persuasive, however, the proposed procurement route should represent the capacity to deal with the identified procurement risk in context (Tookey, et al, 2001). For example, the 'traditional' model becomes more suitable when 'design completeness' of a particular project is high and the procurement risk is measurable (Bajari & Tadelis, 2001).

Conclusively, results from my abstract research indicate that the construction industry context has the potential to impinge upon clients' purchasing

behaviour by virtue of its particular discursive structure – the ‘delivery discourse’. The properties of the ‘delivery discourse’, I argue, are objectified in the generic procurement models, which, when used, enable and constrain the process of developing a procurement strategy for a particular project. In other words, in case a construction client does not use any of these models or any other artefact, which objectifies the ‘delivery discourse’, then that client will not be constrained and enabled by the properties of that discourse¹². On the basis of this framework, I move to the next section in order to elucidate whether and how the ‘delivery discourse’ actually conditioned the ‘Theta’ project team’s effort to devise a suitable procurement strategy in light of its particular project characteristics, i.e. its vision, objectives and design solution.

6.3. THE SELECTION OF A PROCUREMENT STRATEGY FOR THE THETA PROJECT

6.3.1 ‘Profiling’ the Project in relation to the Outline Design Solution

In this section, I report on the results I obtained from my concrete research and elucidate how Mathew, the Theta Project Director approached and solved the procurement strategy development problem. Ingeniously, Mathew began his effort by organising a so-called ‘market-testing’ conference. In one of our discussions, he revealed to me what that meant.

Mathew: Ok, let’s go backwards... in summer 2006 we invited in 8 organisations (most of the largest construction contractors in the industry)... the objective being that they would hear from us what our project was about, where we were on the funding, what the timescales are likely to be, and what the drivers for the funding partners were. And then in return, what we asked them was for them to come back

¹² Although the client may indeed experience the unidentified influence of the ‘delivery discourse’, e.g. no contractors bidding for a contract that is not incorporated in a recognised ‘procurement model’.

and tell us how we would need to package the project to make it attractive to them. In simple terms, my explanation to them was that I wanted to put something to the market place that made the Theta Project sexier than other projects that they have the opportunity to bid. What that meant was... we had 8 different answers that came back to us. At one end of the spectrum we had a company that wanted a single staged lump sum contract... through to the other end of the stage... a company that was very interested in construction management... and somewhere in the middle, a cluster of companies that recognised that we had a finite budget and that both single staged contracting and construction management were perhaps two extremes.

My analysis indicates that, for Mathew, the 'market-testing' enabled him to develop a more sophisticated 'delivery profile' of the project, since the views of potential contractors provided valuable information that could be used to assess and select a suitable procurement model for the Theta project; as illustrated by the above quote, most organisations were not attracted by 'design & build' and 'construction management' models. Mathew further explained to me,

Mathew: What would have been totally wrong would have been: 'this is the answer Mathew wants.' (And) The market out there has no appetite... it was all built around the fact that we need to have a healthy competition (for the contracts).

While the director of procurement also mentioned,

John (director of procurement): Knowing how busy the market is at the moment... it would be silly (that) if we came up with a strategy in isolation and the market had no appetite for it. So we approached all these people and they gave us some ideas.

In addition to the market's preference (and non-preference) for various procurement models, Mathew and his team 'profiled' the Theta project on the basis of its cost, quality and time characteristics. More specifically, the Theta project had an absolute budget. Michael, the director of programme for the Theta project explained to me the implications for project delivery.

Michael (director of programme): With this project we have a fixed pot of money... there is no more! Unless somebody within the partner organisations decides, is willing to (spend more)... but essentially there is a budget, and we will not spend above that. Cashier's clean! There is no more! Cashier's clean! Rule no.1: cashier's clean; rule no.2: cashier's clean! And that's it!

While Mathew's view was even more overwhelming:

Mathew: That's what is going to happen: we will go out of affordability, and will have to then chop and change, and that will bring us back into working with the partners about the changes to get alignment (of objectives)... that's just a fact of life. That will happen. History tells me that's what happens! And there is no reason why this (the Theta project) would be any different... I can't change what will happen in the outside world. I can't change the price of the oil... you know... what I can do is keep people constantly fixed on what the cost is or the expected outturn cost ... and where the opportunities are to take money out or where the opportunities are to secure more money... we will need to make sure we are sufficiently underneath our funding to be comfortable that when something goes wrong, and there will be something going wrong!... And we need to have enough reserve to be able to deal with that.

In essence, the executive Theta team profiled the Theta project as 'cost-driven'. Furthermore, as I showed in the previous chapter, the 'quality parameters' of the project were 'fixed' not only because the technical design solution had been established after a year's long complex engineering problem solving; but also because the relation between design solution characteristics and the investment objectives of the funding partners had been firmly stabilised. According to the Theta team members, the second driver for assessing delivery options was the 'fixedness' of quality. As regards, 'time' Mathew confessed that:

Mathew: ... only the programme (i.e. time) offers the greatest amount of flexibility; there is no fixed deadline. (fieldnotes from a workshop)

Effectively, my result confirm, the Theta project team developed a 'delivery profile' for the Theta project by drawing upon the elements of the 'delivery discourse'. On the basis of that profile, they further created an estimate of the procurement risk.

Mathew: Most importantly of all... the fact that our funding is limited, our time is very precious, and the perception of the amount of risk would tend to suggest that anybody who was going to take all our risk offers would only do it at a very, very significant premium; such a premium that we wouldn't be able to afford it within our own available funding. So, we had to find a way of taking each of those different constraints and making them work... therefore we shouldn't pick up the major premiums that usually get attached to the 'unknown'. Things like Project X (which is well-known for its failure to meet budgetary objectives) would indicate, if people were going to have to price those ('unknowns'), then they are going to seriously, seriously load it, and that is no good use of public funds. If you are a private developer, you might take a different view, but this is public money we are spending and therefore we have to be absolutely mindful of getting best value for every cent we spend.

Michael (director of programme): (We) couldn't have done it (i.e. delivering the project) the traditional way, because nobody could price the risk for such a long period, inflation, hyper-inflation. There was no appetite and why should companies take on that risk when there is plenty of work around.

Essentially, Mathew and his team re-interpreted the key Theta project characteristics from a delivery viewpoint; that is, in terms of time, cost, quality and procurement risk. Also, since they used and relied upon the project objectives and the design solution, they were necessarily conditioned by the heterogeneous properties (i) of the regime of investment justification, and (ii) of NS' dual identity of 'node' and 'place', that made these actual products possible in the first place. The outcome of their re-interpretation, i.e. a specific 'delivery profile', thus provided the basis for assessing possibilities for a suitable procurement strategy.

6.3.2 The Articulation of the Preferred Procurement Strategy

Eventually, in December 2006 the Theta team explicitly articulated in the official procurement strategy document (hereafter 'strategy doc') the 'delivery merits' of their different options, i.e. the 'procurement models'. They did so in relation to the 'delivery profile' of the Theta project. In the strategy doc, the Theta project team also presented various 'delivery parameters': the cruciality of the project's cost and quality objectives, opportunities provided by relative programme flexibility, client control of contracts, benefits of early involvement of contractors, enhancing buildability of design, managing 'unknown risks', attractiveness to the market. In essence, the Theta team could articulate those elements as 'delivery parameters' because their presentation and subsequent assessment of delivery options was structured in accordance with the guidelines of 'delivery discourse'.

Furthermore, their arguments were plainly grounded on the uncontested criterion of 'value for money'; a crude manifestation of the influence of the 'delivery discourse'. In the strategy doc, the Theta team stated their commitment to the idea of 'value for money':

The principle objective of ALL procurement activities in connection with the Theta project shall be to:

'Secure the engagement of the Supplier(s) offering best overall Value for Money (VFM) solution that most closely satisfies the needs and expectations of organisation 'P' and its partners. VFM will be determined by reference to a range of issues including, but not limited to, price and any associated commercial terms'. (Strategy doc, format original)

In light of all the above parameters, the Theta team explained in the document that the 'traditional', 'design & build' and 'construction management' (or 'management contracting') models were unsuitable. They

then defended their claims for the suitability of a 'integrated team' procurement model by explicitly stating that that model addressed successfully all the 'delivery parameters'. They recommended an 'integrated team'/'collaborative working' model, which was based on the creation of an 'integrated team' with the participation of the following parties:

1. The Theta project team,
2. **A 'Construction Consultant'** (Large Contracting Organisation), and
3. A 'Principal Designer' (Large Engineering Firm)

The delivery vision was that Theta project team (the smallest in number) would lead the 'integrated team' through its four functional directors (Design, Construction, Procurement, Programme) and the Project Director. Along with the CC and the 'Principal Designer', they would work together throughout the pre-construction phase in order to ensure constructability and affordability of the detailed design; to make design and construction "talk to each other" (Gary, director of construction). The articulated aspiration was that as soon as design completeness is increased and a thorough construction methodology is established, then 'specialists contractors' would be procured directly by the client to undertake the physical construction works. (see figure 28)

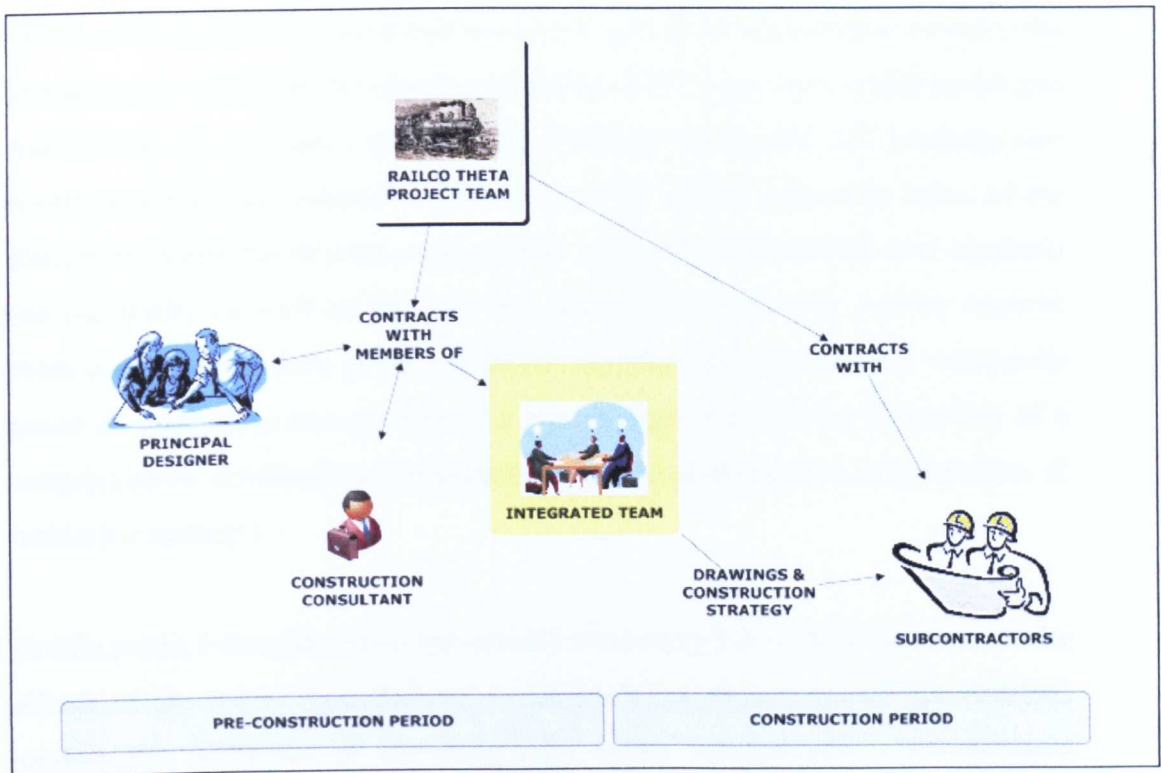


Figure 27. Railco’s ‘integrated’ procurement strategy

As soon as all internal (within Railco) and external stakeholders signed the procurement strategy off (summer 2007)¹³, the Theta project team started implementing the strategy – product of their own argumentation efforts. And the first crucial step was to populate the ‘integrated team’ with the ‘right’ partner by selecting and appointing a capable ‘Construction Consultant’ (CC).

6.4. DEVELOPING THE PROCUREMENT STRATEGY: CONCLUSIONS

In conclusion, in this chapter, I completed my effort to elucidate the historical processes that resulted in the possibility for a CC contract award project and therefore for coordinative phenomena to happen on that project. In particular, results from my abstract and concrete research indicated that, by

¹³ At this point, it should be mentioned that a subsequent and very important process was the seeking of approval of the strategy by both the partners and by internal Railco stakeholders. However, the discussion of that process lies outside of the scope of this thesis.

virtue of the project's embeddedness in the construction industry context, the Theta team's efforts to develop a procurement strategy were constrained and enabled by the industry's pre-existing 'delivery discourse'. My findings also confirmed that they created a 'delivery profile' of the project in terms of the discursive elements of time, cost, quality and procurement risk and assessed the suitability of each of the 'generic procurement models' in this context. With a comprehensive project delivery profile, the Theta team eventually made a convincing enough claim in the strategy doc for the suitability of a 'collaborative working' procurement strategy (enabling the consideration of 'value for money').

At this point, I should stress that other factors might also have influenced the efforts of the team. Nonetheless, I positively identified (recall the RRREIC model) the influence of the externally valid 'artefactually real' delivery discourse (Tsoukas, 1989b) on the development of a procurement strategy. In short, my aforementioned analysis and argument is 'practically adequate' (Sayer, 1992) and yet does not preclude other possible explanations (see § 3.3.3, p.136 on fallibility of knowledge).

More than a document, I argued, the procurement strategy objectified the influence not only (i) of the 'delivery discourse' (an 'ideally real' entity), but also (ii) of the social material properties of NS (an 'artefactually real' entity), and (iii) of the properties of the regime of investment justification (a 'socially real' entity). This was due to the fact the strategy was made possible and incorporated all the key features of the Theta design solution (vision, objectives, and investment merits) into the rationale for adopting an 'integrated team' delivery model. In essence, this 'structuring phase' culminated in increasing the contextual complexity of the project; that is, in assembling the heterogeneous properties (i),(ii) and (iii). Any further usage of and/or reliance upon the strategy as well as the project vision, objectives and design solution in subsequent project activities would hence be

necessarily conditioned by the heterogeneous contextual properties ([i], [ii] & [iii]) that made the development of these products possible in the first place.

The significance of these findings will be crystallised in chapter 8, where I will discuss how the actual accomplishment of the CC contract award project and of coordinative phenomena on that project was indeed constrained and enabled by the historically inherited heterogeneous properties (conditions for coordination) of the Theta project context; which I labelled in § 4.1.1 (p. 161) as 'properties A'. The following figure (No. 29) illustrates how 'properties A' developed historically.

In the meantime, in order to enhance further the task of explaining coordinative phenomena throughout the CC procurement process, I will elucidate in the following chapter 7 that this process was also embedded in a particular problem solving context with additional distinct properties pertaining to the nature and locus of the (procurement) problem of Railco; what I called in § 4.1.1 (p. 161) 'properties B'.

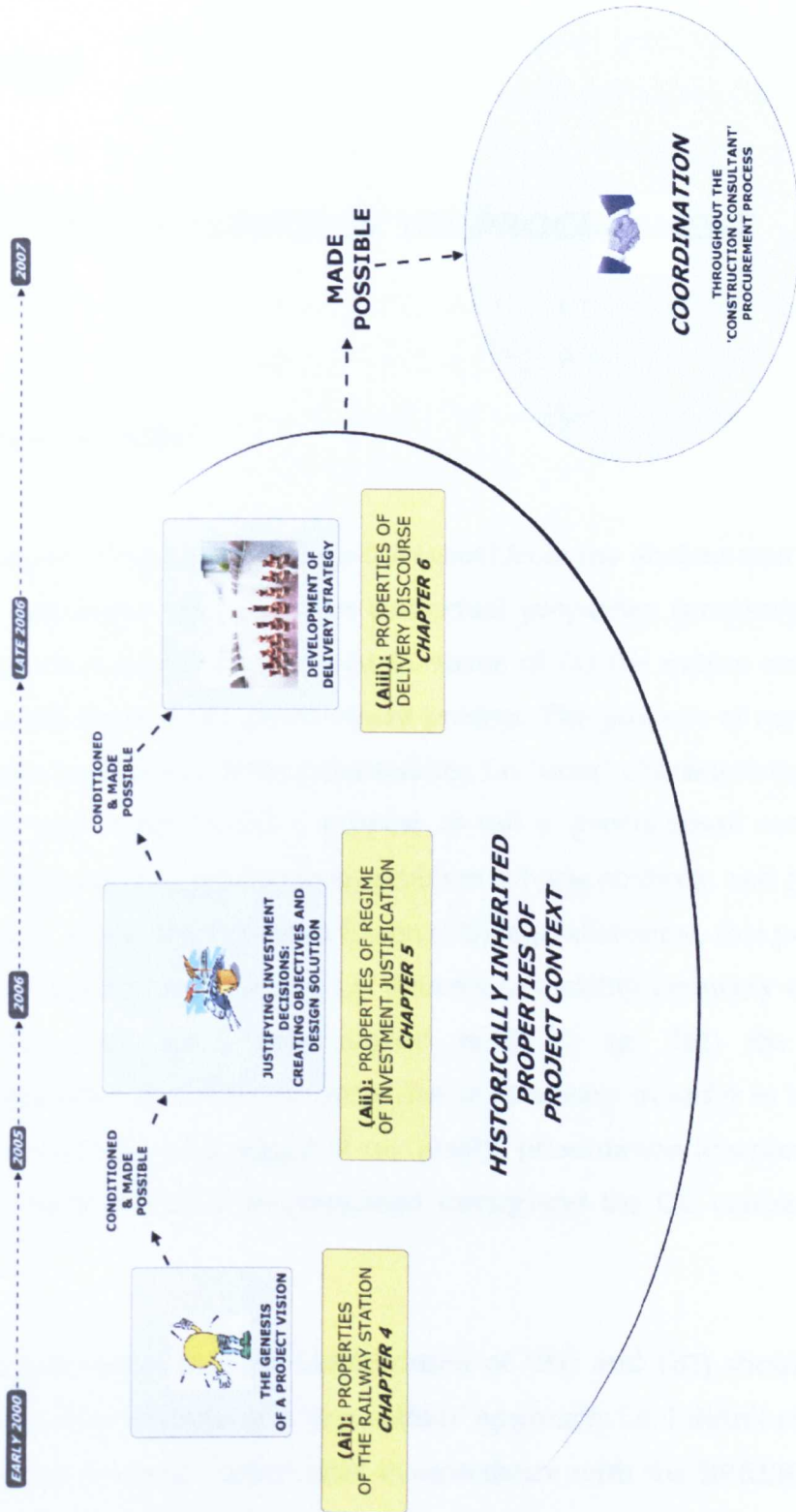


Figure 28. Historically inherited Context Properties

CHAPTER 7

THE NATURE AND LOCUS OF THE PROCUREMENT PROBLEM

7.1 INTRODUCTION

In this chapter, I report on findings I obtained from my abstract and concrete research and argue that particular contextual properties (properties 'B') of the CC contract award project exist in virtue of (1) the nature and (2) the (institutional) locus of the procurement process. The purpose of my analysis is to enhance awareness of the potentialities, i.e. 'ontic' characteristics, (B1) of a 'socially real' entity, which I propose to call a 'procurement convention' and which pertains to procurement problem solving contexts; and (B2) of an 'ideally real' entity, the European Union (EU) legal discourse, that pertains to the specific institutional context, i.e. Railco's as a utility company operating in the EU area. As I have argued in §4.1.1 (p. 161) the abstract conceptualisation of contextual properties is necessary in order to be able to explain, in the following step 2 of my results presentation (chapter 8), how and why coordination is accomplished throughout the CC contract award project.

I should also stress that the identification of (B1) and (B2) should not be conceived as the outcome of a 'top-bottom' approach; i.e. I didn't commence with abstract research. Rather (and in accordance with the RRREIC model), while I was observing as a non-participant observer the CC procurement process, I was sensitised by some particular processes and events. From there, I 'resolved' (RRREIC) those events into their components, 're-described' (RRREIC) them, and 'retroduced' (RRREIC) the existence of (B1) and (B2). In addition, in order to validate my abstract conceptualisations, I

'eliminated' (RRREIC) certain theoretical elements, positively 'identified' (RRREIC) the influence of (B1) and (B2) in actual events and process, and if needed 'corrected' (RRREIC) my conceptual categories and their relationships.

Conclusively, my aim is to elucidate how the context of the CC contract award project was complex (in addition to the historically inherited complexity discussed in the previous 3 chapters) due to the nature and locus of the problem at hand. Contextual complexity, I will show, pertained not to the large number of factors considered for problem solving, but to the heterogeneity of the properties of (B1) and (B2). By the end of this chapter, I will thus have completed my effort to illuminate additional (to the historical) conditions for making coordination during the CC contract award project possible (completion of 'step 1', see § 4.1.1, p. 161); conditions in the sense of being capable of potentially constraining and enabling coordination of procurement activities. In chapter 8, I will discuss whether and how this potential is realised through actual coordinative phenomena during the CC contract award project.

This chapter is structured as follows. I first develop an account of particular characteristics of the 'procurement convention'. Second, I report on findings of my abstract research concerning the specific elements of the EU legal discourse and the way it is objectified in specific rules.

7.2 PROCUREMENT CONVENTION

Results from my abstract research indicate that procurement problems tend to be solved through a distinctive generalised ‘mode of engagement’ (Thévenot, 2001a); what I propose to call, ‘procurement convention’. That is, for the accomplishment of contract award projects to be possible, procurement practitioners tend to act in accordance with an abstract evaluative framework governing engagement with their tasks; what Thévenot called ‘regimes of justification’ (2001b, 2002). From a perspective of a ‘stratified’ social ontology, procurement practitioners experience (stratum of experiences) and take hold of the potentialities of the procurement convention (stratum of social context) and produce actual events (stratum of actual phenomena) (see § 3.2.3). As I also argued in chapter 3 (see § 3.2.5.2, p. 118), in order to conceptualise the properties of a regime of justification as a particular context (‘socially real’ entity), I need to identify (through retroductive reasoning) how such a regime is endowed with (i) a commitment to a ‘common good’ and (ii) a requirement (demand) for a particular format of information (required for problem solving). With respect to (i), findings of my abstract research confirm that the ‘procurement convention’ aims to guarantee the establishment of a contractual relationship. With respect to (ii), because procurement is a ‘phased’ problem solving endeavour, the format of required information is differentiated across phases. In what follows, I will elaborate on those points.

7.2.1 In Pursuit of a Contractual Relationship

The key element of contract award problems is a concern that revolves around the creation of a new relationship; more precisely, a new contractual relationship. The object of the ‘contract’ makes the creation of a new inter-organisational relationship very distinctive. This is due to the nature of the contract as a unique artefact of our contemporary society. In particular, the

sociality of the contract is determined by the fact that it objectifies principally the legal discourse. It is a universally recognised social instrument for creating legal liability (Pietz, 2002). Pietz also argued (2002) that its key element is the notion of material consideration, to which economic value can be assigned. A contract has the power to transform a promise into an objective obligation because it refers to the exchange of a material thing of some economic value; most conventionally, money. Hence, when two organisations enter into a contractual agreement, they effectively transform a voluntary agreement to become a legally binding obligation on monetary grounds.

The requirement of some material condition beyond that of verbal utterance is a way of acknowledging that a contract is a social object, not a mere agreement among private individuals. The public power takes the responsibility for enforcing the obligation of contracts that it does not take for even the most sincerely made and gravely consequential promises. The consideration that transforms a personal promise into a socially sanctioned obligation cannot be what is called a 'moral consideration', such as a person's sense of moral duty, rather it must be a 'material consideration' such as the transfer of a tangible object. (Pietz, 2002, p. 38)

A fundamental prerequisite for the establishment of a contractual relationship is thus the written articulation of rights and obligations of both parties on the basis of some material consideration; any rights and entitlements pertaining to the relationship between two contractual entities is constituted always in relation to an exchange of material objects. For instance, a contractor agrees to provide construction services for a project, if the client, with whom a contract is to be signed, also agrees to pay the contractor the cost of and an amount of profit for his services. In other words, the contract is the reference point for creating a relationship, while the contracting parties' entitlement arising from the contract becomes the cornerstone and reason for realising their relationship over time (Hart & Moore, 2008).

These characteristics become constitutive features of a mode of engaging with the contract award problem. Practitioners, striving for its solution, orient and regulate their attention and actions towards the content of the contract and of the necessary material considerations. Furthermore, the area of validity of these issues has historically expanded and become very general; hence, the gradual genesis of the 'procurement convention'. This is particularly exemplified in the fact that types of contracts have been conventionalised, i.e. standardised, as Bajari and Tadelis argued (2001, p.388):

The vast majority of contracts are variants of simple fixed-price (FP) and cost-plus (C+) contracts¹⁴. (In fixed-price contracts, the buyer offers the seller a pre-specified price for completing the project. A cost-plus contract does not specify a price, but rather reimburse the contractor for costs plus a stipulated fee.)

Effectively, the method of reimbursement, i.e. material consideration, articulated in the contract appears to influence procurement problem solving (Bresnen & Marshall, 2000). The 'procurement convention' thus induces attention to the type of contract (Bajari & Tadelis, 2001), insofar as each type has differential effectiveness as regards the creation of a relationship; e.g. flexibility to adjust, incentives for quality improvement and/or cost reduction, and allocation of procurement risk (Albano et al, 2006). All these elements are crucial because they define the relationship between contract entitlements and material consideration.

The following table (No. 12) illustrates how the differential entitlements embedded in the two basic contract types may constrain and enable the realisation of contractual performance.

¹⁴ Between the two extremes, Albano et al (2006) observe that, there is an intermediate kind of *incentive contract*. This typically includes a target cost, a target profit and a profit adjustment formula, i.e. a mechanism (a) to reward the contractor if actual production cost is lower than the targeted and (b) to penalise the contractor in case the actual cost is higher than agreed.

Table 11. Contract types by Bajari & Tadelis (2001)

<u>Contractual entitlements/performance</u>	<u>Types of Contracts</u>	
	<u>Fixed Price (FP)</u>	<u>Cost Plus (CP)</u>
Risk allocation mainly on	Contractor	Buyer
Incentives for quality	Less	More
Buyer administration	Less	More
Documentation efforts	More	Less
Good to minimize	Costs	Schedule
Flexibility for change	Less	More
Adversarial relationship	More	Less

'Qualified' procurement professionals, i.e. people with official qualifications to solve procurement problems (Thévenot, 1984), are aware of the importance of such dimensions, which they tend to consider in advance of signing a legally binding contract (Berends, 2000). That is, they act in accordance with the 'procurement convention', which they may experience in different ways. Inattention to those dimensions may be potentially critiqued by other corporate agents, while it may result in an unsuccessful completion of the contract award project; e.g. unaffordable commercial agreements, using a 'fixed price' contract type whereas a need for an 'incentive contract' is required. In short, the 'common good', with which the 'procurement convention' engages, concerns the establishment of a suitable contractual relationship.

7.2.2 A 'Seeking & Selecting' Problem

Findings from my abstract research further indicate that contract award problems specifically refer to 'seeking for and selecting' a suitable

supplier/contractor. Essentially, this requires interaction with a market of suppliers/contractors (in this context, the construction industry). More than that, for such interaction to be effective, suitable (with respect to the desired contractual requirements) suppliers need to be made interested and express an interest in the contract (Pidduck, 2006). What becomes crucial then is making an attractive call for contract (Darr & Kurtzberg, 2000). In other words, a key feature of the 'procurement convention' relates to the need for seeking 'suitable suppliers' at the beginning of the procurement problem solving.

Furthermore, the interaction with a market ('seeking') aims at stimulating competition (Bajari & Tadelis, 2006). This is due to the fact that interested suppliers/contractors should bid for a contract, i.e. make a (normally detailed) proposition as regards their approach to realising the contractual relationship. Hence, procurers wish to attract multiple suppliers for their contracts because through competition bidders are given incentives to spend more effort to improve their offers (Bajari & Tadelis, 2006). In view of the different types of contracts, it is not necessarily the amount, but the quality of competition that matters (Bajari & Tadelis, 2006; Wuyts & Geyskens, 2005). In essence, competition is a crucial component of the 'procurement convention' because it affords the opportunity to select among 'good' and 'not so good' suppliers.

On the other hand, though very desirable in the beginning, receiving bids from multiple suppliers subsequently becomes a problematic issue. The procurer is now faced with the screening or comparison and selection problem; e.g. from those organisations that expressed an interest, how does or should a client decide upon a most suitable supplier and on what basis? Providing answers to this very common question - feature of the 'procurement convention' - has been the main object of studies on contract award processes (Pidduck, 2006; de Boer & van der Wegen, 2003; Sen et al 2008; Hatush & Skitmore, 1997; Hatush, 1996; Kafefors et al, 2007).

'Comparing and contrasting' bids is a specific phase of procurement problem solving, which requires information of certain format. Most conventionally, this key aspect of the procurement problem is grasped or engaged with through the creation of selection criteria, which aim at facilitating comparison and at guaranteeing successful selection. While there is a variety of selection procedures, the common underlying principle is the enablement of comparability on the basis of relevant criteria, which correspond to the demands and character of contractual requirements (Kadefors et al, 2007).

Conclusively, procurement practitioners tend to regulate and monitor their actions and enact practices in accordance with a generalised mode of engagement with procurement problems ('procurement convention'). The fundamental components of this convention relate to: (a) the consideration of the type and content of the contractual relationship, (b) the interaction with a relevant market of suitable suppliers, (c) the creation of competition, (d) the comparison among bidders and (e) selection of the most suitable. Procurement problem solvers thus coordinate the accomplishment of contract award projects in light of those interconnected elements of the abstract evaluative framework of 'procurement convention'.

Also, insofar as the contract award process is a phased accomplishment each component depends upon the outcome of the previous phase. For instance, the task of comparing and contrasting among potential suppliers inherently depends on which suppliers the procurer managed to attract, which in turn depends on the kind of contract and on the method used to advertise it. In other words, each element pertaining to 'procurement convention' has knock-on effects on elements to be dealt with in stages to follow. The following figure 30 illustrates all the above points.

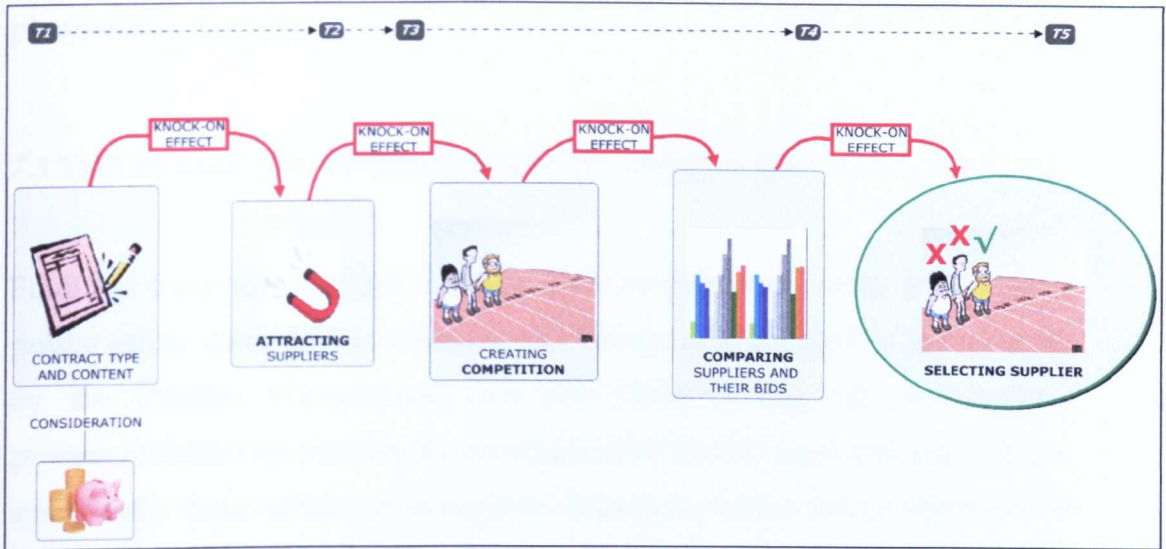


Figure 29. Illustration of Procurement Convention

Essentially, the discrete components of the convention are assembled together in virtue of the project telos, i.e. ultimate aim to select a most suitable supplier in order to establish a promising contractual relationship ('engaged' good). This overarching objective supplies procurement practitioners with 'directionality' (Archer, 1995) to coordinate their actions throughout the life of the contract award project; a feature that might be thought of as the linchpin that links all the components of convention together.

In that sense, the '**procurement convention**' represents a **foundational condition** for coordinating procurement problem solving.

At this point, I should clarify that the procurement convention, as a (socially durable) abstract evaluative framework, does not represent the only way to solve procurement problems; nor does it determine in precision how exactly the procurement process unfolds. Rather, the procurement convention is a fallible social construction (hence convention) and in virtue of its abstractness provides only general rules, which are always appropriated in local circumstances. In short, the procurement convention is 'socially real'

entity, which conditions to some extent only the emergence of actual phenomena.

7.3 THE EUROPEAN UNION (EU) LEGAL DISCOURSE

Findings from my abstract research also confirm that, since Railco, as a public utility company operating in the European Union (EU), has to abide by the Utilities Procurement Directive (2004/17/EC), all procurement process of Railco are necessarily constrained by the EU legal discourse. More specifically, this is achieved through the Directive, which sets comprehensive guidelines and principles regulating the procurement procedures of all public firms operating in the water, energy, transport and postal services sectors in the EU area. In essence, the Directive objectifies an 'ideally real' entity: the EU legal discourse, which aims to concert the actions of a myriad of institutions in order to constellate a 'single market' (the EU). In what follows, I will elucidate further the properties of this discursive structure and the way it tends to impinge upon actual procurement processes.

7.3.1 Characteristics of the EU Legal Discourse

In all EU member states the application of EU law must be enforced. The foundational elements of the discourse are objectified in the EU legislations. More specifically, the European commission has developed over the last few decades a new legal text, the EU law, which constitutes the premises of the EU. According to the commission's website:

The main goal of the EU is the progressive integration of Member States' economic and political systems and the establishment of a single market based on the free movement of goods, people, money and services.

To this end, its Member States cede part of their sovereignty under treaties, which empower the EU institutions to adopt laws.

These laws (regulations, directives and decisions) take precedence over national law and are binding on national authorities¹⁵.

Public procurement is one important aspect of the aspired integration, which accounts for approximately 16.3% of the union's gross domestic product (GDP) and thus becomes a key sector of the European economy; in 2000, it was estimated that 1.5 trillion euros was spent for the purchase of goods, services and works by governments and public utilities¹⁶. The opening up of public procurement within the union's internal 'single market' aims to increase cross-border, i.e. among member states, competition and improve prices paid by public authorities (Evaluation of Public Procurement Directives, 2006). All EU legal texts embody this principle of a 'bigger market', which must be respected by all EU countries. The underlying principle of justification of the EU legal discourse is thus based

... on a unique notion of common good corresponding to the market order of worth. The European court accepts very few exceptions to this principle which are actually pointing to other orders of worth... (Thévenot, 2001b, p. 419)

Furthermore, as a legal discursive structure, the EU discourse has a clear potential to impinge upon those who do not comply with its principle. For example, if there is infringement of the EU law, then there are clear legal consequences.

Under the Treaties (Article 226 of the EC Treaty; Article 141 of the Euratom Treaty), the Commission of the European Communities is responsible for ensuring that Community law is correctly applied. Consequently, where a Member State fails to comply with Community law, the Commission has powers of its own (action for

¹⁵ Accessed on 6th December 2008 from:

http://ec.europa.eu/community_law/introduction/treaty_en.htm

¹⁶ Accessed on 01/12/2008 from:

http://ec.europa.eu/internal_market/publicprocurement/index_en.htm

non-compliance) to try to bring the infringement to an end and, where necessary, may refer the case to the European Court of Justice¹⁷.

Conclusively, the EU law represents the instrument that guarantees a broadly agreed (by the governments of all EU member states) 'common good', i.e. the creation of a 'single market'; it is an objectification of the EU legal discourse. One of the main contexts where EU law is enforced is public and utilities procurement. In fact, the harmonisation of procedures for concluding public or utility related contracts is regarded as a major achievement of EU's intervention in EU economy (Waara, 2008). In the following section, I will specify how such achievement tends to be accomplished.

7.3.2 Instruments of the EU legal discourse

Due to the differences in the legal systems across Europe, in many cases the EU law has been deliberately designed to provide 'general principles', rather than outlining very detailed regulations. Hence, the European Commission has developed directives:

EU directives lay down certain end results that must be achieved in every Member State. National authorities have to adapt their laws to meet these goals, but are free to decide how to do so. Directives may concern one or more Member States, or all of them.... Directives are used to bring different national laws into line with each other, and are particularly common in matters affecting the operation of the single market (e.g. product safety standards)¹⁸.

Across the EU area, all institutions providing utilities services have to abide by the Utilities Procurement Directive, which has been incorporated in individual member states' legislation. The current EU directive was

¹⁷ Accessed on 01/12/2008 from:

http://ec.europa.eu/community_law/infringements/infringements_en.htm

¹⁸ Accessed on 01/12/2008 from:

http://ec.europa.eu/community_law/introduction/what_directive_en.htm

published in the Official Journal of the European Union (OJEU) in 2004. The Directive 2004/17/EC of the European parliament and of the council of 31 March 2004 aimed to 'coordinate the procurement procedures of entities operating in the water, energy, transport and postal services sectors'¹⁹. Each Member State is responsible for the implementation of EU law, i.e. incorporating the Utilities Directive within its own legal system.

Furthermore, in order to guarantee the creation of a single market, the EU Directive outlines 'filtering devices' (Fairclough et al, 2002). Those devices ensure the exertion of the influence of the EU discourse, which, in the context of contract award procedures, imposes clear restrictions pertaining to the 'transparency, non-discrimination and equal treatment' of all EU suppliers who might express an interest in the contract. The instruments, in and through which this happens, are the following:

- (A) Determining a threshold of contract value, above which the enforcement of EU legislation is introduced.
- (B) Providing a limited set of alternative 'procedural frameworks' for the conduct of the procurement process; that is, procurement procedures, such as the 'open, restricted, negotiated and competitive dialogue' procedure.
- (C) Requiring the establishment of:

objective criteria which ensure compliance with the principles of transparency, non-discrimination and equal treatment and which guarantee that tenders are assessed in conditions of effective competition. As a result, it is appropriate to allow the application of two award criteria only: 'the lowest price' and 'the most economically advantageous tender'. (EU Utilities Directive 2004 , paragraph 55)

- (D) Establishing rules for advertising a contract and contract award

¹⁹ Accessed on 01/12/2008 from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0017:EN:NOT>

- (E) Outlining time limits for the receipt of request (by prospective bidders) to participate in the competition and for the receipt of tenders (the formal bid documents)
- (F) Constraining the use and format of criteria throughout the procurement procedure. That is, selection criteria at e.g. prequalification stage cannot be used for awarding the contract.
- (G) Imposing a need for documenting and storing information relating to contract award process.
- (H) Giving the opportunity to firms participating in the competition to challenge the contracting authority's decision on contract award, if they feel they have been treated unfairly (Waara, 2008).

All the above instruments objectify the EU legal discourse and ensure its 'selection' (Fairclough et al, 2002) when contract award projects are accomplished. Their enforceability is ensured insofar as fines can be imposed to those breaching the EU procurement regulations.

In essence, the EU legal discourse is embedded in the 'procurement convention' and therefore has the potential to impinge upon coordination phenomena accomplished throughout contract award projects. Figure 31 illustrates such impingements.

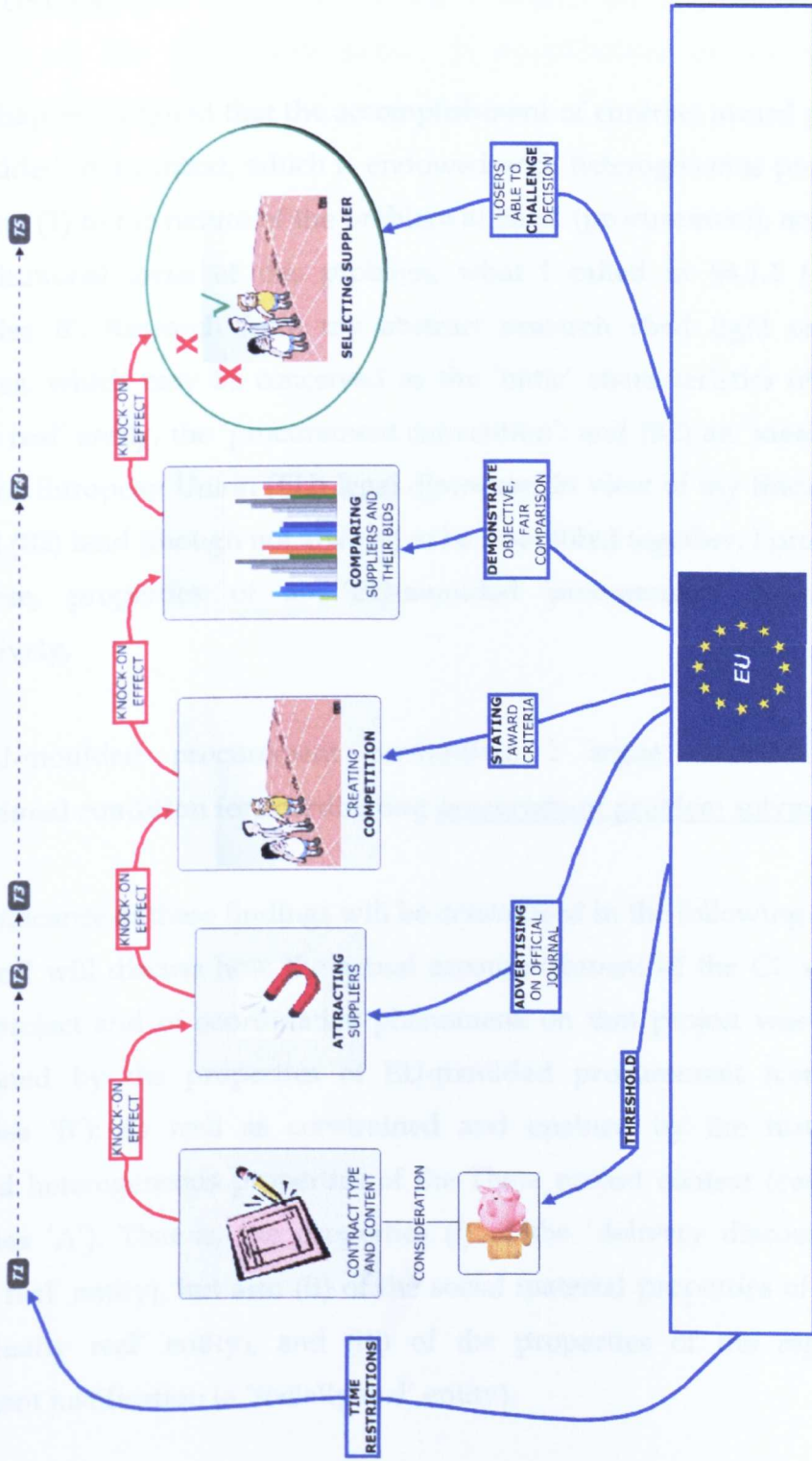


Figure 30. Impingements of EU discourse on procurement

7.4 THE NATURE AND LOCUS OF THE PROCUREMENT PROBLEM: CONCLUSIONS

In this chapter, I argued that the accomplishment of contract award projects is embedded in a context, which is endowed with heterogeneous properties pertaining (1) to the nature of the problem at hand (procurement), and (2) to the institutional locus of this problem; what I called in §4.1.1 (p. 161) 'properties B'. Research from my abstract research shed light on these properties, which may be conceived as the 'ontic' characteristics of (B1) a 'socially real' entity, the 'procurement convention'; and (B2) an 'ideally real' entity, the European Union (EU) legal discourse. In view of my finding that (B1) and (B2) tend (though not always) to be assembled together, I propose to call these, properties of an 'EU-moulded procurement convention'. Conclusively,

The EU-moulded procurement convention, I argue, constitutes the **foundational condition** for coordinating procurement problem solving.

The significance of these findings will be crystallised in the following chapter 8, where I will discuss how the actual accomplishment of the CC contract award project and of coordinative phenomena on that project was indeed conditioned by the properties of EU-moulded procurement (contextual properties 'B'); as well as constrained and enabled by the historically inherited heterogeneous properties of the Theta project context (contextual properties 'A'). That is, the properties (i) of the 'delivery discourse' (an 'ideally real' entity), but also (ii) of the social material properties of NS (an 'artefactually real' entity), and (iii) of the properties of the regime of investment justification (a 'socially real' entity).

Effectively, I have completed the first step (part 'A') of my effort to create explanatory knowledge of coordination by elucidating the properties ([A] & [B]) of the context (conditions for coordination), within which the CC

contract award project is embedded (see §4.1.1, p. 161). I will now move on to the second step (part 'B'), where I will elucidate the influence of these properties on the actual constitution of coordination during the CC procurement process.

Part B

CHAPTER 8

ACCOMPLISHING COORDINATION THROUGHOUT THE PROCUREMENT PROCESS

8.1 INTRODUCTION

As the second step of creating new explanatory knowledge of coordination, in this chapter I report on the results I obtained from my intensive and longitudinal research as a non-participant observer of the CC procurement process and illuminate how this process was accomplished over time; all results in the following sections are founded on data from real-time observations, interviews, project documents and emails (see § 3.4.5, p. 147). In essence, the purpose of this chapter is to develop new 'substantive' theory of coordination in the particular CC procurement context (what I would like to call 'substantive' explanatory knowledge); in order to draw implications and explain (in the next chapter 9) the distinctiveness of coordination as an organisational phenomenon in general ('formal' explanatory knowledge) (see § 3.1.1, p. 100-101).

In this chapter, I will therefore demonstrate the development of new 'substantive' explanatory knowledge by elucidating how the heterogeneous contextual properties (Ai, Aii, Aiii, B1, B2) of the CC contract award project actually impinged upon coordinative phenomena throughout this project as conditions for coordination (see § 3.2.6, p. 125-127). In addition, in view of my research questions (see § 2.3.2, p. 97), I will focus on and seek to explain coordination: (1) in the ways project heterogeneity was 'addressed' and/or 'managed'; (2) in the actual accomplishment of the processes of 'managing' or 'dealing with' heterogeneity as well as in the outcomes produced through these processes; and (3) in whether and how (1) & (2) relate to the

achievement of particular organisational ends. I will thus develop new 'substantive' explanatory knowledge through investigating and discussing how the contextual properties of the CC procurement process constrained and enabled coordination in terms of (1), (2) and (3) over time.

More specifically, I will show that the historically inherited (Ai, Aii, Aiii) and problem specific (B1 & B2) conditions for coordination manifest themselves to organisational actors contingently as heterogeneous demands. Findings from my in-depth concrete research further indicate that coordination is a distinctive organisational happening in the context of the CC procurement. Distinctiveness lied in that production heterogeneity (demands) was addressed in and through an analytically recognisable and patterned process; namely a process of 'engineering' compromises and/or connections among heterogeneous contextual demands, which produced certain composite outcomes/solutions.

In order to avoid misunderstandings and confusion, I will clarify how I use the two terms 'engineering' and 'compromise'. By 'engineering' I mean an agent-generated process, which aims to construct an artificial solution to a problem. Also, that process of construction depends on and results in something 'external' to those agents, i.e. something, which is 'actual' and 'realises' the influence (potentialities) of heterogeneous social conditions (see § 3.2.6, p. 125-127)²⁰. In that sense, my use of the term 'engineering' is different from that of e.g. Suchman (2000) or Gherardi (2000) and Gherardi & Nicolini (2000, 2002), who do not differentiate among ontological strata, i.e. why engineering occurs and under what conditions, and emphasise the performative aspect of engineering. More importantly, my approach significantly departs from their conceptualisation of 'heterogeneous elements'. For the above authors, those elements refer to 'engineering' of heterogeneous actual observable features of organisational reality:

²⁰ Even though human agents do experience that process, they do not necessarily appreciate 'what their doing does', i.e. what actually is constructed and which potentialities are reproduced.

“competences, materials, relations, communications, people” (Gherardi & Nicolini, 2000, p. 334); while for me, heterogeneity refers to heterogeneous abstract contextual properties (e.g. of ‘regimes of justification’, procurement convention etc.)²¹.

Furthermore, my use of the term of ‘compromise’ is similar to that of Thévenot (2001b), who argued that compromises are composite solutions that suspend resolution of contradictions and are required in situations where heterogeneous and/or conflicting contextual properties (potentialities) are present; e.g. in organisations, he argued, compromises between the (at times) contradicting ‘market’ and ‘industrial’ orders of worth are necessary (2001b). In essence, compromise refers to idea that actions and/or outcomes of actions bring together competing conventions or regimes of justification. Compromises are open to criticism exactly because they can be challenged, if they are to be evaluated by recourse to a single regime. For example, in hospitals, managers are required to compromise between at least two contradictory demands: (1) for providing clinically effective and (2) cost effective healthcare services. Pragmatic compromises become a necessity for hospital managers because they cannot provide services only on the basis of their clinical or cost effectiveness; solutions need to accommodate two different kinds of demands. Similarly, by ‘compromise’ I mean solutions that accommodate only partly the heterogeneous and at times antithetical demands of Ai, Aii, Aiii, B1 & B2 of the CC project context.

In addition, my results confirm that the influence of the ‘procurement convention’ as foundational condition for coordination is constant and durable at all stages of the procurement, since coordination occurs predominantly in a procurement problem solving context. In that sense, I posit, coordination is accomplished in accordance with the ‘procurement

²¹ At this point, I concur with Thévenot (2001b), who commented on ‘Actor-Network Theory’: “The notion of network is very compelling because of its power to embrace in its description a potential list of entities which is much broader than the one offered by models of action and practice. But this notion tends to *overlook the heterogeneity of links* for the benefit of a unified picture of interconnected elements”. (2001b, p.408, emphasis added)

convention' in order to guarantee the particular 'good' at stake, i.e. the selection of the most suitable CC. Also, my findings show that coordination gets accomplished in a differential fashion over time. This appears to be due to the fact that the heterogeneous (contextual) demands influenced differentially the construction of composite solutions (coordination outcomes) required at each phase of the procurement.

My analysis will predominantly shed light on the situated character of coordination, i.e. its localised and emergent nature. Coordination activities, I will show, are provisional, contingent and confined within particular (procurement) problem solving circumstances; that is, they are not pre-determined, but generated dynamically by human agents. My findings also indicate that the following elements enabled these 'local' organisational endeavours: enacting a team role structure, setting task objectives and timescales, using artefacts (primarily documents), communicating, and coping with contingencies. Yet, all these actual phenomena, I argue, are necessarily conditioned by the heterogeneous properties of the complex Theta project context (conditions for coordination).

Effectively, by the end of this chapter, I will have explained how coordination is a distinctive organisational phenomenon in the context of the CC contract award project. On the basis of this new 'substantive' theory, I will be able to articulate (next chapter 9) and raise claims for an original 'formal' organisation theory of coordination.

In what follows, I adopt a chronological perspective to illuminate coordination and project accomplishment at different stages of the CC procurement process: (i) project pre-launching phase, (ii) the project commencement (advertising the contract and preparing the prequalification questionnaire), (iii) preparation of the 'invitation to tender' (ITT) documents and (iv) bid evaluation.

8.2 PROJECT PRE-LAUNCHING PHASE

Before the start of the CC contract award project, the Theta project team had to make some important decisions regarding: (a) the acquisition of the right procurement expertise, (b) the selection of a suitable advertising medium to make a call for the contract, and (c) the articulation of contract award criteria. All these three decisions, I would like to argue, constitute manifestation of the 'procurement convention': planning procurement problem solving, considering how to attract the 'right' suppliers, and defining what a 'right' supplier stands for. However, as I will show in the following section, decision making at this project pre-launching phase was much more complex, since contextual complexity necessitated coordination, i.e. compromising/assembling together (connecting) heterogeneous demands. Before I discuss why and how coordination took place during this initial phase, I briefly comment on the role structure, which the Theta team enacted throughout the procurement process and enabled them to coordinate and get their job done.

8.2.1 Project Team Roles

The following figure is based on the original organisational chart, which the Theta team used to represent their roles and responsibilities.

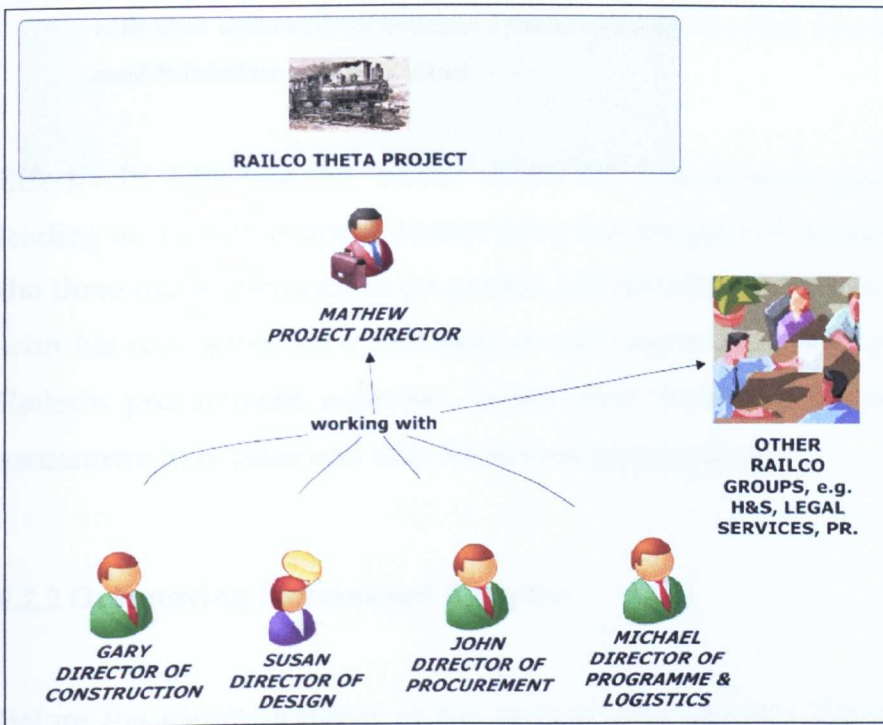


Figure 31. Key Roles of the Theta Project

I tried to elicit John's (Director of procurement) response with regard to what this chart meant for the day-to-day activities of the team. He said:

John: I mean there are certainly clear tasks. Mathew is the project director. He gives us the overall leadership, guidance, the ultimate (vision)... at the end of the day. Gary is director of construction... anything that relates to whatever we want to build for the job is Gary... Susan is director of design. All design relates to CS... any procurement and commercial management is me... and then we got a guy called Michael, who looks at the planning, programme control issues. I think they look quite clear, but actually when we are looking at, for example, the CC prequalification questionnaire (PQQ), predominantly it is me (responsible) working with Gary, because it's going to be Gary's main contract, but equally you got to make sure that the scope of services we are asking the CC to do (is agreed with other project team members). Susan is out with the designer people, who may say... no I don't want to do that (task outlined in the PQQ)... So we don't want any duplication etc... so consequently we need to make sure that we bring all the parties in. Gary is looking at the bigger picture... I suppose for the CC... Susan is making sure (and asking): does this fit with what I am doing with the 'Principal Designer'? She makes sure there is no duplication and that the right person is doing the job in associates

with their skills and competence. I think, our roles are clear, but obviously we do need to interface with each other.

Effectively, John was the 'owner' of the CC procurement process and was leading its accomplishment. Hence, John was the person 'in charge' to make the three major decisions at the project pre-launching phase in consultation with his colleagues. As a first step, it was important to assess the level of Railco's procurement expertise. In the next section, I discuss how that assessment took place and why it required coordination.

8.2.2 Outsourcing Procurement Expertise

Before the commencement of the procurement process, the Theta project team were confronted with two important issues, which led to a decision to outsource procurement expertise. The first issue related to the fact that the Theta project was in its pre-construction 'funding stage' and final decisions regarding the funding applications were pending. The consequences were that commitments to long-term investments, such as recruitment of personnel and the signing of final contracts with suppliers could not go ahead. For instance, the procurement of the 'Principal Designer' had to be delayed, according to John:

John: I think the big delay (in awarding the Designer contract), really, is because we haven't got funding. That's just moved us back a little bit, even if we get in a position to award... So, we might award subject to limited liability until full funding is given.

Similarly, the CC contract award project was also affected:

John: At the moment, you know, we got a relatively small team. And we got a few posts... I have got potentially two people in my (procurement) team that I haven't populated yet. But we need a lot more people than that. And we can't really start recruiting to the extent we want to, until we get funding! As a result of that, we are

utilising external support to help us in some things that probably our own people would do when we are fully populated.

The situation at the project level, i.e. funding uncertainty, was a roadblock to committing the necessary human resources to the CC procurement process; , this, I argue, reflected the influence of a historically moulded project context. Temporary outsourcing looked like a reasonable alternative, which could also be justified corporately within Railco. Notwithstanding funding constraints, the Theta team conceived outsourcing expertise as vital because they felt they had to address a demand originating from the 'delivery discourse' objectified in their procurement strategy: acquisition of relevant procurement 'know-how'. More specifically, in view of the fact that the CC contract was a novel 'partnering' contract, the Theta team were convinced that the procurement for a CC differs from procurement for a 'traditional contract', but they were uncertain as to how. In Michael's view (director of programme), the CC should be contradistinguished from traditional contracting:

Michael: We are buying a team; we are not buying 100m² of brick works, or 10,000 tons of concrete steel or 4,000m³ of concrete. We are buying services, people, expertise, knowledge! It is not cold odd cash... it is not about performance as in, 'this is stronger, faster'... it is not a performance specification.... main drivers (are) to get the best possible partner! What is the best possible partner? Somebody who can add value, (be) creative. We don't just want bums on seats. We want thinkers, strategic thinkers... That goes back to incentivisation, motivation... we want the best possible team!

The procurement problem of the CC had to be re-framed in light of an enriched 'delivery discourse' objectified in the adopted 'collaborative working' model, which put great emphasis on 'delivery modalities' to be facilitated by the CC (see § 6.2.2, p.207). This created some novelty for the Theta team who felt that they needed to engage with the problem differently. They considered, for instance, that different kinds of questions should probably be asked at different stages and that various documents should

reflect a commitment to the principles of the procurement strategy e.g. to 'partnering', 'collaboration', 'cultural changes', etc. (Hosie, 2001; Bresnen & Marshall, 2000). The team experienced that novel demands of the procurement strategy should be reflected on the way they would deal with the procurement process. And, accounting for the knock-on effects of each phase of the process (influence of 'procurement convention') these demands had to be addressed at the beginning. John was pondering about these challenges:

John: We need to understand the scope of services, to understand what kind of questions you should be asking at a (contract advertisement) stage, what kind of questions you should be asking at PQQ... what kind of questions you then want to ask at the next stage... It's all about the evaluation criteria... that you envisage stages: what are the key points? What is it really going to differentiate the top players from average players? All that kind of information... (we need) to understand the process... thinking about the reimbursement for these people (the CC team). Should it be a lump sum (contract)? Should it be a target cost? Should it be some kind of incentivisation regime? It's all that kind of information. Irrespective of the process you go through, you still need to go over all those areas.

According to Gary, Railco had never solved a similar procurement problem before. Having no prior experience in buying 'a CC team', the Theta team procured the organisation Sigma (a pseudonym), which would help them reduce and manage the increased levels of novelty characterising the CC procurement problem; a decision fully justified according to John:

John: The reason we approach them (Sigma) is because... it was for the CC... and the concept of the CC is relatively new within Railco. And certainly new to people like myself and Gary. Mathew has been involved with it before. He is very much familiar with it and... Sigma have provided support to the organisation Kappa (pseudonym) when they selected their CC to deliver the multibillion project XXX. That's a massive scheme. It's about €500 million for the CC. Huge! And I have contacted a guy within Sigma. So, I spoke to him (and asked him): who is the lead within your organisation, and is there any merit in us speaking to them to see if we can... get some information to the overall process, the nature of the CC contract and

more importantly lessons learnt from what they've been through with Kappa? He obviously put me in touch with the relevant partner in Sigma who led all that... and we built the relationship from there... (We wanted to) make sure we capture that knowledge and information and experience they (Sigma) have got from doing this (procuring a CC) with Kappa. Coz that's by far the biggest CC contract awarded today. So they can start bringing that to us. We thought it would save us... it saves us reinventing the wheel. It should save us time because time is not something we've particularly got. We haven't got that luxury and we just thought we might end (up) having a more robust solution as a result of it (utilising the Sigma support). And they can bring that lessons learnt, and we don't actually have to go through the same problems that Kappa did...

Sigma was one of the few organisations with the experience of procuring a CC contract. The Theta team wished to outsource procurement services from Sigma, because the latter had experience from the procurement of a 'CC' for Kappa's project. In other words, Sigma appeared to have the relevant procurement expertise to deal with the novel problem of combining demands of the 'procurement convention' and of the 'delivery discourse' with regards to 'partnering contracts'.

Effectively, I argue, the Theta team considered that heterogeneous demands originating from the 'procurement convention' and the 'delivery discourse' (properties of the Theta project context) had to be addressed. As a result, they coordinated, i.e. assembled these demands together by acquiring relevant procurement 'know-how'. In light also of the funding uncertainty (constraints of the project context), the Theta team eventually outsourced expertise from Sigma (outcome of coordination) in order to be able to re-frame the procurement problem and to pursue the achievement of the project's ends (guarantee 'good' in accordance with the 'procurement convention'). At the same time, they also had to cope with the demands of EU regulations as regards the other two important decisions at the pre-launching phase of the project: how to advertise the contract and what award criteria to articulate.

8.2.3 Complying with EU regulations

As illustrated in figure 30 (p.240), the influences of the EU discourse were exerted at all stages of the procurement process. For the CC procurement, abiding fully by the EU legislation was essential, since the estimated value of the contract was above the threshold value of €422,000. The implications were that, prior to the commencement of the process, the Theta team should address serious impingements of the EU legal discourse: (1) select an EU-compliant mode of advertising; and (2) state explicitly in the advertisement of the contract the award criteria.

With respect to the first demand, Railco decided to make a 'call for competition' through the issue of a 'contract notice' to be published in the Supplement to the Official Journal of the European Union (OJEU). OJEU publications are made through a special website, the Tenders Electronic Daily (TED - see <http://ted.europa.eu>), which is the online version of the Supplement to the OJEU dedicated to EU public procurement. OJEU is a smart mechanism through which the 'common good' ('single market') of the EU legal discourse is supposedly guaranteed²². However, I was surprised to find out that the Theta team could have done otherwise and at much less cost! As I will show in the next paragraph, the selection of the OJEU as an advertising mode was the outcome of a coordinating endeavour to compromise among the heterogeneous demands of the EU-moulded procurement convention and of the 'delivery discourse'.

²² TED provides free access to business opportunities. It is updated five times a week with approximately 1500 public procurement notices from the European Union, the European Economic Area and beyond. Anyone can browse, search and sort procurement notices by country, region, business sector and other categories. It is also notable that information about every procurement document is published in the 23 official EU languages. All notices from the European Union's institutions are published in full in these languages.

8.2.4 How to Advertise the CC contract?

My analysis of corporate policies and documents indicates that Railco could have used an industry-wide supplier database, the 'Look For A Supplier' (LFAS - a pseudonym). The LFAS is a supplier registration and qualification scheme, to which suppliers subscribe in order to become eligible candidates for contract award procedures in the railway industry. For each product, works and service to be procured, e.g. signals, services, IT, construction works, etc., there are standardised categories and subcategories. For instance, there is a category 'consultancy', which is coded e.g. 00C, with further subcategories, such as 'business consulting', 'civil engineering', 'commercial services', and respective codes, e.g. 00C1, 00C2, etc. In addition, the LFAS is considered to be EU-compliant.

In search for a better understanding of how the LFAS was used in practice, I asked John.

John: so, if we want, for example, to subscribe for a CCTV scheme, which is what we have got here (showing in the product coding booklet), we could look at this (subcategory) and we choose the suppliers of that list (who have already registered). So, we got that subcategory... (and looking at) all these people (we) believe (they) can do it. We have certain criteria, which will give us a long list, and as long as we have a short process that we are being through to get the short list, we comply with the EU legislation and we don't have to do an OJEU notice... So, we actually went out for the Designer and... looked at the description (for the category) 'civil engineering'. So we got civil engineering and we looked at all the people on there (that have registered successfully for that category). We said we anticipated the scheme to be around €11 - €12m. We said: who are the people to do that kind of contract? There must be 40 or 50 and maybe more and we ended up with the people who met all the criteria, there was probably... I don't know... double figures anyway. And we looked at the list. And we said, 'do we believe that we would get a strong tender list and the type of list we would need from that long list?'... And we did. All the main type of players that we thought they could do this work were on that list. So we were fairly comfortable... (LFOS is) more useful for ourselves to actually be able to come up with lists.

It (the LFOS) is a first cut and really all it says is... this is the first filter to comply with the EU legislation, and... after that, you go out and check whether they got the real competence and ability to do what you want. And (you) just assume that they (potentially capable suppliers) are in here. This (using the LFOS) is very much a desktop exercise. Some random people within LFOS... (It is) the first pass for EU reasons; you need to go down a lot deeper.

John's explanation illustrates how he experienced the demands of the 'EU-moulded procurement convention': 'getting the right list', i.e. attracting the most suitable suppliers in order to create healthy competition. In his view, the existing supplier database LFOS normally enabled Railco to produce 'long lists' in an efficient way; an observation, which intrigued me to explore why such a powerful instrument had been considered obsolete in the case of the CC contract. I turned to Mathew for an answer.

Question: Why didn't you use the LFOS database to select the CC?

Mathew: the reasons we didn't use the LFOS are several. There isn't a natural category. There are lots of categories that touch on it... but perhaps more pertinently, we needed to actually explain to the outside world (the wider construction industry and stakeholders) what it was we were going to do (re: procurement route)... and again, give our partners confidence that this was not just a 'railway club'. It is actually the outside world. And this was the end... (the decision was) built on the market testing that we've done in 2006... because I think our perspective was that, whilst it would be nice to see lots of people applying for our OJEU notice, the reality was (that) there are a limited number of companies that are out there that have the capability, the appetite and display, hopefully, the right characteristics (of a potential CC) that we might want to be involved with. So, it is about visibility.

From Mathew's perspective, the creation of 'the right list' of CC candidates was a more complex issue in that there were not many suitable organisations to bid for the CC contract. John also added:

John: It (the OJEU notice) gives some profile on the project... this is very different, because this job is not rail-related... anybody who could have done construction management (is suitable)... (The LFOS) is (used) because really they (suppliers) want to do rail-related work. This is very much... 90% of this job is not rail. So, as a result of that, Mathew thought, there may be people, who may have been interested in the scheme that are not on a railway LFOS system, because they are not addressing rail... So that's why we decided to open up the market really...

Within the confinements of the articulated procurement strategy (specific conditions for coordination), Railco thought more carefully about how to 'get the right list', i.e. to deal with the first component of the procurement problem. The Theta project team members realised that they had to coordinate by 'opening up the market' in order to attract the most reputable suppliers, i.e. organisations qualified to bid for the CC contract. The LFOS was inadequate as a coordinative device because it didn't enable 'engineering' of compromises among the EU-moulded procurement convention and the historically inherited condition of delivery discourse (or indeed the industry structure). In light of the constraints imposed by the EU legislation framework, they had only one choice: to publish a 'contract notice' in the online Supplement to the OJEU (outcome of coordination). Another immediate consequence of that decision was that the Theta team now had to specify the kind of criteria that had to be stated (according to the EU Directive) in the contract notice.

8.2.5 Defining Contract Award Criteria

In the Utilities Directive, two general award criteria categories are outlined: 'the lowest price' and 'the most economically advantageous tender'. The Theta team were firmly convinced that the CC contract should be awarded on the basis of the second criterion. Interestingly, although they were not required (by the EU legislation) to elaborate on those, they chose to do so. They outlined in the contract notice three areas of assessment (award criteria) and their percentile weights: (A) technical capability (52%), (B) partnership

capability (27%), and (C) commercial offer (21%)²³. The following figure illustrates the distribution.

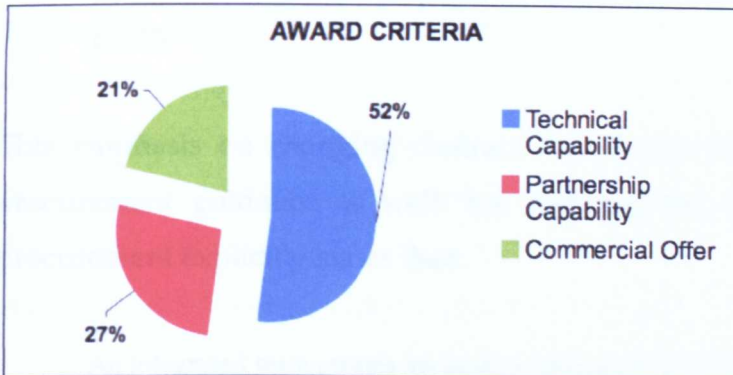


Figure 32. The CC Contract Award Criteria

On deeper examination, I argue, selecting these particular areas of assessment constitutes a coordination outcome, which was produced in order to address the demands of the EU-moulded procurement convention and the enriched industry delivery discourse. In particular, under the ‘collaborative working’ model of delivery, the selection and appointment of strategic suppliers, like the CC – members of the ‘integrated team’ – should be reconsidered in order to achieve alignment with the principles an enriched delivery discourse. This thinking was in alignment with ‘best practice’ in that a heightened focus on ‘delivery modalities’ should form the basis for evaluating suppliers’ partnering capabilities (impingement of the discourse):

Clients in partnering projects use many criteria that are common in ordinary projects, such as capacity and technical competence, performance in economic terms, and quality and safety performance, but put greater weight on attitudinal aspects and collaborative competence. Examples of the latter type of criteria are “understanding of the partnering concept”, “response to partnering”, “enthusiasm for the project”, “attitudes towards the involvement of contractors in the design process”, “team composition and attributes of individuals”, “models for evaluation and conflict management”, “commitment to collaborative working”, “senior

²³ Scaled slightly for confidentiality purposes.

management commitment”, “supply chain team working and management”, and “corporate culture”. There is also emphasis on innovative proposals, ability to bring value to the project, risk analysis and performance measurement, as well as on tools for financial control and proposals for incentive arrangements. (Kadefors et al, 2007, p. 377)

This emphasis on changing contract award criteria is reflected in public procurement guidance as well. For instance, the UK OGC guidance on procurement explicitly states that:

An integrated team creates the best environment for all who contribute to the design process – consultants, specialists, and manufacturers – to generate the design solutions that optimise value for money for the client.

Key criteria for selection of the integrated team are:

- Proven attitude to collaborative working and integrated approach
- Proven ability to be proactive
- Proven track record in innovation and managing risk

There should be evidence of:

- Senior management commitment to partnering in team
- Staff in the integrated project team with experience in the culture of partnering and team working
- Commitment to openness and shared accountability
- Commitment to collaborative working

(OGC, 2007, *Achieving Excellence in Construction Procurement Guide*, ‘The integrated project team – Team working and partnering’, p. 10)

My analysis revealed that the Theta project team felt that they should state their commitment to the new delivery discourse, which had to be reflected principally on award criteria in order to highlight departure from current procurement practice. As a result, they adopted the motto that ‘assessing soft skills’ should influence to a large extent their entire problem solving endeavours. This is particularly manifested in the very high weight (approx. 27%) on the ‘collaborative capability’ criterion. In fact, John confessed to me that they wanted “to send a message” and “stress how important partnering

is” for them and for the Theta project delivery strategy. Although I cast no doubt that the Theta project team were themselves convinced for the importance of testing bidders’ collaborative competence, I submit that they were able to justify their decision on the basis of the argumentation framework supplied by the delivery discourse, which was objectified in ‘best practice’ guidance. In essence, I argue, the team coordinated by stating award criteria in order to address the heterogeneous demands of the discourse (emphasis on ‘partnering competence’) and the EU-moulded procurement convention (defining the CC contract content).

8.2.6 Project Pre-launching Phase: Summary

Prior to the commencement of the project, the Theta project team coordinated to a significant extent in order to accommodate heterogeneous contextual (historically inherited and problem-nature) properties. They identified and addressed key coordination challenges. The solutions – outcomes of their coordinative efforts were the following:

- (a) Outsourcing procurement expertise addressed the demand (novelty) to combine elements of ‘procurement convention’ and of the construction industry ‘delivery discourse’ (acquiring procurement ‘know-how’ with respect to ‘partnering contracts’).
- (b) Publishing a contract notice in the OJEU enabled compromises among demands of the ‘EU-shaped procurement convention’ and the ‘delivery discourse’ (‘opening up’ the market in an ‘EU-compliant’ fashion).
- (c) Deciding which award criteria to state in the contract notice was also the product of an ‘engineering’ effort to assemble together demands originating from ‘EU-shaped procurement convention’ and the ‘delivery discourse’ (depart from ‘traditional’ procurement practice).

The following figure (No. 34) illustrates the above points.

My findings essentially indicate that, contrary to what existing organisation theorists believe, coordination occurs due to the presence of heterogeneous contextual properties, i.e. conditions for coordination; and it may not necessarily involve 'communication', 'knowledge sharing' among different groups, etc. This finding was also verified in the following section, where I discuss the 'project commencement' phase.

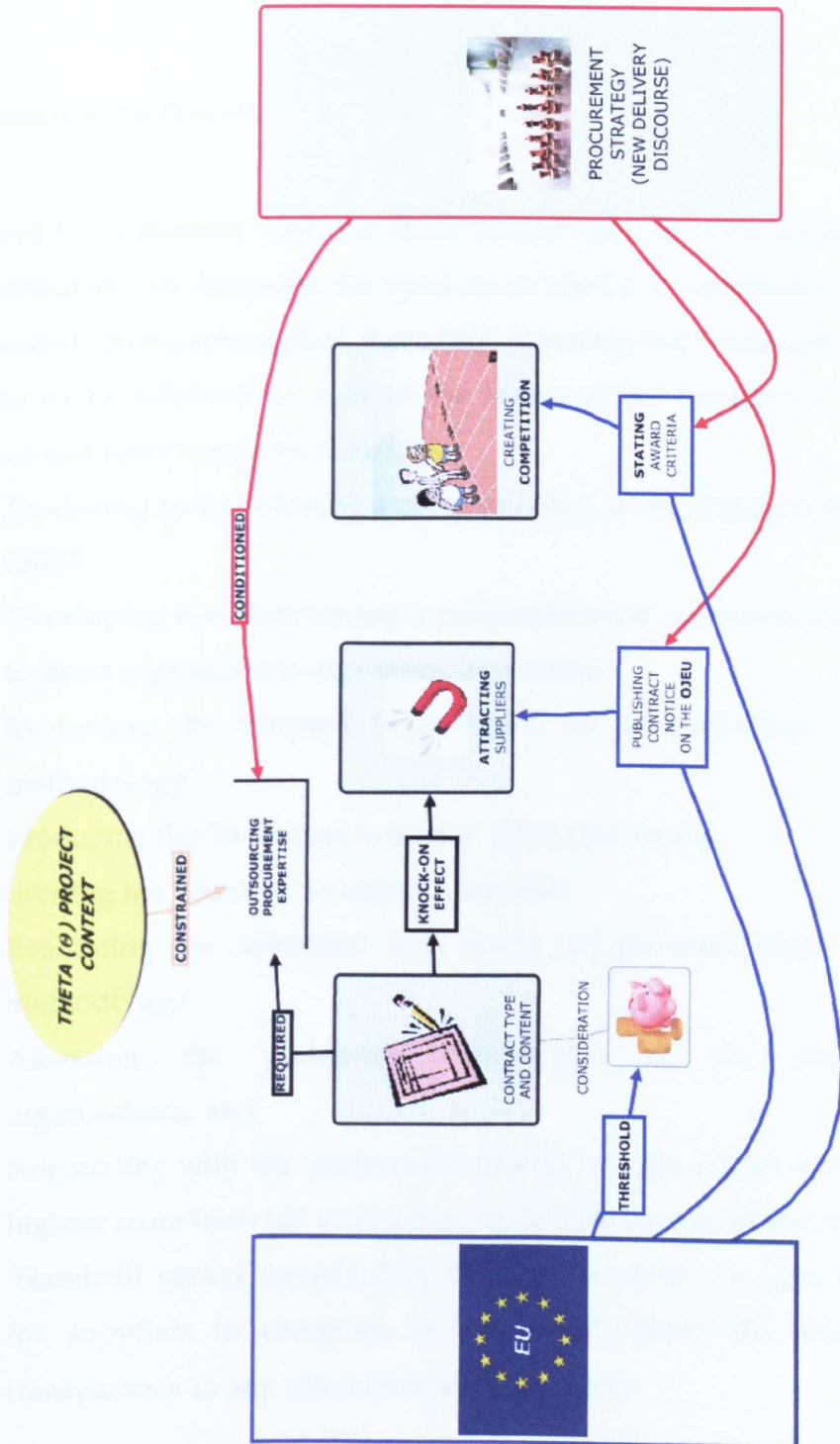


Figure 33. Coordinating at Project Pre-launching Phase

8.3 COMMENCEMENT OF THE PROCUREMENT PROCESS

8.3.1 Planning the Process

In the middle of summer 2007, the Theta project team with the assistance of Sigma embarked on designing the specifics of the CC procurement process. The so-called 'procurement plan' (hereafter 'planning doc') outlined in detail the steps to be followed as well as the issues to be considered. Specific objectives and tasks were articulated:

- (A) Producing and publishing a contract notice in the Supplement to the OJEU.
- (B) Developing and distributing a prequalification questionnaire (PQQ) to those organisations expressing an interest
- (C) Evaluating the returned PQQs based on pre-established 'scoring methodology'
- (D) Producing the 'invitation to tender' (ITT) documents
- (E) Inviting the 'shortlist' to submit their bids
- (F) Evaluating the submitted bids based on pre-established 'scoring methodology'
- (G) Assessing the partnering competence of the short-listed organisations, and
- (H) Negotiating with the 'preferred bidder(s)', i.e. the bidder (s) with the highest score from bid evaluation, on various aspects of the contract.
- (I) 'Standstill period' (required by the EU Directive), i.e. time to allow for suppliers to complain, if they wish, about the fairness or transparency or any other issue of the process.

In the planning doc, the Theta team and Sigma also visualised the 'phased' accomplishment of the contract award project. The following figure (No. 35) is based on their visualisation.

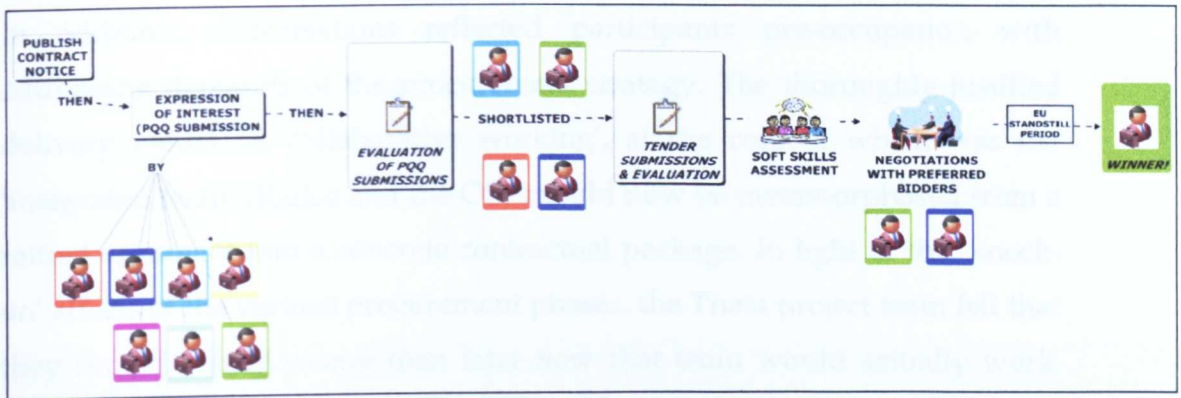


Figure 34. Visualising the Contract Award Process

The commencement phase consists of stages 'A' (producing and publishing a contract notice) and 'B' (development and circulation of a PQQ) which I will discuss in the following paragraphs.

Before publishing the contract notice in the supplement to the OJEU, a 'kick-off workshop' (which I attended) was held in order to consider key issues of the procurement project. The aim of the workshop was to elaborate on the term of the CC and to address procedural requirements imposed by EU regulations. In essence, I argue, the aim was to plan how to coordinate. The participants regarded as important issues: (i) constraints on the wording used in the contract notice, since the terminology and contract content described in the notice cannot change at subsequent stages (say at PQQ or tender stage); (ii) incompatibility of questions asked at a PQQ and tender stage, since the EU directive clearly states that information provided by bidders should be asked no more than once during contract award procedures; and (iii) development of 'demonstrably objective' evaluation criteria at both stages.

My 'real-time' observations indicate that the discussions that took place at the kick-off workshop were structured in a way so as to address the above issues and coordinate. Effectively, these discussions aimed at addressing the impingements of the EU-moulded procurement convention (issues [i]-[iii]).

In addition, conversations reflected participants pre-occupation with addressing demands of the procurement strategy. The thoroughly justified delivery model of 'collaborative working', at the core of which was the 'integrated team' (Railco and the CC) should now be metamorphosed from a reified argument into a concrete contractual package. In light of the 'knock-on' effects of the various procurement phases, the Theta project team felt that they should clarify sooner than later how that team would actually work. This was due to the necessity to provide a short contract description in the contract notice and in the PQQ (to be sent to those organisations expressing an interest). In other words, the team felt that they had to coordinate, i.e. address heterogeneous demands.

In particular, just two weeks before issuing the notice, Mathew attempted to specify at the workshop how the 'integrated team' should work:

Mathew: I see the CC acting as the primary contractor. I see the 'integrated team' as (being) divorced with a separate identity. I would expect the team to form a cultural identity of its own. Everyone in the 'integrated team' should be seen as equal. This is important. Imagine the team as a box with resources, which could be populated by Railco or the CC. (field notes taken at kick-off workshop).

Imagining the 'integrated team' aimed at triggering further discussions in order to determine 'how to procure a CC'; rather than just how to justify and convince various stakeholders about the superiority of 'collaborative working' delivery model. In essence, the influence of the delivery discourse was differentially manifested. Sigma members, who drew upon their previous experience with the organisation Kappa and other 'exemplary projects', also provided significant input to this process. In addition, the workshop participants were careful about selecting appropriate words to describe the contract characteristics in order to attract (influence of the 'procurement convention') the 'right people' (i.e. the right list). Notably, the workshop discussion were also documented by the workshop facilitator and became part of the planning doc in order to safeguard Railco against legal

challenges (potential impingement of EU discourse). Effectively, the intermediate outcome of their coordinative endeavours was the construction of a general table, which addressed the heterogeneous demands at this phase. The following figure (No. 36) represents part of the actual table – outcome of the workshop.

Characteristics		Role Contract Notice		Evaluation	
				PQQ Sift	Tender +Negotiation
Must haves	Desirables	Essentials	Desirables / minor		
1. Contractor based	Training and local approach	No construction risk	Access to central support	Company turnover annual accounts for 3 years	Commitment to mobilise
2. Not consultant	Stakeholder management	Common deliverables & works	Common user service	Turnover to fit to scope	"Buy in" to bonus incentivisation
3. Contracting entity	Staff retention	Method statement (review)	Influence on supply chain	Company organisation and structure	Incentivisation phase 1& 2
4. H+S record	Rail safety case	Change control	Sourcing	Insurances?	Conforming commercial bid
5. People. Who?	BMS capability	Management	Design of temp works	Regional connection	Options for alternative bids
6. People quality level	Succession planning	Affordability	Whole life costs	(what benefit does tenderer see in having a lead design?)	Simulation exercise
7. Turnover & profitability		Sustainability	Construction	Width of scope	Outline possessions
8. Credit rating		Quality management	Planning support	Single contractual entity structure	Enabling works initial focus
9. Capacity		Procurement		H+S record for past 3years	Incentivisation mechanism options to be developed

Figure 35. Actual Part of the Table - Procurement Planning

In order to produce that table, the Theta and Sigma team further enacted a particular communicative pattern – process of coordination. I will briefly describe that process. First, the two columns ‘characteristics’ and ‘role (contract notice)’ were created. Then, the contents of the column ‘characteristics’ were translated into criteria at a PQQ stage; and the contents of the ‘role’ columns into tender and negotiation criteria. While experienced by most participants as brainstorming, this communicative pattern actually manifested the influences of: (a) the procurement convention (getting the contract notice right in order to attract ‘the right list’), (b) the EU legal discourse (fixedness of contract description in the OJEU notice and avoidance of duplicate evaluation criteria), and (c) the selected procurement strategy (need to elaborate on the kinds of services to be provided by the CC as well as evaluation criteria at PQQ and tender stage). Communication was

coordination only because it aimed at 'engineering' compromises and connections among (a), (b) and (c).

My observations at the workshop also indicated that the issue (c) did not attract much attention. The categories used to describe the CC scope of services, e.g. 'management', 'affordability', 'quality management', were very abstract; the team didn't address thoroughly the issue of 'how the integrated team should work'. Specifying in detail the diverse kinds of services for the CC remained a critical open issue. An abstract description of the contract seemed, nevertheless, adequate and could be included in the contract notice, which represented, a further outcome of the Theta team's coordinative efforts. In the next paragraph, I discuss how the contract notice actually enabled coordination.

8.3.2 Publishing the Contract Notice

In this very small document (approx. 4 pages - see an example contract notice in the appendix), the Theta project members included a short description (one large paragraph) of the scope of services for the CC, which was very carefully drafted and outlined only the very basic 'management services' to be procured; e.g. 'the CC will provide programme and construction management services...', 'planning of the construction process...', 'supporting Railco in subsequent procurement of works...', 'managing construction...', etc. Interestingly, the notice was loaded with terms associated with the 'integrated' delivery model; e.g. 'integrated team', 'The CC will ensure buildability, affordability, sustainability of design', 'collaborative working', 'partnering'; and, of course, the 'award criteria'.

Results I obtained from my investigation of the Theta project's contract notice and of other contract notices confirm that a number of sentences in the CC contract notice were identical to those included in the contract notice of

organisation Kappa's own CC contract, published approximately two years before! At first glance, it may seem a sheer coincidence. On deeper examination, however, I argue that the Theta project team were deliberately copying and pasting wording from Kappa's procurement documents (made available from Sigma) in order to coordinate²⁴: demonstrate their commitment to 'partnering' effectively (demand of 'delivery discourse') and attract contractors of similar 'calibre' as those attracted by Kappa (demand of 'procurement convention'). In their effort to 'bring in lessons learnt' from Kappa's project, my findings indicate, the Theta project team considered 'wording' as a particularly salient feature to be transferred (in fact copied) from Kappa's procurement documents. Keeping a similar 'wording profile' for Theta project's CC contract description, it was expected, would increase the likelihood that the 'right people would understand' (Mathew's words) the similarity in delivery philosophy; that is, emphasis on 'integrated team' and 'collaborative working'. In addition, reusing existing textual products was a particularly attractive option for the Theta team members, who were overburdened with multiple tasks during a period of intense collective effort (along with their funding partners, they had to finalise the business case for the Theta project in order to get the long-awaited funding approval by the government). Effectively, 'copying and pasting' seemed a good enough solution to coordinate, i.e. 'engineer' compromises among heterogeneous contextual demand.

With the publication of the 'OJEU notice', as the Theta members called it, compliance with EU advertising requirements was achieved; i.e. affording the opportunity for any supplier of the entire EU area to express an interest in and bid for the CC contract. What was also achieved was a practicable accommodation of the 'attraction demands', i.e. imperative to magnetise the interest of a number of suitable (according to Theta members' beliefs and in relation to the procurement strategy) organisations - 'long list'.

²⁴ The validity of my finding was further attested, when the same pattern was subsequently observed at the PQQ and ITT preparation phase.

Following the call for competition in the OJEU, which would expire in 30 days (EU restriction), the Theta project team focused on developing the Prequalification Questionnaire (PQQ), a much longer document with much more detailed information. The PQQ was seen by the team as a continuing attempt to maintain and increase the interest in the contract (demand of the 'procurement convention'). After all, the creation of competition was key to the successful accomplishment of the procurement process (according to the procurement convention). In order to achieve their aims, the Theta team recognised that in the PQQ much more detailed information should be given about the particular services required by the CC, i.e. the contract content and about a set of questions to be answered and later evaluated in accordance with pre-specified criteria (impingement of EU discourse). In what follows, I illuminate that developing the PQQ document was particularly challenging because the requirements for and process of coordination were high and not well designed respectively.

8.3.3 Developing the Prequalification Questionnaire (PQQ)

There was real time pressure to produce the PQQ because the EU Directive imposed some time limits on the procurement process. The Theta project team accelerated the production of the PQQ. They made a quick, 'on-the-go' decision to split the PQQ document into two Microsoft (MS) Word files; one relating to the scope of services, and the other comprising all the PQQ sections (introduction, background and questions) apart from the scope. In light of the above decision, the Theta project members enacted a situated pattern of coordinative performances in order to produce the PQQ.

8.3.3.1 The Challenges of Getting the 'Scope' Done

The following excerpt from my field notes (taken at the first PQQ meeting) provides a glimpse into how the Theta and Sigma procurement team went about producing the PQQ.

At the beginning of the meeting, John gave me a tabulated version of the notes taken in the (kick-off) workshop (i.e. the four columns – org. characteristics, role of CC in the Theta project, PQQ and tender evaluation)... I asked Sara whether she had to type everything from the whiteboard. She replied positively (laughs)... John explained to me that for today's meeting, they had to define the scope of services, because as soon as they do that then, they would be able to know what they want (i.e. what kind of CC services) for the PQQ and in general... Mathew and Michael had already made electronically comments on the first draft of the 'scope file'. Gary was on holiday and Susan (Railco's head of design) hadn't been sent the document yet. Mathew's and Michael's comments were made by using the reviewing functionality of MS Word. They (John and Sara) started with the first paragraph (of the scope), which, they decided would probably be moved to the 'introduction to the procurement strategy' (part of the other PQQ file). They went through the 'scope' line by line and were checking the wording... Sara would tick the paragraphs they would be reviewing. For the last paragraph, they stayed a bit more. John suggested that they split the information... Sara found the last paragraph confusing. They discussed a bit the wording. They didn't really spend a lot of time on each paragraph...

.....

Throughout the meeting, John's and Sara's attention was shifting from one document to another; from the scope file, to the PQQ, to contract notice and the Kappa procurement documents... They were constantly checking the contract notice, because some of the information contained in the PQQ had to be consistent with what is included in the notice. John also mentioned that the PQQ should be ready by the following Mon – Tue (it was Thursday), because already 7 organisations had expressed an interest.... John sounded very excited because the first response (to the notice) was received 45 minutes after the OJEU publication! He also told me that an organisation from Athens, Greece had expressed an interest as well...

... For point 1.2.2.2 (of the document) there was an issue of wording. John suggested that they borrowed some (wording) from another 'exemplary project' ... He proposed that 'expediting construction' should become a subsection... As for the 'management

of cost', John changed the wording: 'to include' is changed into 'to support'... For the section 'Management of Programme', they were not sure whether the included comments were Michael's (Michael was head of Programme)... Delayed by an hour, Stuart (senior partner of Sigma) walked into the room... He suggested that for section 1.2.8 they clarified the roles of other contractors... He asked John whether the Theta team had made up their mind about the exact content of those roles. John was not sure about the views of the other members of the head team... Stuart suggested that for the PQQ they might deliberately leave it vague...

Reflecting upon my fieldnotes, I argue that the Theta and Sigma team were discussing in order to not only develop a document, but also to ensure that coordination was achieved; i.e. engineering compromises among the EU discourse, the procurement convention and the delivery discourse. Not surprisingly, coordination could not be accomplished only in and through the discussions held at the first PQQ meeting, since the entire Theta team hadn't agreed upon the role and responsibilities of the CC. In other words, assembling together the demands from the EU-moulded procurement convention (explain succinctly and in writing what services are to be procured) and the 'delivery discourse' objectified in the procurement strategy (content of the 'integrated team') required more than a discussion between John and Sara and Stuart. Although the Theta team did try to reuse some of the wording from Kappa's procurement documents and from other 'exemplary projects', they couldn't coordinate. The strategy had to be further developed in order to define 'how exactly the integrated team would work'; (an issue left open from the 'kick-off' workshop).

Essentially, it turned out that coordination could only be accomplished when all members of the Theta team reached consensus by 'talking through' and agreeing upon the procurement strategy elements. In order to reach consensus, however, they enacted a problematic communicative pattern. The PQQ was completed with an approximate delay of 10 days (quite significant for such a time-pressurised process) because the process of compiling a final document, which would reflect a collective understanding of the CC scope of

services and its role in the 'integrated team', was further exacerbated by the selected mode of communication, i.e. electronic. John's reflections upon this process illuminated this aspect:

John: I think it (the delay) was because of the number of iterations, and the number of people that (were involved). I think it was the number of people that were asked to comment on it, and then the conversations and discussions that (were) generated from there... Basically it was people continuing to input, starting thinking about it, and every time we got another draft, we just sent it out for... what I hoped would be people's final comments. (I was) saying (to them) 'I am not looking now to change it anymore. I just want to make sure that you are happy with the amendments we have made'... and they did come up with some comments that were quite valid. And at the end of it, it was me and Sara. (We) just sat in a room and just got a document. It was in here. She came up to our offices, where we got everybody's comments and just went them through one by one... to make sure whether we incorporated them all already. Because it was a nightmare trying to incorporate all these comments from all over the place!... We got so messy trying to... I was copying Sara, we shared it (the document) electronically, but there (were) people (who) sent comments electronically, and sent them on to Sara. But at the end of it, there were comments from all these people and it was a case of: 'does that what one is saying contradict with what somebody else is saying? And can we make sure that everything has been covered?' ... So what we end up doing was, because there were comments from all over (the place)... we ended up printing them off...

Results from my 'inter-textual analysis' (see § 3.4.6, p. 157) of all versions of the 'scope' and PQQ document, i.e. versions produced by each member of the team over time (including their personal comments) elucidate additional dimensions. My analysis reveals that coordination 'glitches' referred not just to a 'communication breakdown', but also to the disconcerted efforts of project members to 'engineer' pragmatic compromises among contextual demands; namely, to articulate the elements of the 'scope' in order to reflect commitment to the principles of 'collaborative working' (influence of 'delivery discourse') and specify the contractually based roles and responsibilities of the CC (influence of 'procurement convention'). Coordination 'glitches' were indeed exacerbated by the communication

breakdown, since each member of the team was focusing on different demands in isolation to other issues. More specifically, throughout the coordination process:

- **Mathew (project director)** repeatedly made comments about and highlighted the idea of the 'integrated' team, the required collaborative spirit of the CC, the tasks the CC would jointly accomplish with Railco. Striking, he tended to substitute the term 'CC' for the term 'integrated team' in order to emphasise the collaborative philosophy of the delivery process. Mathew was also instrumental in adding, time and time again, wording in relation to Railco's aspirations, hopes and desires about the partnering culture of the team.
- **Michael (head of programme)** made comments only in relation to how the CC would support programme management.
- **Susan (head of design)** emphasised (and changed the wording respectively regarding) the independence of the design team, which she would lead. She also made sure that design-related tasks were removed from CC's scope, e.g. design management, since, in her view, it was the design team's responsibility. In short, she attempted to define clear the boundaries and relationships between the 'integrated team' and the 'design team'.
- **Gary (head of construction)**, being on holidays in the middle of the PQQ production, only expanded on some construction-related responsibilities.
- **The Sigma team (Sara, Stuart and to a lesser extent Bob)** assisted John in his cumbersome editing work and provided 'wording' from Kappa's procurement documents (used in the past for its own CC contract) as well as from other 'exemplary projects'.
- **John (head of procurement)**, focused on the structure of the document and on the accuracy of information. For example, he transferred sections across the document and corrected typos and

general information, such as Railco's internal processes. He was responsible for embedding all comments in the scope file and the conclusions reached after some ad hoc meetings held within the team; e.g. to remove tasks, responsibilities, terms, to revise the 'ownership status' of management tasks. John was also the person to liaise with the Health and Safety (H&S) department of Railco in order to get their view and input (minimal at this point) in the document. Ultimately, John was the 'coordinator-in-chief'.

On the basis of these results, I argue that the enacted communicative pattern was problematic in terms of coordination, not only due to asymmetric possessions of information regarding the purpose of the document and/or to interpretative differences, but also because the requirement to engineer compromises among the demands of the 'procurement convention' in relation to the 'delivery discourse' could not be effectively dealt with. Eventually, the desired coordination outcomes were achieved after a lot of meetings and phone calls among the Theta project members.

8.3.3.2 Compiling the Entire PQQ Document

In addition to the 'scope', a lot of emphasis was put on collecting and fitting together many different sections in the PQQ:

- (1) introduction to the document,
- (2) project background,
- (3) project timescale,
- (4) project overview,
- (5) introduction to procurement strategy,
- (6) scope of services,
- (7) instructions and procurement timescale,
- (8) evaluation criteria, and

(9) questionnaire (covering three main areas - financial standing, experience, health and safety record).

With respect to sections (8) and (9), the procurement team (Theta and Sigma members) attempted to coordinate by addressing three heterogeneous demands: (i) development of screening criteria in order to select the shortlist (impingement of procurement convention); (ii) development of 'demonstrably' objective evaluation criteria (impingement of EU legal discourse); (iii) ensuring that the PQQ criteria would screen candidates with 'partnering approach' and experience and capability in delivering the CC services (impingement of delivery discourse). With respect to the first two kinds of demands, my notes from another procurement meeting shed light on the coordinative attempts of Sara and Stuart from Sigma, who were discussing the development of PQQ questions:

Stuart attempted to phrase a question. He proposed: "Please explain how through the provision of resources and the organogram, you would ensure continuity of the delivery of service?" Sara wondered how they could score that. I asked why they needed to score it. They said because it was important. I asked whether things, which were not scored, were not considered. They confirmed that non-scored questions did not count (such questions just provided additional information). Stuart then said that all those questions that started with 'how' were subjective. Sara suggested asking them (the interested suppliers) about their commitment: (provide them with the options) yes/no. Stuart disagreed. He said that then everyone would reply 'yes', which does not provide any opportunity to elicit any differences among suppliers' answers... for the issue of 'co-location'... Stuart suggested: "Outline the benefits of collocation". He then commented frustratingly that this was again subjective!... (Fieldnotes, procurement meeting, 20th Sep, 2007)

I argue that Sara and Stuart had difficulty in coordinating because the 'engineering of connections' among (i), (ii) and (iii) was challenging. They eventually concluded the coordination process by developing two sets of criteria: 'informative' and 'scoreable' and by assigning weightings to different groups of questions in order to demonstrate commitment to

'delivery modalities': financial stability (approx. 20%), health and safety (approx. 15%), experience and capability (approx. 65%)²⁵.

As far as parts (2) – (5) of the PPQ documents were concerned, the results from a further inter-textual analysis reveal that these parts had been 'copied and pasted': a) from the procurement strategy document into the 'Principal Designer' PQQ, and subsequently b) from the 'Principal Designer' PQQ into the CC PQQ. At this point, it should be noted that in the 'strategy doc', parts (2) – (4) from the Theta project business case and outline design Theta solution report (produced in the beginning and middle of 2006) had also been 'copied and pasted'. Although this pattern of 'cloning text' may seem accidental, I would like to propose an alternative explanation. The following figure illustrates the relationships between the various reports/documents.

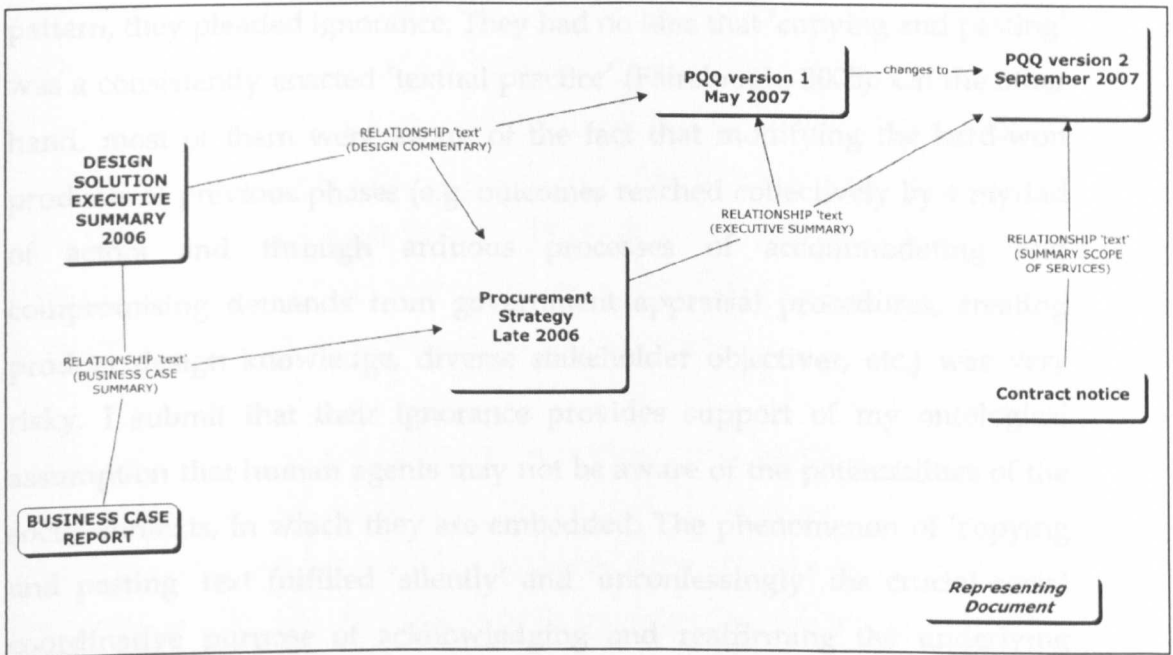


Figure 36. Relationships between key project documents.

Project members chose not to alter and used those particular sections in order to accomplish coordination of a particular sort: to 'engineer' connections with the historically moulded project context. By 'cloning text',

²⁵ Scaled slightly for confidentiality purposes.

the Theta members reaffirmed the significance of the conditions that made the CC project possible: the integrated project vision, the partners' objectives (vital pre-conditions for financing the project), the design solution (objectified investment rationale), and the delivery strategy. By 'cloning text', i.e. information relating to those historical products, the Theta team restated their commitment to the kind of and the ways 'investment return' to be guaranteed by the project delivery parties (Railco, CC, and 'Principal Designer'). Essentially, 'cloning text' ensured coordination across space and time, since it addressed demands originating from the historically inherited contextual properties (properties 'A') and from the 'procurement convention'. It should also be noted that the conditioning influence of those properties hadn't been manifested before that point.

Strikingly, when I asked Theta project members about the 'cloning text' pattern, they pleaded ignorance. They had no idea that 'copying and pasting' was a consistently enacted 'textual practice' (Fairclough, 2005). On the other hand, most of them were aware of the fact that modifying the hard-won products of previous phases (e.g. outcomes reached collectively by a myriad of actors and through arduous processes of accommodating and compromising demands from government appraisal procedures, creating product design knowledge, diverse stakeholder objectives, etc.) was very risky. I submit that their ignorance provides support of my ontological assumption that human agents may not be aware of the potentialities of the social contexts, in which they are embedded. The phenomenon of 'copying and pasting' text fulfilled 'silently' and 'unconfessingly' the crucial social coordinative purpose of acknowledging and reaffirming the underlying social foundations of the Theta project.

On the other hand, I should stress that the particular style by which this purpose was fulfilled, i.e. reproducing certain texts in a 'cloning fashion', constituted a contingent and practical accomplishment. Indeed, it should not be viewed as the only possible means through which the social foundations

of the project could be acknowledged. (As if the non-modification of words would ensure the non-modification of the ontologically distinct properties of the project's social context!). 'Cloning text' was a provisional and localised coordination outcome; yet, necessarily conditioned by the complex project context (conditions for coordination).

8.3.4 Commencement of the Procurement Process: Summary

Throughout the commencement phase of the CC procurement process, the Theta team with the assistance of Sigma enacted a multitude of coordination processes and achieved a variety of coordination outcomes. I would like to argue that the diversity of those patterns (processes and outcomes) was caused not simply by the different task requirements, e.g. planning, developing the contract notice and producing the PQQ; but also by the differential impingements of the heterogeneous contextual properties ([A] & [B]). This finding demonstrates succinctly the value of the historical analysis I conducted in chapters 4,5, 6 and 7 in order to elucidate the nature of conditions for coordination; namely, the value lies in my ability to be able to frame production heterogeneity much more holistically and in relation to the ontologically distinct properties of the project context.

I also showed that the procurement convention defined the kind of coordination needed for each particular task, insofar as it provided the overarching abstract framework for achieving the project's ends, i.e. to select the most suitable CC. In other words, coordination related to an overall organisational purpose in virtue of the 'directionality' (Archer, 1995) afforded by the procurement convention. The Theta team were coordinating in order to interact with the industry, attract suitable suppliers and construct a good enough 'long list'. It is in that sense that the procurement convention may be conceived as foundational condition for coordination.

Furthermore, I provided evidence that coordination as the 'engineering' of compromises and connections among heterogeneous demands was accomplished through various actual processes, some of which were experienced in particular ways (e.g. communication, conversation, planning) and other of which were not experienced at all (e.g. 'cloning text'). I also elucidated that some of these processes were less successful than others, precisely because the heterogeneous demands were differentially manifested over time and necessitated different approaches to coordinating; during e.g. planning the CC project, publishing the contract notice, and 'getting the scope done'. In essence, the impingements of contextual complexity were actualised in a differential fashion and conditioned the nature of coordination process and outcome. In short, conditions for coordination do not determine the actual content of coordination; but they pre-exist and make coordination possible.

With the completion of this phase (which I labelled 'project commencement' for analytical purposes), the Theta team recognised that coordination should continue in order to maintain competition and exploit it effectively. Yet, as I will show, different kinds of coordination were required at the following ITT preparation stage in virtue of the differential impingements of a complex context.

8.4 PREPARING THE 'INVITATION TO TENDER' (ITT)

One month after the publication of the contract notice in the OJEU, 20 organisations expressed an interest. According to the Theta project members "all the people we expected to see are there" (i.e. in the list), with the exception of two very reputable organisations. Unfortunately, however, only 6 out of 20 submitted the PQQ. That development fell short of their expectations and as Mathew admitted "6 was a little light". Before completing the evaluation of the 6 PQQ submissions (on the basis of pre-established evaluation criteria and a scoring matrix), the Theta team with the assistance of Sigma shifted their attention towards preparing the very detailed 'Invitation to Tender' (ITT) documentation (hereafter ITT docs).

ITT docs are generally very important because they form the basis of the formal contract. In the ITT docs, comprehensive information about contractual entitlements and obligations, such as design drawings, method of remuneration, scope of services, etc. (Jackson, 2004), needs to be provided. The documents should describe succinctly the very specific (to become legally enforceable) expectations about the desired contractual relationship, for the establishment of which a procurement process is carried out (Kamann & Bakker, 2004; Bajari & Tadelis, 2006).

This necessity was recognised, I argue, by the Theta team as well, because, in view of the 'procurement convention', the creation of competition needed to be consolidated; the detailed characteristics of the contract needed to be communicated to prospective bidders and the award criteria needed to be operationalised in order to enable comparability of offers. That is, according to the abstract evaluative framework of the convention, procurement problem solving should focus at this stage on these key issues. Consequently, for Theta members 'getting the ITT right' was an important step towards

accomplishing the procurement process successfully and fulfilling their ultimate objective: the selection of the best possible CC.

At the same time, as an 'outsider' non-participant observer, I was also wondering: "How could the Theta team get all the ITT docs done within such a short time period?" (Approximately 3 weeks after the receipt of PQQ submissions)

Findings from my in-depth concrete research confirm that the Theta team members were able to prepare the ITT docs relatively quickly because they drew upon a 'procurement instrument'. More specifically, they used extensively the Railco ITT template, upon which all ITTs to be issued by Railco businesses should be based and which has the same basic structure:

- (1) Covering Letter
- (2) Instruction to Tenderers (describing what the ITT is about and how to use it)
- (3) Contract Arrangements (the legal terms and conditions of the contract)
- (4) Contract Requirements (the content of the contract)
- (5) Tender Submission Documents (the kind of information to be provided by the bidders in order for their tenders to be evaluated).
(Railco template)

The Railco ITT template provides very detailed instructions through which compliance with the EU Utilities Directive and Railco corporate commercial principles is ensured; for instance, by way of instructing practitioners to state explicitly and elaborate on the award criteria.

The Theta team relied heavily on the template for producing items (1) - (3). As for items (4) and (5), they recognised that they should reach consensus within the team in order to make some critical decisions as regards the following questions: How should the PQQ scope of services be expanded so

as to form part of the contract? Which elements of the design solution should matter most and become part of the contract and how to decide? What kind of information should the tenderers submit in order to assess their suitability for the job and enable comparison across tenders? What could the most effective evaluation mechanisms be? As I will show in the next sections, addressing all those complex issues was a challenging task for the Theta team primarily because requirements for coordination were particularly novel.

8.4.1 Weaving Through Uncertainty to Get the ITT Done

Findings from my longitudinal observations indicate that coordination at the ITT stage represented a formidable challenge because the Theta team were not sure about how to 'engineer' compromises among heterogeneous demands; i.e. they were faced with great uncertainty. The following excerpts from my fieldnotes at various meetings shed light on the sources of uncertainty.

MEETING ONE: THETA & SIGMA DISCUSSIONS

(Approximate documentation of a dialogue between Gary and Stuart)

...

Gary: we don't want to inhibit their (tenderers') constructive thoughts. We shouldn't restrict imagination. There are infinite numbers of variations (of how the project could be delivered; not just programme and construction management solutions included in the outline design report)

Stuart: Yeah but at this point you want to compare 'eggs with eggs' (different bids)..

...

Stuart: As for incentivisation (see § 7.2.1 on 'incentive contracts') ... (you may need to specify the model to be used)

Gary: mmm... incentivisation arrangements... we are not at the best place to know how it's going to work. For us to pretend to know the arrangement would be foolish.

Stuart: You need to have an internal session (within Theta team) about what goes in the incentivisation mechanisms.

Gary: what could the tenderers bring?

Stuart: Should they confirm the commercial bid (provided by Railco for incentivisation) or (provide) an alternative bid (proposals about incentivisation models)? They do not have the time to submit new (alternative) bid... In your heads you (Theta team) need to think the areas you would like to incentivise.

...

Stuart: (I think) that the technical report (for construction and programme management) be (used) for internal consumption (within the Theta team).

Gary: (we need though) to provide precedence and direction about how phasing interacts with the station...e.g. platform works, the operational railway, the train companies, etc.

Stuart: those are constraints and restrictions. They should be 'contract requirements'.

Gary: some aspects of the environment (construction site), such as the fact that the announcements must be heard (during construction - NB: the station would remain operational). This is linked with the (acceptable levels of) noise of the construction...

Stuart: That is specification of the job!

Gary: we haven't written it... it is in our head... the operational conditions.

...

Gary: (as for) possession patterns (time period for doing works on a platform)... We have agreed with the operational guys (the Railco group responsible for managing the operational station) a particular number of weeks, which is not tested (for its technical feasibility)... We don't know (whether that number is adequate)

Stuart: those are constraints... clear governing requirements! (they are) Contractual rather than non contractual... you can't mess around with possession... (On the other hand) it is the biggest opportunity with the platform... fundamental for speed and cost of delivery... it is a programme driver...

MEETING TWO: INTERNALLY WITHIN THE THETA TEAM

(Approximate documentation of a meeting held among Gary, Michael and John)

...

Gary: (He is writing on a whiteboard the meeting title: ITT. He keeps writing: 'What do we want in the tender submission documents? [We need to] define what a compliant bid looks like and what an alternative, and what is fixed and variable'.)

John: we can't tell them about the alternative bid. We will tell them what's fixed.

Michael: Fixed time (total duration of the project) and sequence may be in the alternative... but do we know where we are going (by asking such questions)?

John: for me it is not the key thing.

Michael: we need to be clear on that.

Gary: we should concentrate on the content of the invitation.

Michael: What do we expect from these people? Do we need nuclear experts for the project? (sarcastically)

Gary: ... we need focus on: "what do we want from ITT?"

Michael: Yeah, but first we have to know what we want (from them to do).

Gary: (starts writing 'scope of services')

John: we have done that in the PQQ! (ignored)

Gary: what's the role of the CC?

Michael: pre-budget estimate.

John: no, it is to earn value!

(Numerous disagreements on the 'scope' to follow)

....

Gary:... about the compliant bid. According to Mathew, we should give them the entire report (programme and construction management feasibility solution) and ask them for their unique innovative ideas... (But should we) send them the *entire* report? (scepticism was prominent but no discussions followed)

....

Michael: what about the number of people (i.e. the CC team)?

John: For the compliant bid (we will restrict the number)... We should also ask for the CVs (of the potential CC members).

Michael: Do we have veto (in case we don't like any of them)?

John: yes.

Michael: they (bidders) shouldn't make it (total contract value) go out of cost....

John: It is not just cost, but (the quality of) people!

Gary: Yeah, but they will think about performance (high/low cost of more/less qualified person) and we will think about the best person (most qualified). It is a good idea, but does it work?... We should give them the organogram and ask them to qualify (for each role) the people.

John: about staff cost... The key driver is not cost, but the best people!

Gary: (agrees, but) even if we guarantee we get the people, they may move, go to other projects etc. (after all it is a 6 year project!)

The above excerpts illustrated that the Theta team were striving to cope with critical uncertainty (Thévenot, 2001b) stemming from contradictory sources: How to trigger bidders to demonstrate their innovative capability and at the same time disclose essential information (programme, possession pattern)

that might inhibit their imagination? In what way key contractual requirements (incentivisation), for which the Theta team had limited knowledge about, should be articulated in the ITT docs? How to compromise between competing project priorities (best people vs. outturn cost)? Is the Theta team clear about what the CC contract is all about? If not, could the ITT docs be produced regardlessly? Finally, what is the most effective way to enable comparison across bids (especially alternatives)?

My analysis indicates that all those episodes essentially demonstrate inherent coordination uncertainty, i.e. uncertainty as to how to 'engineer' pragmatic compromises and connections among heterogeneous and at times conflictual demands. I provide a possible explanation of these tensions. In particular, the Theta team wished bidders to demonstrate their innovative capability (primarily through the submission of an alternative bid) because the role of the CC, according to the procurement strategy, was to add strategic value and to be experienced in 'delivery modalities' (impingement of 'delivery discourse'). At the same time, Railco would be associated contractually with the CC, who should act in line with its interest and respect important prior decisions ('possession patterns', 'total project cost'); thus, vital information might need to be provided in the ITT docs, in spite of potentially inhibiting imagination (impingement of 'procurement convention'). In other words, coordination uncertainty refers to situation where organisational actors feel puzzled as to how to justify a solution to their problems and/or how to evaluate a situation where compromise is needed.

The Theta team were also puzzled by important gaps of knowledge (regarding incentivisation and 'scope of services'), which stemmed primarily from the novel nature of the CC contract and the delivery approach; while they felt that solutions to such problems (coordination outcomes) could only be constructed in cooperation with the bidders (differential impingement of 'delivery discourse'). This, however, was at odds with the necessity for articulating key contractual requirements, e.g. method of remuneration

(impingement of 'procurement convention'). In essence, I argue, all the above tensions or critical uncertainties made coordination at the ITT stage a very challenging process.

Strikingly, that challenge was further exacerbated when a sudden event occurred: the outline design solution of the Theta project was to change! In the following section I discuss the implications of that change for the coordination process enacted by the Theta team.

8.4.2 Significant Changes in Project Context

Before I analyse the impact of the changing project context on the ITT stage, I will first outline what kind of changed occurred. More specifically, in the middle of 2007, the MOTRD unexpectedly announced to the Theta team that the Theta project outline design solution could be improved substantially. John recalled the moment his team was informed about that (approximately two months before the CC procurement project commenced).

John: we went to tender for the 'Principal Designer', and I think it was the Thursday before the tenders would return on Friday... there was a meeting with the MOT, where they asked us to do a lot more work to support their (ideas for an improved) 'Theta Pro' scheme (disguised title).

Question: So are you going for a (new) 'Theta Pro' scheme?

John: that's what it looks like at the moment (autumn 2007). We don't know. It is not our decision. It is the decision of the MOT²⁶.... That is going to cost another (approx.) € 40 million to do the 'Theta Pro', than the 'Theta'... But the 'Benefit-to-Cost' (BCR) has gone up, so... from Theta.

I was alerted by this piece of information, because if the design solution changed, then the 'investment returns' for each individual partner might

²⁶ NB. It was not the MOTRD that would decide; they only had the idea for the new scheme. The final decision had to be approved by the board of the entire MOT, a different department of which would fund NLA.

change and their conditions for financially contributing to the project might be violated. I turned to Pat from the Nopolis Development Agency (NDA – see chapter 4) to understand the implications of this important development.

Question: As far as the Theta Pro is concerned, was NDA involved in that?

Pat: to the point where the advent of a need to perfect the Theta project, and refine it so that it could potentially deliver more benefits, but not for any more investment (from NDA). It was a modest additional investment to deliver a large amount of benefits, and that is all fine. Our involvement was to the point that at the start of the process (of developing the Theta Pro) you got the Theta project, which we all co-developed. Our (NDA's) requirement was (from the Theta team): 'whatever you do during this Theta Pro design development, you must not damage the key components (delivering regeneration benefits) that underpin our rationale (for investment). As long as you protect those elements, then really it is a transport issue as to what you want to do with Theta Pro'. And they have been protected those.

Evidently, my historical analysis helps reveal that the change of the Theta design solution represented a potentially significant event because it could trigger unwanted modifications to the ways the heterogeneous contextual properties of (i) the NS station and (ii) the regime of investment justification had been historically assembled; which had been objectified in the integrated project vision and the project objectives and expected outcomes. Eventually, the issue of protecting partners' investment returns was successfully resolved among all project partners: MOTRD, Railco, NLG, NDA and NRTA.

For the Theta project members, however, a new design solution introduced additional coordination novelty at the ITT stage; that is, novelty pertaining to complex conditions for coordination. They were bewildered as to what the implications of the Theta Pro scheme (which hadn't been formally approved yet) might be for the content of the CC contract. In other words, they were not sure whether it would affect their coordination endeavours. They felt that any potential coordination issues had to be identified and dealt with at that moment, i.e. at the ITT stage, when bidders would learn what kind of

design solution they would help deliver. The following excerpt from another meeting sheds light on those perplexities.

Michael: what about the new scheme? Should we ignore it?

Gary: we (will probably) do.

Michael: I know but... (there may be costing implications)

John: By the time we issue the ITT docs, we will know about Theta Pro (i.e. whether it would be approved)...

(LATER THE SAME DAY)

John: (talking to the project director, Mathew) (Soon) we will know what (scheme: Theta or Theta Pro) the MOT are recommending. Should we send them (the bidders) the Theta Pro (i.e. the new design solution)?

Mathew: I don't think we can. We don't have a comprehensive enough pack. What we are trying to do with the CC is to stimulate competition to find somebody to work with. We haven't got any comprehensive programme, any methodology... so I think giving somebody the complete pack (of the Theta design solution)... At least we have got a comprehensive enough pack to say, tell us what your offer is based on that. Because we are only buying people... well, we are predominantly buying people... the fact that it (design solution) changes doesn't really matter. I suspect that the guess you did at staff (i.e. number of people to be populated by the CC), Michael, doesn't change dramatically...

Michael: what we said this morning was... is there a basis for the pricing?

John: I think it depends on what type of reimbursement we use...

Mathew: I don't think it changes dramatically. Because I don't think we are going to buy a lump sum service (for the CC)...

John: we are not, we can't.

Gary: we cannot deal in the same way with Theta and Theta pro...

John: yeah, but because we are not going on lump sum...

Mathew: the important bit is to give people comprehensive information to base competition...

The Theta team were puzzled, I argue, by the Theta Pro scheme primarily because if it were to get approved, the contractual requirements in connection to the CC role might need to be altered. That is, additional coordination between procurement problem solving requirements and (new)

demands originating the historically constructed project context (integrated vision, investment objectives and outline solution) might have been required. As a result of this critical uncertainty, the team sought to assess the significance of such impact at that particular moment, because contractual requirements had to be fairly consolidated in the ITT docs.

In essence, the incremental change in the design solution heightened the levels of critical uncertainty/novelty with regards to how the heterogeneous contextual demands would be addressed, i.e. coordinated. In conjunction with the other coordination tensions (identified in the previous paragraph § 8.4.1), the Theta team created a number of solutions (coordination outcomes), which, in their view represented pragmatic compromises among heterogeneous demands; of the historically inherited properties 'A' (of the NS's dual identity, regime of investment justification, and delivery discourse) and problem specific properties 'B' (EU-moulded procurement convention). The following figure (No. 39) illustrates the areas of critical uncertainty and coordination tensions encountered by the Theta team.

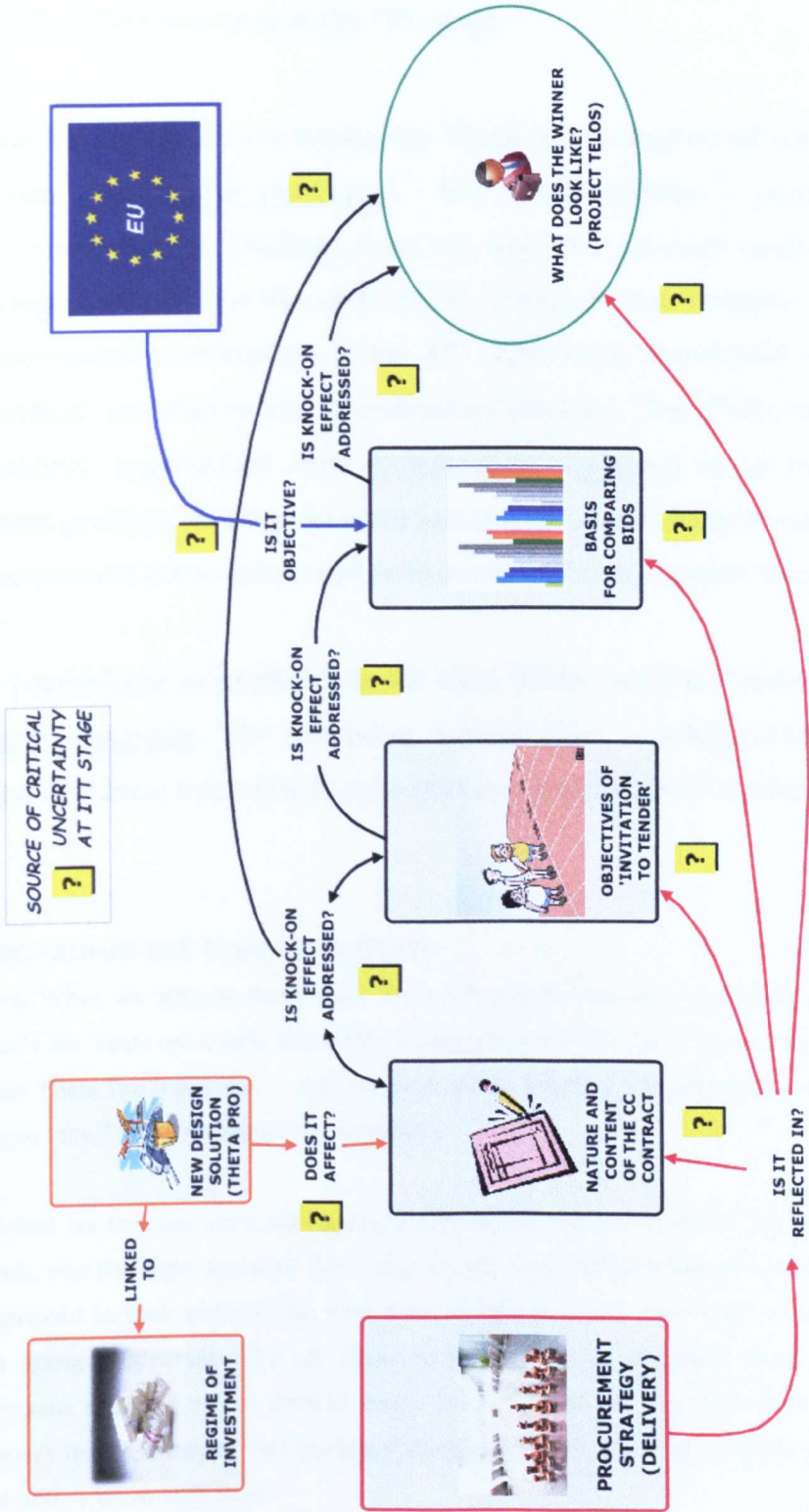


Figure 37. Critical Uncertainty During the ITT Stage

8.4.3 Coordination Outcomes at the ITT stage

By the time the ITT docs were issued, the Theta team constructed solutions – compromises (coordination outcomes) – that would address a multitude of demands combinatively. Findings from my in-depth concrete research into the ITT stage indicate that the sections (4) ‘contract requirements’ and (5) ‘tender submission documents’ in the ITT docs were developed so as to address critical uncertainty and coordination tensions. The Theta team, my results confirm, approached their coordination problems so as to enable procurement problem solving (in accordance with the evaluative framework of the procurement convention) and achievement of the organisational ends.

This was particularly exemplified in the ways Theta members justified their coordination outcomes. The following excerpt from a subsequent (to the issue of the ITT docs) interview I had with Gary and Michael illuminates this point:

(REGARDING THE THETA PRO ISSUE)

Gary: What we said to them was: ‘we want you to consider the Theta (solution). That’s the basis on which this (ITT) is done. But we also want you to be aware of what Theta Pro looks like’... and we gave all tenderers the opportunity to come and inspect the Theta Pro design in our offices.

Michael: we took the view not to send it (Theta Pro) out (i.e. in the ITT docs), which, I think, was the right decision. (By doing so) you just deflect them and really you are interested in their philosophy, how they are going to do, what sort of people they are going to provide. The job (how to deliver) hasn’t changed. Some structure elements changed but it doesn’t really matter. What we are after (final scheme) doesn’t really influence that (delivery strategy). It was felt (within the team)... ‘let’s not bother them with that’.

As regards the coordination tensions he and his colleagues encountered at the beginning of the ITT stage, Gary said:

Gary: we asked them to reflect in the compliant bid the phasing and the programme and we (gave them) already access to (all) technical reports. And we said: 'this represents a compliant strategy in terms of programme and in terms of sequence, possession'... we've said this is the compliant one, and in some instance we have asked them to echo back and... I think I felt a little bit as if this was almost like getting a name right on the exam paper... to recognise what we have already told them! This was not worth much in terms of original thought. But the view of the members... John's and Michael's was that at least that (giving them every information) showed that they would understand what we were telling them... reflecting it (the compliant bid) back means that they understand or at least they appear to understand what it is we were asking them to accept as the compliant bid. ... there was some value in plumping the understanding of the tenderers... understanding their understanding.

Michael: it was done to get a firm basis on which we could compare, like for... across the various bidders, otherwise there would be ... one would say 'I have worked on that, but I will make that on'... how do you compare? It was to get a level playing (field) for them... to start. And then we asked for alternatives. The rules were you must submit a compliant bid before we look at your alternative.

Michael was also very firm on the 'rightness' of their decision to eventually ask bidders to price an organogram of key roles to be populated by the CC team.

Michael: We have to have a price to go in the document. Not that whatever goes in there will be the price that we pay, but... there has to be a value into the contract... because we pay what it costs. There has to be a figure in there... and we know we have our ceiling (maximum cost). How much we can/can't pay!

Question: Although it is not a lump sum (contract)...

Michael: no, it is not, but (we) don't go into contract that doesn't have a value in there. And we need to have a figure in mind, because... cashier's clean! We can't spend anymore money (than what we have been granted)... we need to be mindful of what we are spending.

As regards other coordination outcomes of this stage, the Theta team expanded on the description of 'scope of services' provided in the PQQ

'scope' and added some new categories – services in order to articulate their requirements (for the CC contract) for additional 'delivery modalities' (influence of the 'delivery discourse'). In addition, a significant coordination outcome related to the incorporation of information about 'the project overview', 'the outline solution' and 'the procurement strategy'. More specifically, the practice of 'cloning text' was reproduced! As my results from the PQQ stage indicated, that outcome ensured the accomplishment of coordination across space and time (see § 8.3.3.2). Finally, coordination could not be achieved as regards the key issue of incentivisation. As it turned out (in later phase) this was due to the fact that the input of bidders was needed in order to accomplish the respective coordination outcome.

8.4.4 Preparing the 'Invitation to Tender' (ITT): Summary

Throughout the ITT preparation phase of the CC procurement process, the Theta team enacted a multitude of coordination processes and achieved a variety of coordination outcomes in the face of critical uncertainty and coordination tensions, which they experienced in particular ways. I would like to argue that uncertainty and tensions represented occasions when the Theta team were in doubt as to how to coordinate, due to the novelty of heterogeneous impingements; stemming from the procurement strategy and nature of the CC contract, from the new design solution (Theta pro) and from the EU procurement requirements, i.e. from historically constructed and problem context specific conditions for coordination.

My findings also indicated that coordination processes varied during this phase and in relation to previous phases because impingements from contextual properties were differentially manifested over time and necessitated different approaches to coordinating. These findings essentially confirm the value of the analysis I conducted in chapters 4, 5, 6, and 7; namely, that coordination patterns can be better understood if framed in

relation to project context; rather than, irrespectively of the context, as some organisational theorists have argued (e.g. Kellogg et al, 2006).

Furthermore, I showed that the procurement convention defined the kind of coordination needed for each particular task of the ITT stage; e.g. considering tender criteria, and the various contractual requirements. Most significantly, the Theta team members justified their coordination outcomes on the basis of the convention, and especially when uncertainty was critical. My analysis revealed that they acted so because the procurement convention provided the abstract evaluative framework for achieving the project's ends, i.e. to select the most suitable CC. In other words, when uncertainty and tensions were present, the Theta team resorted to a single 'justification framework': that, which would guarantee the overarching 'good' at stake; successful procurement problem solving.

With the issue of the ITT, the Theta team 'short-listed' three organisations (after the PQQ evaluation) and engaged with them extensively during the 'tender period'²⁷, i.e. the time period during which the bidders required clarifications regarding the ITT docs in order to submit their bids. At the end of this period (approx. 45 day later from the issue of the ITT docs), the Theta team received 3 offers, which they had to evaluate according to the award criteria they had specified in the contract notice. In the next section, I will discuss how coordination was accomplished during the 'bid evaluation' phase and elucidate further distinctive dimensions of coordination.

²⁷ I do not discuss this phase due to space limitations.

The following figure illustrates the key phases and events of the contract award process that had unfolded up to that temporal point.

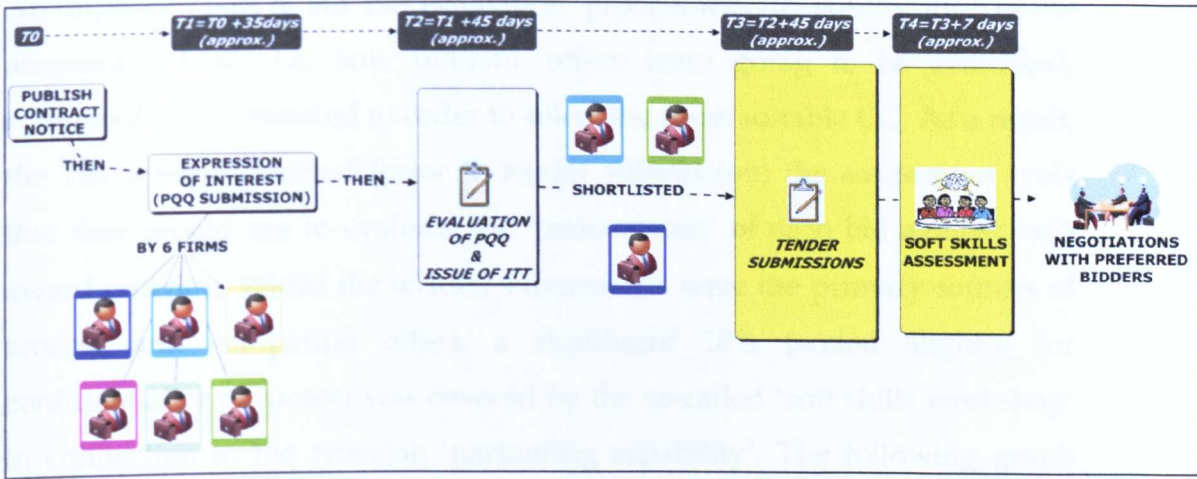


Figure 38. Key Procurement processes and events

8.5 EVALUATING BIDS

An important part of the 'bid evaluation' process was the specification of the assessment tools, i.e. how bidders' offers were going to be evaluated, compared and contrasted in order to select the most suitable CC. As a result, the Theta team specified (prior to tender submission) the assessment tools that they would use to evaluate the 'performance' of each bid against each award criterion. Whilst the written submissions were the primary sources of scoring and comparing offers, a significant 18% (scaled slightly for confidentiality purposes) was covered by the so-called 'soft skills workshop' in connection to the criterion 'partnering capability'. The following graph illustrates how the different award criteria corresponded to the two assessment tools, i.e. written submission and soft skills workshop (hereafter SSW).

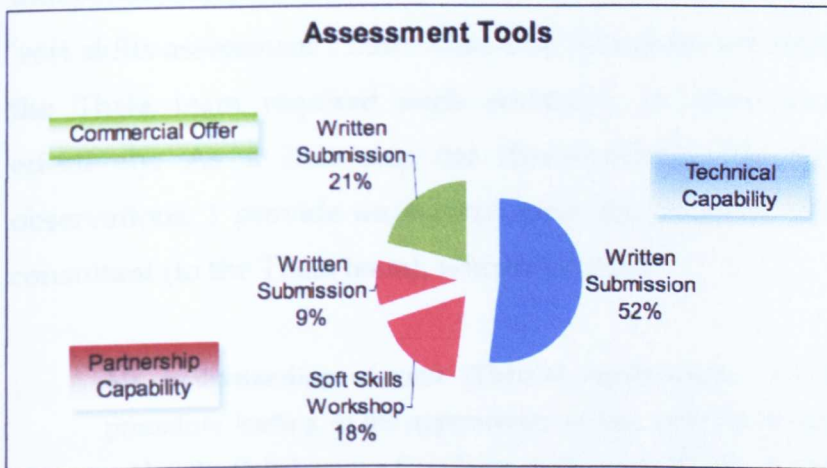


Figure 39. Bid Assessment Tools

In the following section, I report on the findings I obtained from my real-time observation of all the SSW the Theta team held in order to assess the partnering capabilities of their three bidders. The purpose is to attest my argument that this process was essentially a coordinative endeavour with innovative coordinative outcomes.

8.5.1 Assessing Partnering Capability

The idea of assessing 'soft skills' as part of a contract award process has its roots in the enriched construction industry delivery discourse on 'collaborative working' (Bresnen, 2007). According to government guidance and 'industry best practice', procurers are strongly recommended to assess 'cultural fit' and test the collaborative capability of bidders especially for key contracts (see § 8.2.5, p. 353)²⁸. The role of 'independent consultants', who specialise in 'the development of people and organisations' and 'team building' is highlighted in industry reports. With the assistance of 'qualified' consultants, the argument goes, procurers may be in a better position to assess bidders' partnering skills.

The Theta team wished to build upon 'best practice' and to follow such recommendations. They thus sought to outsource the expertise of an independent consultant solely for the purposes of assisting them with the 'soft skills assessment'. More than that, however, my findings indicate that the Theta team required such assistance in order to coordinate more effectively. As a first step for demonstrating the significance of my observations, I provide an excerpt from the proposal of the 'independent consultant (to the Theta team), who mentioned:

My understanding of your (Theta's) requirement: As part of the selection procedure leading to the appointment of key partners to the project you wish to undertake Collaborative Capability Assessment (CCA) approach. This approach is covered in more detail later in my proposal but it is essentially an assessment of each bidder to determine their cultural and behavioural fit as a potential partner for the Theta project team. This is adopted best practice for large projects such as the Kappa. Railco wishes to build on existing best practice and develop a model that is bespoke to the needs of the project and also robust and auditable....

²⁸ See, for instance, the UK National Audit Office (NAO) report on successful project control (2005), accessed on URL:

http://www.nao.org.uk/publications/0506/effective_project_control.aspx

My proposed approach is that I will work closely with the Theta team to develop and deliver a robust and auditable assessment process... (Email to John, director of procurement)

My results confirm that the Theta members were convinced by the consultant 'Coaching People' (a pseudonym), not only because of his experience in assisting big projects (such as Kappa's), but also because the CCA approach would be 'robust' and 'auditable'. Those dimensions were crucial, because, according to the demands of the EU-moulded procurement convention, comparing tenders had to be 'demonstrably objective' and on the basis of a robust methodology. In relation to the proposal of 'Coaching People', John said:

John: I mean... the 'beauty' of this tool (the proposal of 'Coaching People') is that there is some structure and you can measure something...

The assessment proposal had indeed some clear structure, since it was largely based on psychometric tests (Belbin style) normally used to measure personality characteristics and performance of important team processes against pre-established categories. Examples of such categories are 'introvert vs. extrovert', 'analytical vs. based on belief', 'creative vs. control seeking', etc. (personality test); and 'innovation', 'organisation', 'coordination' (ironically!), 'monitoring', 'cooperation' (team performance test). Most significantly, however, the structure was important in order to enable coordination, i.e. 'engineering' connections among the heterogeneous demands of the EU-moulded procurement convention (auditability, comparability, rigor and transparency) and the 'delivery discourse' ('bidders should exhibit 'collaborative skills').

Effectively, the aim of the assessment methodology was to measure the performance of each bidding team against each 'soft skills' category and on the basis of 'evidence' produced by 'independent assessors' throughout the SSW. In the 'planning doc', this principle was explicitly stated:

The SSW should generate sufficient reliable and valid evidence on the behaviour characteristics and competences of the tenderers' teams in realistic and challenging environments that model potential future challenges for the teams involved, thus allowing Railco to understand the managerial skills and competences of the prospective CC team. The results of the SSW should provide Railco with a behaviour characteristic profile of the tenderers' teams which should be representative of how a team is likely to work alongside the Theta team. The characteristics will be observed and recorded within a structured framework...

Each SSW workshop will comprise of challenges presented to the teams, designed to scrutinise the specified assessment areas, the competencies of the tenderer, and its ability to work with the Theta team. The exercise could involve a combination of realistic work-related and non work-related challenges sufficient to test competence. Each SSW is a controlled process to ensure that each tenderer had a constant assessment environment....

Two discrete areas of assessment will be used:

- Specific behaviours of the tenderer observed by the workshop evaluators;
- The Railco and tenderer's suitability as observed by the Theta senior management team. (Procurement Plan)

In addition, in order to render coordination outcomes possible, the workshop evaluators (four in total) received clear guidelines as to how to gather 'auditable evidence'. Below is an example of the scoring matrix that they used.

Table 12. Example of Scoring Matrix used at the SSW

Quantitative score	Qualitative Score	Description
0 to 10	Inadequate	"little or no evidence" of the competence
11 to 35	Marginal	"some evidence" of the competence
36 to 60	Competent	"evidence" of the competence
61 to 85	Comprehensive	"clear evidence" of the competence
86 to 100	Excellent	"comprehensive evidence" of the competence

After a lot of preparation, three separate one-day 'Soft Skills Workshops' (SSWs) were held a week after the receipt of the tenders (I attended all SSWs). The assessment was based on a real-life project scenario. The following figure illustrates anecdotally how a typical SSW day was structured.

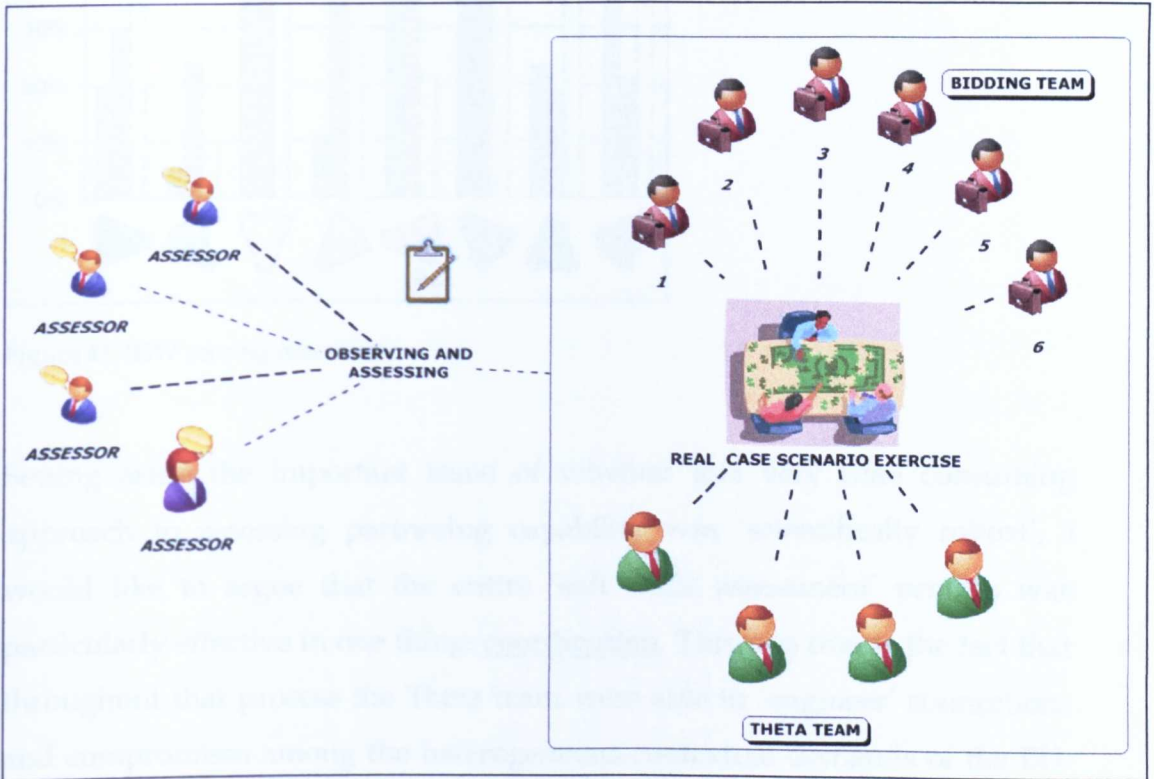


Figure 40. Example of a typical SSW day

After the workshops, 'scoring consensus' was reached among assessors and a final score for each bidding team was produced. That was important in order to produce the desired coordination outcomes, i.e. 'demonstrably objective evidence'. The following figure represents the final assessment outcomes. Please note that each column represents one bidding team, while each triangle stands for a particular assessment area (e.g. 'communication' or indeed 'coordination').

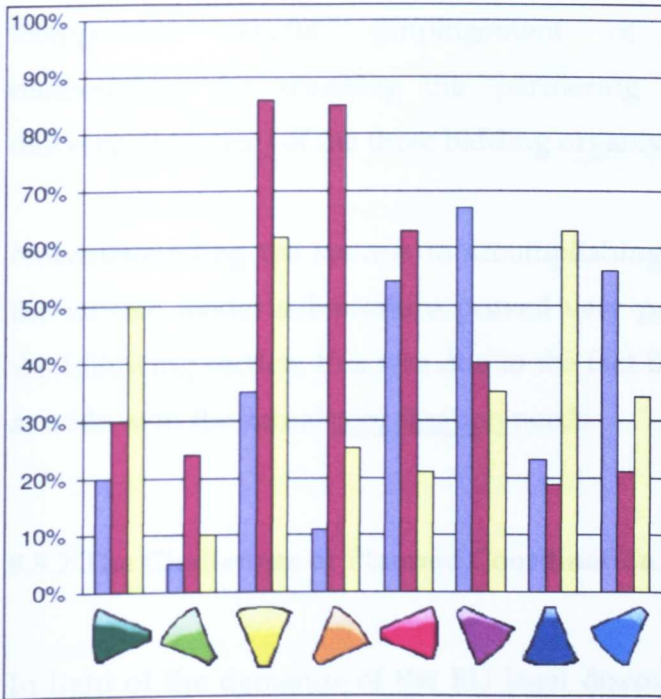


Figure 41. SSW scoring outcomes.

Setting aside the important issue of whether this very time consuming approach to assessing partnering capability was 'scientifically robust', I would like to argue that the entire 'soft skills assessment' process was particularly effective in one thing: coordination. This was due to the fact that throughout that process the Theta team were able to 'engineer' connections and compromises among the heterogeneous contextual demands of the EU-moulded procurement convention (enablement of objective, fair and transparent comparison among bidders) and the delivery discourse (commitment to partnering ethos and assessing partnering attitude of bidders); in other words, conditions for coordination could be assembled together. At first glance, the design and implementation of assessments based on 'data' produced at the SSWs may represent a coincidental situation of using some questionnaires and team performance evaluation techniques. On deeper examination, however, I assert that these activities rendered coordination process and outcomes possible: justifying, developing and implementing a 'robust', 'auditable', 'demonstrably fair and transparent' (impingement of EU legal discourse) and with the capacity to produce

'comparable results' (impingement of procurement convention) methodology for assessing the 'partnering capability' (impingement of delivery discourse) of the three bidding organisations.

Notwithstanding the success in accomplishing the SSWs, the evaluation of the written tender submissions proved very problematic. As I will show in the following section, this was due to the fact that planned coordination was at odds with the actual coordination needs.

8.5.2 The Challenges of Planned Coordination

In light of the demands of the EU legal discourse, the Theta team pursued the assessment of the three different tenders against pre-specified criteria and a pre-established scoring methodology; that is, on the basis of planned coordination which aimed at compromising among the EU discourse (pre-specification of criteria) and the procurement convention (criteria enabling effective comparison). This means that organisational actors agree to follow certain rules by using various tools or artefacts so as to coordinate in the future. In other words, planned coordination refers to the situation where there is the expectation (held by organisational actors) that certain already available techniques will prove efficacious for the construction of compromises in the future.

In the context of the Theta project, the predetermination of bid evaluation techniques would render a 'fair and transparent comparison' across bids possible as well as the positive identification of the 'most economically advantageous tender' (impingement of EU discourse). It appears that Sigma assisted a lot on that, as Gary explained.

Gary: We leaned heavily on Sigma in terms of the 'donkey work' that they did in terms of constructing the (marking) document, taking note of our view on where the prioritisation (i.e. weights on each set of questions) should lie... they'd gone away

and done the mathematics around. Because the weighting of the commercial, technical and soft skills... although we've given a weight within 100% on those three elements... within those elements there is a further rating mechanism, which they (Sigma) helped in evolving... the mathematical arrangements within the spreadsheets (evaluation matrices).

Notwithstanding the sophistication of these arrangements, planned coordination proved problematic in virtue of the distinctive features of a pre-established scoring methodology: (a) the pre-specification of questions; and (b) the pre-establishment of mathematical formulas. With regards to (a), planned coordination was at odds with actual coordination needs because the bidders interpreted questions in many different ways and thus the required (for the purposes of assessment) information was not elicited. As regards (b), designed coordination was incompatible with actual coordination needs because, more often than not, the outcomes produced through formulas did not enable fair and /or desired comparison among bids. My findings confirm that the limitations of all the above features related to incomplete knowledge, which, to a great extent, could not have been possibly developed before the receipt of the tenders.

Effectively, the evaluation process was characterised by inherent contradictions, which made coordination problematic. On the one hand,

Michael: ...the scoring the criteria had to be established before (tender) submissions come back... otherwise, you could say 'oh, I really want him to be' and therefore give lots of scores to people for company called 'X' or 'Y'... it has to be dead straight!

On the other hand, there was an emerging need for post-tender clarifications and for asking other questions (e.g. at tender interviews). It was explained to me that most of those were required,

Michael: ...in response to an error, or omission or an ambiguity in the tender document. It was to elicit more information... to get an answer that should have

been answered... to get some more information... you don't know what kind of question (at a post-tender stage) you are going to ask until you get the submissions back.

Andrew (Sigma member): The problem with these tenders (has been) various anomalies, which you normally get. You tell these tenderers what you expect from them. And invariably they send their interpretations of what they want. And they want to dress up their bids to make it look better than the others.

Mathew (Project director): *What you end up, generally, are words that would tend to suggest that perhaps you are going to get (referring to information systems) more than reality says you will get... hence, questions like that (post-tender clarification)... people will quite often talk about how their company uses such and such (systems) ... that doesn't necessarily mean that you are going to get it.*

For Michael, the issue was also about how a question was articulated in the ITT docs, as he retrospectively confessed:

Michael: What you ask for (in the ITT docs) is what you get! If you don't ask for it, you may not get it!

It became apparent, that the creation of knowledge and understanding of the different offers throughout the post-tender period was a coordination necessity that was addressed satisfactorily only at the very end of the contract award process.

Further contradictions also related to the limitations of a pre-established scoring methodology.

Gary: It wasn't easy (to use the evaluation guidance). Sometimes it proved... we have actually buried some of them, because either the questions... the rules were flawed, or... we had to change... Here is one example (showing the evaluation guidance document)... We were probably ambitious about giving (requiring) 15 years experience in a role (in the organogram to be populated by the bidders). We went back and reduced that to 12, and reduced other sections accordingly. So we compressed the years (upon which scoring would be based), when we could see that

... perhaps our expectations would have resulted in none of the tenderers getting a very significant mark, which may have then led to very small differentiations between the tenderers. If they all scored '0' that wouldn't have been good. So, we had to modify our... parameters, so that we could distinguish between... levels of experience so that someone with 12 years of experience would get marks. Whereas if we say it was a minimum of 15 years of experience, the '12-year man' may have got nothing! Which wasn't... which would have been unfair to both the tenderer, and it would have been unfair to us, because we would have been potentially excluding good people, who did have experience and were relevant to the role... No, it (the scoring methodology) didn't survive!

Michael: (Reflectively speaking) What we, with hindsight, perhaps, should have said was: 'provide this information in this order and in this format to make evaluation easier'.... Evaluation was challenging... because different interpretations, commercial standpoints (existed). One company in particular wrote the questions and provided the answer. And that is the way to do it! Because it makes it easier for the examiner, the reviewer to find that information... answer in a way that people can check it. Like an exam question... Make it easier for the examiner to give you marks...

On deeper examination, the above contradictions demonstrate the impossibility of accomplishing coordination on the basis of plans only. On the one hand, the EU legal discourse demanded fair and objective comparison of bids, that is, planned coordination. On the other hand, actual coordination needs, i.e. information regarding the 'real' potential of bidders, could not have been determined in that way. Essentially, as indicated by Gary's quote (above), accomplishing the project successfully required discretion and local adjustments.

Strikingly, absolute confidence of what was to be procured was not gained until the very end of the procurement process because coordination outcomes produced up to that point... were provisional and might need to be revised! As Mathew confessed:

Mathew: When it comes to the actual (contract) award... all of these (post-tender) discussions need to be crunched into a very concise agreement, because what we

don't want is people starting to rely on something that was 4 months ago (written submissions)... we actually have to distil all of that (discussion and negotiations) down, so that we get everybody to the same point now... and that's where we move forward from... Everything that went before (throughout the procurement process) was simply the courtship, but actually the marriage (contract award) is where we start from...

8.6 ACCOMPLISHING COORDINATION THROUGHOUT THE PROCUREMENT PROCESS: CONCLUSIONS

In this chapter, I provided rich descriptions and detailed analysis of why what and how coordination was accomplished at the different stages of the CC contract award project. I elucidated that the historically constructed project context not only made the procurement process possible, but also provided a mix of conditions for coordination. These conditions and predominantly the 'delivery discourse', my findings indicated, created heterogeneous production demands, with which the Theta team attempted to deal by coordinating. Most significantly, their coordinative attempts were predominantly enabled and constrained by the procurement convention (foundational condition for coordination): the abstract evaluative framework, which oriented and afforded monitoring of procurement problem solving in order to guarantee the project telos, i.e. the selection of the best possible partner.

Furthermore, my findings showed that some conditions for coordination were not always salient for enacting actual coordination. That is, their potentialities were not realised (see § 3.2.4, p. 117). For example, the influence of the NS's dual identity or of the regime of investment was not manifested frequently. From this, however, it does not follow that they ceased to be conditions, since the existence and realisation of potentialities are ontologically distinct phenomena. I argue that they always (at least until the project is completed) have the potential to impinge upon actual coordinative activities, since the integrated project vision and investment returns can be materialised only with successful delivery! (Recall Pat's quote on § 5.3.1, p. 205) In conjunction with this insight, I showed that the influence of conditions for coordination was differential throughout the CC procurement process because coordination requirements changed over time. Evidently, such changes were due to the phased nature of the procurement

problem, which necessitated different kind of coordination at different stages.

Most intriguingly, my results illuminated that the accomplishment of actual coordination was inherently dynamic and at times more or less successful depending on: the level of novelty as regards the effort required to 'engineer' compromises and connections across heterogeneous contextual demands, e.g. coordination tensions, critical uncertainty, 'glitches'; the coordination medium, e.g. communication, conversation, 'copying and pasting' text; local circumstances, e.g. electronic reviewing and SSW. In addition, at some times coordination produced innovative coordination outcomes, while at other times coordination was dynamic in that organisational actors had to locally and emergently construct the conditions for assembling heterogeneous elements together.

In essence, my analysis demonstrated the value of a historical-longitudinal investigation of coordination in this organisational context, which has enabled me to explain why and how coordination throughout the CC contract award project was distinctive.

Coordination was a distinctive organisational phenomenon of the CC procurement process, since it aimed at dynamically 'engineering' compromises and connections among heterogeneous demands of the complex Theta project context (conditions for coordination) in order to enable the selection of the most suitable CC.

Effectively, with the completion of the second step required for creating 'substantive' explanatory knowledge of coordination, I can now draw implications and raise claims for an original 'formal' theory of coordination, i.e. a theory which explains the distinctiveness of coordination as an organisational phenomenon in general. In the following chapter 9, I complete this final process.

CHAPTER 9

DISCUSSION OF ORIGINAL THEORETICAL CONTRIBUTIONS

9.1 INTRODUCTION

In this chapter, I will clarify how the new ‘substantive’ explanatory knowledge I created in the context of the CC procurement process translates into and/or forms the basis for new ‘formal’ explanatory knowledge of coordination. In order to do that, I will draw general conclusions from the findings of my intensive case study and explain the distinctiveness of coordination as an organisational phenomenon. The generality of my conclusions, I argue, is valid because it is based on the principles of a particular mode of inference: retroduction (see § 3.3.2, p. 144-145). That is, I have aimed to transform my ‘substantive’ knowledge claims into ‘formal’ knowledge claims on the assumption²⁹ that coordination as an organisational phenomenon has ‘ontic’ characteristics; i.e. dimensions that pertain to the possibility of coordination as a general concept (Gkeredakis & Ferdinand, 2007). In other words, the metamorphosis of my explanatory conceptualisations of coordination in the context of the CC contract award project into general theoretical statements may be thought of as a process of abstract research (see § 3.3.1, p. 129-131); that is, moving from particular to general conclusions that explain a very important ‘ontic’ characteristic of coordination (as a concept) – its distinctiveness!

²⁹ If this assumption is not accepted, then the very belief that there *is* a possibility of ‘formal’ organisation theory, and, of course, of organisational research in general, should be refuted as well. Hopefully, (most) organisation scholars accept this assumption and have thus ‘allowed’ me to pursue a PhD!

Furthermore, in order to articulate my original ('formal') theoretical contributions more succinctly, I took note of Sayer's insight that,

Contrary to the usual view of the development of science, progress consists partly in improving and extending our ability to *picture* the world. (Sayer, 1992, p. 63, emphasis original)

I have thus sought to develop an analogy/metaphor of coordination that highlights, accentuates and 'pictures' in new intriguing ways the key elements of my epistemological contribution. In this chapter, I will describe how I have considered a new metaphor/analogy of coordination and why I have selected the notion of 'diarthrosis' to re-imagine and emphasise the distinctiveness of coordination.

In addition, I will attest to the 'practical adequacy' of my new theory by using it to re-describe existing knowledge and address the current 'fragmentation trap' in organisation studies (Knudsen, 2003). I also will draw some further implications for other research fields, policy and practice. Finally, after summarising the thesis findings, I outline some important limitations and directions for future research.

To recapitulate,

The aim of the chapter is to (i) articulate and discuss my original contributions to organisation theory through explaining the *distinctiveness of coordination* as a general phenomenon; (ii) propose a new metaphor/analogy of coordination; (iii) demonstrate its practical adequacy and relevance to other theoretical and practical affairs; and (iv) summarise my research project's findings and outline some limitations and directions for future research.

The chapter is organised in four sections. In the first section, I draw general 'formal' theoretical conclusions from my particular 'substantive' theory of

coordination in the context of the Theta project. I then describe how and why I propose the notion of 'coordination as diarthrosis' as a new analogy/metaphor of coordination. In the second section, I apply my new theory and metaphor with a view to re-describing, re-contextualising and resolving any conceptual challenges of existing organisation theory (discussed in chapter 2). In the third section, I outline additional contributions made to interrelated fields and draw implications for policy and practice. In the fourth and last section, I summarise the key findings of my thesis and sketch out research boundaries and directions for future research.

9.2 EXPLAINING THE DISTINCTIVENESS OF COORDINATION

In this section, I draw general conclusions from my empirical study and raise claims for an original contribution to 'formal' organisation theory. As argued in the beginning of the chapter, the validity of the following conclusions is based on the assumption that there is the possibility for explaining coordination and its distinctiveness ('ontic' characteristic). Therefore, in order to develop new 'formal' theory, I apply 'retroductive reasoning' in relation to my 'formal' theoretical research questions (see § 2.3.2, p. 94). Effectively, the inferences I articulate in the following paragraph will also provide the basis for selecting a suitable metaphor/analogy of coordination.

9.2.1 General Conclusions from 'Substantive Research'

First, in order to explain the distinctiveness of coordination in organisation theory, I argue, it is crucial to clarify the notion of heterogeneity in organisational settings (see research question [a], p.94). The main conclusion I have drawn from my in-depth study of the CC procurement process is that heterogeneity should be framed in terms of the *heterogeneous properties* of a historically constructed organisational context in relation to a particular problem-solving context. This is important because, generally, organisations are intrinsically historically moulded contexts and provide the conditions for organisational actors to coordinate. In the case of the Theta project, for example, the team who undertook the CC contract award project had to come to grips with pre-established project objectives, a pre-defined procurement strategy and pre-existing procedures guiding and regulating the procurement process. In short, heterogeneity should be conceptualised much more holistically in terms of conditions for coordination in order to be able to explain how coordination addresses heterogeneity and enables organisational accomplishment.

In conjunction with this latter point, a second interrelated conclusion I have drawn from my in-depth study of the CC procurement process is that teleological factors (see research question [b], p.94) should be addressed and synthesised in the explanatory structure of a new theory of coordination. In order to do that, I argue, it is important to postulate the existence of a foundational condition, which provides 'directionality' (Archer, 1995) for coordination. In other words, coordination relates to an overall organisational purpose in virtue of an abstract evaluative framework, which enables orientation and monitoring of successful problem solving (commitment to a particular 'good'). In the case of the Theta project, for example, that foundational condition for coordination related to the 'procurement convention' and the engaged 'good' was the selection of the best possible CC. In short, coordination addresses difference and heterogeneity in organisational settings in relation to the telos it aims to guarantee.

A third major conclusion I have drawn from my in-depth study of the CC procurement process is that the process and outcomes of coordination (see research question [c], p.94) pertain specifically to the engineering of compromises and connections among heterogeneous contextual demands and enable the progressive fulfilment of an organisational telos. The notion of compromise is key to explaining the distinctiveness of coordination because 'grasping' heterogeneity for a particular organisational purpose implies the creation of composite solutions (Thévenot, 2001b, 2002); that is, solutions that bring together diverse contextual elements, yet address those only partly in order to 'get the job done' and achieve 'local closure' (Gerson & Star, 1986). In the CC contract award setting, for instance, advertising the CC contract through an OJEU contract notice represented a coordinative attempt by virtue of compromising demands among: the EU legal discourse, the industry delivery discourse and the procurement convention.

From this perspective, coordination is an inherently dynamic organisational phenomenon, since the way the historically inherited conditions for coordination create demands in concrete organisational (problem solving) situations is situated, localised and indeterminable. That was exemplified many times in the context of the CC procurement process, where organisational actors had to deal with: coordination glitches, tensions, novelty, critical uncertainty, and limitations of designed coordination. In short, the key general conclusion I have drawn from my in-depth study of the CC procurement process is that the process of coordination refers to the process of 'engineering' compromises and connections among heterogeneous demands and the outcomes of coordination concern composite solutions/results.

Conclusively, I raise claims for an original contribution to organisational theory through explaining the distinctiveness of coordination: the process and outcome of 'engineering' compromises and connections among heterogeneous contextual demands in order to enable the progressive fulfilment of an organisational telos.

I also validate the originality of my new theory on the grounds that it: (i) alters in novel ways the core explanatory logic of existing models (e.g. coordination vs. communication and knowledge sharing); (ii) re-organises the relationship between new concepts (e.g. heterogeneity and process of coordination); and (iii) transforms problematic images of coordination (e.g. happening at the boundaries). According to Whetten (1989), if a set of theoretical statements substantiate (i), (ii), and (iii), then claims for an original 'formal' theoretical contribution are indeed verified.

In addition, in order to accentuate further the innovativeness and distinctiveness (ironically) of this new explanatory knowledge of coordination, I propose in the following section a new metaphor/analogy of

coordination. By doing so, I submit, it will be possible to demonstrate more effectively the 'practical adequacy' of the new theory.

9.2.2 In Search for a New Analogy/Metaphor of Coordination

I argue that in order to highlight how my new theory is different and superior from existing ones I should pursue the development of an enhanced 'picturing' and re-imagining of coordination via a new metaphor/analogy. However, before creating one, it is important to understand what metaphors/analogy are. According to Sayer (1992):

Metaphors and analogies play an important part, but often misunderstood role in the process of conceptual development... the displacement of a concept to a new object of reference... in more interesting cases... changes the meaning of the 'root' concept. For example, re-describing war as 'state-sanctioned violence' can alter our general concept of violence, leading us to *look at* more conventionally denoted instances of violence (e.g. terrorism) *in a different light*. (p. 62-63, emphasis added)

Furthermore, the development of a new metaphor is based on the principles of 'analogical reasoning':

The defining characteristic of successful analogical reasoning is the *transfer of an explanatory structure* from the source domain (e.g. violence) to the target (new and unfamiliar) domain (e.g. war as 'state-sanctioned' violence). (Tsoukas, 1993, p. 337, emphasis & parentheses added)

Metaphors provide the initial insight into potentially more systematic parallels between two domains, which are explored via a process of analogical reasoning. More specifically, in analogical reasoning, *relations have priority over objects attributes*. (Tsoukas, 1993, p. 342, emphasis added)

From this perspective, analogical reasoning essentially complements and does not substitute 'retroductive reasoning', insofar as the search for a useful analogy and metaphor highlights the distinctiveness of explanation; it does

not enable the generation of theoretical statements. I would disagree, however, slightly with Tsoukas (1993), because the notion of 'transfer of an explanatory structure', i.e. a structure that already exists, may undermine the authenticity of a newly created explanatory structure, i.e. a 'formal' theory. In my view, the key issue is to select a metaphorical device that accentuates the most significant epistemological components of a new theory (Drummond & Hodgson, 2003, 2006).

In line with these thoughts, I therefore developed a set of criteria to choose, or more, accurately develop a new metaphor/analogy of coordination. In particular, a metaphor that re-imagines coordination in organisations in accordance with my new explanatory theory of coordination should: a) accentuate the significance of compromise and connection b) incorporate a teleological dimension, c) elucidate the dynamic, contingent and localised features of coordination, and d) highlight the contextual embeddedness of such accomplishment.

Admittedly, I was initially considering the notion of 'articulation', which was also used by a number of sociologists (Strauss, 1985, 1988, 1993; Corbin and Strauss, 1993; Gerson, 1983; Gerson and Star, 1986; Fujimura, 1987) and theorists of 'computer supported cooperative work' (CSCW) technologies (Herbsleb & Grinter, 1999; Grinter, 2003, 2005; Gerson, 2008; Schmidt & Simone, 1996). All these authors viewed 'articulation' as an analogy of a similar (to coordination) work-related phenomenon:

Articulation consists of all the tasks involved in assembling, scheduling, monitoring, and coordinating all the steps necessary to complete a production task. (Gerson & Star 1986, p. 266)

Soon, however, I realised that the notion of 'articulation', which refers to the 'state of being jointed' (Oxford English Dictionary, 2004), was limited because its metaphorical connotations lack dynamism and the sense of

enablement associated with coordinative endeavours. It also undermined the more holistic theory of heterogeneity, which I had conceptualised, as well as the teleological dimensions of coordination. I thus abandoned the 'analogy of articulation' and concentrated on developing my own metaphor and focused on not only (a)-(d) but also on other 'picture-carrying' elements such as the dynamism and evaluative character of joints as well as the relation of joints to a broader complex accomplishment.

In view of the above criteria, I was gradually sensitised by the metaphorical connotations of the notion of 'diarthrosis'. In English, 'diarthrosis' is principally used as a medical anatomical term referring to:

(noun) A freely movable joint. The ends of the adjoining bones are covered with a thin cartilaginous sheet, and the bones are linked by a ligament lined with synovial membrane, which secretes synovial fluid. (A Dictionary of Nursing, Oxford University Press, 2008)

Any of several types of bone articulation permitting free motion in a joint, as that of the shoulder or hip. (The Free [Medical] Dictionary, accessed on: <http://www.thefreedictionary.com/diarthrosis>, 15/04/09)

Examples of diarthroses are the knee, hip, elbow and shoulder joints (see following figure). The distinctive characteristics of these joints is that they are the most movable bone joints in our body, since the articulated bones are not directly joined - hence, synovial joints (Kingston, 2001).

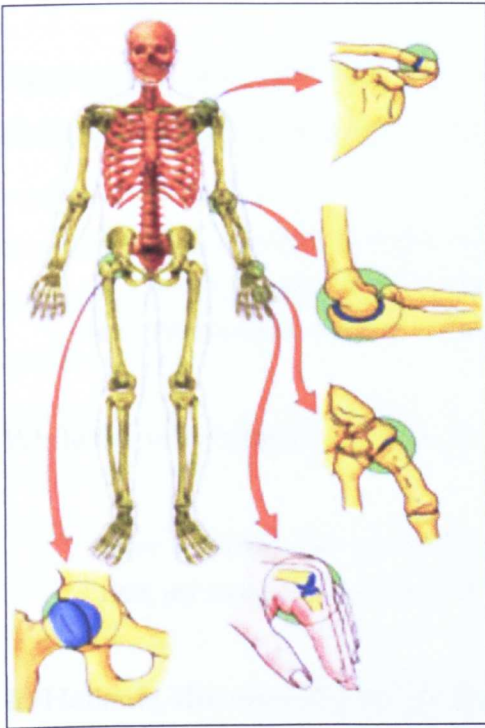


Figure 42. Diarthroses of the human body³⁰



Figure 43. Possible movements enabled by a number of body diarthroses³¹

³⁰ Image taken from www.yangtaichi-form.de on 14/04/2009.

Furthermore, the root of the word 'diarthrosis' is Hellenic (Greek), and in the Hellenic semantic context (in Gk. διάρθρωση), it has an additional meaning:

'Co-order', connection of the distinct components of a unified whole: (e.g.) the diarthrosis of a novel, the diarthrosis of a government department, the diarthrosis of society, etc. (Triantafillidis Dictionary, 1998, my translation from Hellenic)

While the verb 'diarthrono' (in Gk. διαρθρώνω) means:

Shape a unified whole by connecting distinct components. (Triantafillidis Dictionary, 1998, my translation from Hellenic)

In Hellenic, the meaning of 'diarthrosis' is essentially richer, since it denotes both synovial joints (e.g. wrist diarthrosis) and, more broadly, a set of joints that enable the construction and identification of something 'unified'; while the process of diarthrosis refers to the creation of joints, and of a 'co-order'. Effectively, the term diarthrosis emphasises figuratively the dynamism of connections/joints; why connections (e.g. movement) are created; and in relation to what (e.g. entire body).

In light of the Hellenic and English semantics of 'diarthrosis', I propose that coordination may as well be re-imagined as 'diarthrosis'. In what follows, I present how I intend the metaphor of 'coordination as 'diarthrosis' to accentuate the original epistemological components of my new theory of coordination.

9.2.3 Proposing the Metaphor of 'Coordination as Diarthrosis'

In order to clarify how the analogy of diarthrosis advances the 'picturing-carrying' characteristics of coordination, I will further specify its

³¹ Image taken from www.aktive-schuhe.de on 14/04/2009.

metaphorical advantages. First of all, 'diarthrosis' connotes dynamism of connections, whose formation enables the achievement of something, i.e. the fulfilment of a telos; connections afford characteristically movement and enablement. Think, for instance, how the diarthroses of our bodies enable us to walk, run, exercise, and, of course, to use computer keyboards to type a thesis (!); or how the diarthrosis (in the Hellenic sense of the word) of an article enables the reader to enhance his/her understanding of a topic. Analogously, in organisations coordination is about dynamically creating compromises/connections that enable organisational accomplishment; that is, about creating a diarthrosis.

Secondly, and in conjunction with the previous point, the metaphor of 'diarthrosis' incorporates an evaluative dimension, which, as I have shown, is crucial to explaining coordination. Consider, for example, how the diarthroses at knees, hip, elbows, and shoulders, permit the 'right' kinds of movements so as to e.g. run fast or swim. Also, a film may be very engaging, not only due to the protagonists' talent to act, but also due to its diarthrosis – that is, the successful assemblage of its disparate elements, e.g. photography, cinematography, script, etc. Analogously, I argue, in organisations coordination is accomplished in accordance with an abstract evaluative framework, which enables the distinction between 'justifiable' or 'unjustifiable' compromises. The reader may recall, for instance, how the Theta members coordinated at the ITT stage (when critical uncertainty was created due to the new Theta pro scheme) by justifying the non-inclusion of the new design solution in the ITT docs (see § 8.4.2, p. 283). In essence, the Theta team created a justifiable 'diarthrosis'.

Thirdly, the process of diarthrosis (in Hellenic the verb 'διαρθρώνω' [diarthrono]) represents a dynamic process that aims at creating movable/workable connections. Think, for example, how the author of a novel attempts to produce and assemble the various parts and themes of his/her book in such a way so as to create a text that identifiably and

successfully pertains to its particular genre (and not any other genre); that is, he attempts to create a good diarthrosis. The performing of the process of diarthrosis in the previous example is conditioned by an evaluative element, to which the performer is committed; e.g. I am trying to create a diarthrosis of a text that can be identified as a PhD thesis in the field of organisation studies. The metaphor thus alludes to a process carried out locally, but constrained and enabled by a 'global' telos. Analogously, in organisations, the process of diarthrosis is dynamic and localised, but aims to guarantee the achievement of a broader goal. At this point, it may be recalled how the Theta project members exercised discretion to coordinate while they were evaluating bids (a local process), because the prescribed scoring methodology endangered comparability of bids (a global condition); in essence, they were creating diarthrosis (coordinating) in an ad hoc fashion, since the pre-established methodology obstructed bid evaluation (see § 8.5.3, p. 299 - 302).

Fourthly, the concept of diarthrosis also denotes that the ways disparate elements get connected may depend on the context. For instance, I could not have changed substantially the diarthrosis of my thesis and synthesise its components in significantly alternative ways, e.g. change my topic or research methods, 2 weeks before I submitted it for examination. That is, the 'diarthrosis' of my thesis, i.e. the development of a unified 'textual whole', was historically conditioned. On the contrary, I have much more freedom to define the diarthrosis of an unwritten academic article. In essence, the metaphor of 'diarthrosis' embraces the idea that connections and compromises are not freely or voluntarily created, but depend on the context. Analogously, in organisations, I argue, coordination phenomena are internally related to historically inherited conditions. Think, for example, how the diarthrosis required in connection to the statement of the CC contract 'award criteria' in the OJEU notice was historically conditioned, since it had to account for the procurement strategy (which had been

developed 1 year before) and a pre-existing EU legal discourse (see § 8.2.5, p. 254).

Fifthly, diarthrosis highlights the significance of the notion of 'compromise'. The types of joints (diarthroses) condition the way the unification of whole, may be created; specific joints essentially afford 'restricted movement'. Think, for example, the limited number of permissible movements at the knee diarthrosis (e.g. we can bend only in some ways), which are very different from those at other diarthroses, such as at wrist or shoulder. Analogously, in organisations, when coordinating, organisational actors 'engineer' some compromises, which afford the accomplishment of specific outcomes (and not others) – that is, outcomes of a process of diarthrosis and a resultant diarthrosis. Think, for example, how the process of assessing 'partnering capabilities' of bidders enabled coordination, i.e. compromises among the demands of the EU-moulded procurement convention, which produced only some particular outcomes, i.e. scores (see § 8.5.1, p. 294).

To recapitulate, an analogy of 'coordination as diarthrosis' accentuates the distinctiveness of coordination in intriguing ways. In particular, the metaphor of diarthrosis underscores the idea that coordination is about the dynamism of connecting elements of production in specific ways in order to enable the achievement of particular ends. The metaphor of diarthrosis emphasises that coordination is accomplished on the grounds of particular justification principles. The metaphor of diarthrosis underlines the idea that, the process of coordination may be locally performed; yet, always in relation to a telos. The metaphor of diarthrosis highlights the influence of historical contextual conditioning on coordination enactment. Finally, the metaphor of diarthrosis re-imagines coordination as the phenomenon of (creating) 'co-order' through engineering compromises, i.e. producing (only) certain coordination outcomes (and not other). Conclusively, the metaphor of diarthrosis enhances significantly the 'picture-carrying' dimensions of the distinctiveness of coordination.

On the basis of an advanced theoretical and metaphorical vocabulary, in the following section, I demonstrate the practical usefulness of a perspective of 'coordination as diarthrosis' by re-interpreting existing knowledge (as presented in chapter 2) and thus address the 'fragmentation trap' in organisation theory of coordination.

9.3 RE-DESCRIBING EXISTING KNOWLEDGE FROM A PERSPECTIVE OF 'COORDINATION AS DIARTHROSIS'

In order to enhance verification of my new theory of coordination, in this section I will attest to its practical adequacy (Sayer, 1992), i.e. demonstrate how useful it proves to be in practice – in this context, for re-conceptualising an organisational phenomenon. That is, although in this thesis I raise claims for a fallible, rather than eternally true epistemology, I argue that my new theory is 'intelligible' by virtue of its 'practical adequacy' (Sayer, 1992; Tsoukas, 2000). One pragmatic way to demonstrate practical adequacy is through a process of re-describing existing bodies of knowledge from the newly developed epistemology of coordination (Tsoukas, 1989a; Sayer, 1992; Locke & Kolden-Biddle, 1997). In what follows, I thus attempt to re-interpret and improve the explanatory structure of the four perspectives outlined in chapter 2 and to elucidate how the novel perspective of 'coordination as diarthrosis' represents a superior theoretical substrate. In other words, my effort will be to address the 'fragmentation trap' that characterises the formal organisation theory of coordination; an admittedly ambitious effort!

9.3.1 Re-framing 'Organisation Design' Theory from a 'Coordination as Diarthrosis' Lens

The main proposition of contingency theorists has been that organisational structures, and particularly coordination structures/mechanisms, produce successful coordination outcomes if information-processing needs are assessed and 'matched' appropriately (see § 2.2.1.1). From a perspective of coordination as diarthrosis, this insight needs to be rectified and may be re-described more fruitfully as follows. Organisational structures are essentially elements, whose appropriation by organisational actors leads to the construction of a co-ordinated outcome, i.e. a result of diarthrosis. Structures constitute design instruments that facilitate processes of diarthrosis and

enable the 'engineering' of compromises and connections; not just communication. For example, 'relational coordination' (Gittel, 2000, 2001, 2002) may not simply support the 'communication component' of coordination, but may also enable organisational actors to resolve tensions in their efforts to construct compromises among heterogeneous demands.

Hence, the issue is not simply the 'information processing capacity' of a coordination mechanism, since information requirements may not be of a single 'type' (as contingency theorists assume); but of heterogeneous types. In my view, 'capacity' should be re-framed in terms of facilitating the construction of composite solutions by addressing heterogeneous information sources. Recall, for instance, how the Railco ITT template, a coordination mechanism, had adequate capacity to address important coordination requirements, i.e. compromising demands from the EU legal discourse and procurement convention, at an ITT stage. In contrast, the same coordination mechanism had limited capacity to 'process' heterogeneous requirements emanating from the presence of e.g. the 'delivery discourse' and the 'regime of investment justification'; diarthrosis in that case was emergent (see § 8.4).

In essence, I argue that the 'work' of coordination mechanisms, which some contingency theorists have attempted to unpack (e.g. Adler, 1995; Terwiesch et al, 2002; Gittel, 2002), does not simply relate to addressing the needs of uncertainty. Rather, such work principally concerns the 'engineering' of a justifiable compromise among the demands of a plurality of conditions. 'Information-processing' capacity is crucial not only due to the amount of uncertainty; but, most significantly, due to the need to cope with critical uncertainty (Thévenot, 2001b, 2002) – that is, with the contradictions inherent in the co-presence of heterogeneous conditions for coordination. Think, for example, how the 'scoring methodology' failed as a coordination mechanism because it did not absorb the critical uncertainty created from the EU discourse (pre-established evaluation process) and the procurement

convention (comparability of bids); evidently, the methodology didn't fail simply due to its limited capacity to absorb large amount of uncertainty (see § 8.5.3, p. 299 - 302).

Furthermore, the concept of 'interdependence' may be re-interpreted in light of the enhanced theoretical clarity as regards the distinctiveness of coordination. I argue that 'interdependence' may be re-described more usefully as possibilities for connecting and compromising heterogeneous demands/elements. We should no longer frame interdependence in terms of actual patterns of exchange of objects and/or information across groups. Think, for instance, how at the kick-off stage of the CC procurement project the Theta project members were thinking strategically about the 'knock-on' implications between the PQQ and ITT stages; i.e. not to ask the same question again, enable comparability, and create criteria that reflect the partnering nature of the CC contract. In that context, I suggest interdependence related to the (limited) possible ways to assemble the demands of heterogeneous social conditions - EU legal discourse, the procurement convention, and industry 'delivery discourse' (see § 8.3.1, p. 264-265). From a 'coordination as diarthrosis' perspective, interdependence does not exist as an observable feature, but only as a potential, whose influence is actualised and manifested in the process of diarthrosis.

In addition, the propositions of 'coordination theory' (see § 2.2.1.3) should be re-examined as well. The relationship between task and resources (recall Crowston's model of action), I argue, should not be viewed as 'fixed' or regardless of the origin of those resources, because the latter are historical products, whose construction has been conditioned by conditions for coordination. For example, in the CC procurement case, the task of preparing the ITT docs required resources, such as information about 'contractual requirements' and 'tender submission documents'; yet, the sociality of those resources, e.g. objectifying impingements of the procurement strategy and/or of the procurement convention, appeared to be much more

significant (for coordination) than their dimensions of 'reusability', 'shareability' and of whether they represent 'preconditions' or 'effects' for tasks (as 'coordination theory' implies). In other words, the relationship between tasks and resources depends on the particular socio-historical conditions for diarthrosis.

To summarise, a perspective of coordination as diarthrosis sheds new light on the propositions of organisation design theorists by resolving some of their fundamental confusions with regards to the notion of coordination: organisational structures and other 'design variables' may represent elements of coordination, insofar as they support the distinctive social and historically conditioned process of diarthrosis (rather than communication) and have a capacity to cope with 'critical uncertainty' (rather than amount of 'objective' uncertainty) in context.

9.3.2 Re-framing 'Organisation Economics' Theory from a 'Coordination as Diarthrosis' Lens

The main proposition of organisational economists has been that economic structures and organisational strategies influence coordination through the medium of knowledge. Knowledge about components and components' architecture (Henderson & Clark, 1990) may explain coordination strategies (see § 2.2.2). From a perspective of coordination as diarthrosis, those observations need to be rectified and may be re-described more fruitfully as follows. More specifically, 'component knowledge' may be re-imagined as knowledge relating to a mode of engagement (abstract framework) with the production of product components, i.e. to a convention governing localised problem solving activities. Architectural knowledge may also be re-thought of as knowledge referring to specific conventions in and through which different types of component knowledge tend to be combined; that is,

conventions of diarthrosis that provide abstract framework for accomplishing the actual processes of diarthrosis.

With respect to Kogut's and Zander's (1992, 1996) insight that coordination requires not only economic structures but also the development of 'social knowledge' and common identity, my perspective of coordination as diarthrosis dovetails with their view, but also clarifies the sense in which such knowledge is important. In particular, coordination in organisations may be constrained and enabled by 'social knowledge' and 'conventions' (or regimes) which are specific to the organisational problem solving context and which provide the contours for governing, monitoring and evaluating actual coordination. For example, the social knowledge of the 'procurement convention', i.e. of a particular mode of engaging with procurement problems, was tacitly held among the Theta project members, who were thus able to enact a process of diarthrosis and to accomplish the CC contract award project.

On the other hand, Kogut's and Zander's (1992, 1996) and Grant's (1996) argument that social knowledge of coordination is a factor that distinguishes firms from markets should be rejected. This is due to the fact that, what has been recognised as, 'market coordination', also requires social knowledge of coordination, insofar as the functioning of markets depends on the social convention of the market (Boltanski & Thévenot, 1999; Thévenot, 2001b). Finally, the notion of 'convergent expectations' (Kogut & Zander, 1996) may also need to be used with caution when referring to coordinative phenomena, since the process of diarthrosis most likely involves 'engineering compromises' among 'divergent' expectations and heterogeneous impingements.

In conclusion, re-imagining coordination as diarthrosis helps resolve confusion among organisational economists with regards to the role of product and architectural knowledge as well as of social knowledge in

coordinative phenomena. The above re-descriptions of their propositions may also help re-imagine important phenomena such as architectural innovation, firm boundaries and modular architectures (Henderson & Clark, 1990; Brusoni, 2005).

9.3.3 Re-framing 'Group as a Distribute Knowledge System' Theory from a 'Coordination as Diarthrosis' Lens

In §2.2.3, the proposition that coordination may be achieved within groups/distributed-cum-connected systems was presented. This proposition, I argue, needs to be re-considered in light of the new theory discussed in this thesis. In particular, by re-imagining coordination as diarthrosis, group processes may need to be conceived as one aspect only of a more holistic process. Enhanced group processes, such as heedful interrelating or the cultivation of transaction memory systems, may indeed become salient for accomplishing coordination. Yet, the patterns of 'interlocking behaviours' and interactions need to be re-framed as recurrent processes of diarthroses in settings where conditions for coordination remain relatively stable. Metaphors, such as 'collective mind' (Weick & Roberts, 1993), may be useful to understand how coordination may be improved in contexts where the demands of the process of diarthrosis are stabilised and are primarily based on inter-personal communication.

An example taken from the Theta project case study may illustrate those points. My findings indicated that at the PQQ preparation stage of the CC procurement process (see § 8.3.3.1, p. 267-272), the Theta team members did not coordinate effectively through electronic reviewing because they didn't interrelate their collective editing efforts heedfully and lacked a 'collective mind', which resulted in communication breakdowns. Had they been more attentive to each other's contributions to the 'scope doc', the process of diarthrosis, i.e. compromising among demands from the delivery discourse

and the procurement convention, could have been more effectively accomplished.

Furthermore, group processes should be rethought of as taking place in a pre-moulded social context, where contemporary actors are encountered with the results of historical actions by (group members). In other words, the assumption that groups are autonomous organisational settings needs to be rejected (Schatzki, 2005), since the process of diarthrosis is an inherently 'social process' – the 'social' being defined in terms of broader social conditions (e.g. industry discourse, regimes of justification). No matter how 'locally' the process of diarthrosis is accomplished, it cannot be understood irrespective of conditions for coordination. Finally, the idea that in groups coordination is almost always consensus-driven should also be reconsidered, since diarthrosis predominantly involves engineering compromises among conflictual and diverse demands originating not only from the opposing or diverse wishes of group members, but also and more significantly from heterogeneous conditions for coordination.

To summarise, a 'coordination as diarthrosis' perspective may help re-frame more accurately the role of groups in accomplishing coordination. Studying group processes for the purposes of understanding coordination may indeed be very fruitful as long as such processes are conceptually and explicitly linked to the more holistic process of diarthrosis.

9.3.4 Re-framing 'Boundary-Crossing and Social Practices' Theory from a 'Coordination as Diarthrosis' Lens

The main proposition of organisational theorists drawing on a 'social practices' lens has been that coordination refers to boundary crossing phenomena – that is, social processes that enable the interaction between distinctive communities and/or social groups. From a 'coordination as

diarthrosis' perspective, that proposition is misleading and needs to be rectified. More specifically, in connection to Carlile's knowledge transfer and transformation framework (1997, 2002, 2004), I argue that knowledge sharing and learning processes at the 'boundary' may indeed be salient for coordination if they facilitate the process of diarthrosis. In other words, the relationship between coordination and 'knowledge sharing', 'knowledge transfer and/or integration' relating to community boundaries should not be taken for granted, because it is inherently dynamic and revisable.

Furthermore, the use of 'boundary objects' (Carlile, 1997, 2002) may be significant, if different organisational groups are faced with novel requirements for diarthrosis. For example, at the ITT preparation stage (see § 8.4.1) the Theta project members' attempts to address 'critical uncertainty' might have been more effective if a boundary object, which could have enabled them to 'engineer compromises' among novel heterogeneous demands, was used. Essentially, the capacity of an object to enable diarthrosis does not simply depend on 'knowledge boundaries' across groups, but also on the novelty and heterogeneity of conditions for coordination. In addition, objects may need to be thought of as objectifications of historically inherited properties of such conditions. For instance, I showed that the Theta project's procurement strategy was a historically constructed object, which objectified the properties of the 'delivery discourse'. Hence, an account of how the use of various objects may be involved in coordination should account for how they have been created.

As regards Bechky's insight (2003a, b, c) that coordination may be enabled by 'common ground' and 'organisational accountability', a perspective of 'coordination as diarthrosis' provides an alternative explanation: these factors represent mediums and not foundations for coordination. Conditions for coordination relate to the properties of organisational contexts, while factors, such as 'common ground' and 'organisational accountability', refer to factors, which may or may not be involved in a process of diarthrosis.

Remember, for instance, how the process of diarthrosis at the 'assessing partnering capability' stage (see § 8.5.1) was conditioned by the co-existence of diverse demands of: the industry delivery discourse, the procurement convention and the EU legal discourse; rather than by enactments of organisational accountabilities. Contrary to Bechky's suggestions, engineering compromises among those demands, i.e. coordinating, didn't involve literal interactions or a 'transformation of understanding' (Bechky, 2003a), but entailed the creation of evidence that was transparent, 'objective' and comparable.

With respect to Gharardi's and Nicolini's view (2000, 2002) that a 'constellation of communities' forms a distinctive 'discursive' community, a 'coordination as diarthrosis' lens, I argue, helps clarify how the creation and/or existence of such a social milieu may be a salient feature of diarthrosis. Communication processes within a constellation may represent aspects of the process of diarthrosis, only if coordination requires inter-community interactions. For instance, at the PQQ preparation stage the different organisational actors may have indeed been occupying distinct positions in a discursive community; yet, communication encounters among them can only be conceived as processes of diarthroses as long as they facilitated the 'engineering' of compromises among demands of the procurement strategy and procurement convention (see § 8.3.3.1, p. 267-272). A constellation of communities may thus emerge as a salient feature of coordinated arrangements if communication across actors (occupying distinctive positions in a discursive community) is required in a process of diarthrosis.

In addition, Kellogg's et al (2006) suggestion that coordination in post-bureaucratic settings may look like a 'trading zone' needs to be rectified. This is because the process of diarthrosis cannot be explained at the level of literal interactions and/or performances of activities, such as 'representing', 'assembling' and 'displaying' (Kellogg et al, 2006) and, generally, irrespective

of the context, since diarthrosis is internally related to context. In other words, a preeminent focus on 'how boundary crossing is enacted' (Kellogg et al, 2006) does not necessarily refer to coordination. Only by investigating 'why such crossing is necessary' and 'whether it facilitates diarthrosis' can we frame its coordinative merit. From a 'coordination as diarthrosis' perspective, those explanatory demands are fully addressed by relating any observable coordination process, such as boundary crossing, to conditions for coordination, which are necessarily entangled in these processes (see § 3.2.4). In essence, boundary crossing does not automatically qualify as a process of diarthrosis. As an example, it should be reminded that the way the Theta project members coordinated at the PQQ stage (see § 8.3.3.2, p. 273-274) via 'cloning text' was explained as a coordination performance, even though no interaction across communities was required.

Finally, a perspective on 'role-based coordination' (Bechky, 2006) could be enhanced if the assumptions about the explanatory potential of a 'phenomenology of work' were relaxed. That is, although the perspectives of organisational actors in connection to their and others' roles may matter in the accomplishment of coordination, they constitute only one aspect of the process of diarthrosis. Diarthrosis may escape the conceptualisation or experiences of organisational actors. Think again, how the phenomenon of 'cloning text', a key coordination activity, escaped the 'native's point of view'. The point here is not that experiences do not matter in the constitution of diarthrosis, but that there is more than the construction of experiences taking place in organisational arenas.

In addition, the 'structural context' (in Bechky's paper, the film industry and a film's production context) is influential not only because it has been incorporated in people's practices and dispositions, but also because it has been objectified 'in the materials at hand' (Manicas, 1997) – that is, in a pre-moulded socio-material context. Consider, for example, how the Theta project members had to come to grips with not only their team's role

structure, but also the nature and objectives of the NS redevelopment project, a pre-established procurement strategy, a pre-determined project budget and so on. In essence, explaining coordination does not depend on the high or low 'intensity of interaction' among organisational actors (Bechky, 2006), but, more decisively, on the conditions for diarthrosis; in short, it is the heterogeneous contextual demands that define what needs to 'interact' and how.

In conclusion, a perspective of 'coordination as diarthrosis' helps resolve the prevalent confusion among organisational theorists, who have problematically assumed that coordination is about literal boundary crossing practices. As I have argued (hopefully convincingly), coordination is distinctive as a historically conditioned process and outcome of diarthrosis; which may or may not involve boundary crossing and may or may not refer to different communities of practices.

To recapitulate, I have demonstrated through re-describing existing organisation theory that a 'coordination as diarthrosis' lens is a 'practically adequate' theory and analogy of coordination (Sayer, 1992). Having done so, I would like to argue that I have also rectified (to a certain extent at least) the 'fragmentation trap' in organisation studies on coordination (Knudsen, 2003), since I have created a 'reference point' (new theory) that enables the drawing and evaluation of connections across the different research traditions. In other words, a 'coordination as diarthrosis' perspective has enabled the development of a better diarthrosis of organisation theory of coordination!

9.4 FURTHER IMPLICATIONS FOR THEORY AND PRACTICE

In this section, some additional implications are drawn in connection to other interrelated fields, which I have discussed or relied upon in this thesis.

9.4.1 Implications for a 'Critical Realist' Meta-theory

Evidently, drawing upon critical realism has been very beneficial in the process of identifying and addressing 'meta-theoretical' challenges of coordination research. Through this attempt to apply critical realism in this context, important lessons have been learnt and further implications could be outlined. First of all, I have demonstrated how the critical realist framework may be compatible with a number of different perspectives, such as 'regimes of justification' (Thévenot, 2001a,b, 2002; Boltanski & Thévenot, 1999) and 'discursive perspectives' (Fairclough, 2005; Geiger, 2009). So far, any discussion about the 'dialogue' between critical realism and other 'meta-theories' has been theoretical (Mutch et al, 2006; Fairclough et al, 2002). This thesis represents one of the very few empirical studies to draw relations among 'paradigms' (Mutch et al, 2006). The complementarity between critical realism philosophy and various social theories has been epitomised throughout the presentation of the research findings. For example, I re-interpreted the notion of 'regime of engagement', which from a critical realist perspective refers to an ontologically autonomous 'object', in order to conceptualise 'regimes of investment justification'.

Secondly, this thesis is one of the very few attempts to demonstrate the usefulness of critical realism to explain situated organisational action. To my knowledge, very few scholars have used the 'meta-theoretical' framework to provide exegeses of organisational processes (for an exception, see Volkoff et al, 2007). The examination and explanation of the CC procurement process sheds new light on the ways critical realism could be applied fruitfully.

Thirdly, this thesis makes a significant contribution to critical realist debates by illuminating how the historicity of actions (Archer, 1995) may be manifested, involved and examined concretely in objects. The idea of explaining the pre-mouldedness of the CC procurement project context as the result of preceding structuring phases may also be useful in other contexts. Equally useful could be the technique of 'inter-textual' analysis, which unearthed the entanglement of historically produced texts in contemporary textual practices.

9.4.2 Implications for Construction Management & Procurement Theory

My empirical study of the CC procurement process has yielded important insights with reference to the subject of construction management and procurement. More specifically, this study is one of the few, which has examined the actual procurement process for 'partnering' contracts (Bresnen, 2007). Until the time of this writing, most scholars in the construction management field have focused on proposing and validating 'what the most effective criteria for procuring services should be' (Sen et al, 2008); essentially, they have paid no attention to how complex contract award projects are actually accomplished (Kadefors, et al, 2007). In contrast, the in-depth investigation of the CC procurement process has shown that practitioners may need to cope with significant levels of novelty processually; not only with problems of determining bid assessment methodologies. For example, the imperative to: (i) define new areas of assessment, (ii) use appropriate wording in various documents (contract notice, PQQ, and ITT) in order to attract and retain suitable suppliers, (iii) seek bidders' input in the content of the contract, e.g. for establishing an effective system of incentivisation, (iv) evaluate bidders' capacity to demonstrate a 'different mindset' and potential for innovation, and (v) exhibit (on the part of the client) leadership characteristics in order maintain

the interest of suppliers. All the above findings may trigger debates in the construction management and procurement literature.

In addition, the study of the CC procurement process illuminates that procurement practices (Kamann & Bakker, 2004), may be structured in accordance with the general pre-existing procurement convention and its abstract evaluative framework. As findings from my abstract research indicated, that convention seems to pervade industry-wide practices. The implications are that future studies that examine procurement projects may consider investigating how situated procurement activities manifest, activate, reproduce and/or modify the convention. Furthermore, future studies may need to appreciate that procurement practice is embedded in and affected by conditions pertaining to a specific project context, which may also be the cause for emerging tensions throughout procurement processes. As I have argued, project context has always the potential to impinge upon the procurement process. *This was exemplified in the Theta project case many times.* For example, at the ITT preparation stage, the Theta project members coped with critical uncertainty originating from a change in the project's design solution. Also, surprisingly little research has examined the relationship between contract award projects and procurement strategy (Tookey et al, 2001; Hatush and Skitmore, 1997). Another finding from my research thus concerns the observation that a project's adopted procurement strategy inherently and dynamically conditions the accomplishment of procurement; for example, with regards to the selection of advertising mode, selection criteria, preparation of various documents and evaluation methodology. In short, the Theta case study enhances understanding of the contextual character of 'procurement practices'.

Furthermore, the Theta project case study provides new insights with regards to how emerging construction industry discourses may influence concretely actual construction management practices (Green et al, 2008). It was shown, for instance, that the new delivery discourse legitimated the

holding of 'soft skills workshops' and led to the 'borrowing' of resources from different professional fields in order to e.g. 'objectively' assess partnering competences. It also emerged as an important finding that accomplishing procurement processes, which are influenced by the new industry discourse, may be more demanding for procurement practitioners, who need to spend more time developing common understanding within their project teams about the nature and role of new partnering contracts (recall, the numerous misunderstandings relating to the 'CC scope of services'). In essence, my study of the CC procurement process has enhanced awareness of the social ramifications of the adoption of, what was recognised as, a modern procurement strategy and of an enriched 'delivery discourse'.

9.4.3 Policy Implications

Important policy implications can be drawn in light of the fact that the Theta project was embedded in a context where multiple public institutions collaborated. First of all, I showed that due to a lack of alignment between railway policies and local government policies, significant delays to developing 'integrated project objectives' of railway redevelopment projects might occur. Building upon Haywood (2005) and on research results reported in chapter 4, I argue that 'uncoordinated' transportation and town planning policies might have significant negative consequences over the 'destiny' of railway stations. In the context of NS, for instance, there was a delay of at least 2-3 years to develop an 'integrated' project vision and various other funding delays.

Important insights have also been yielded with regards to the ways investment decisions may be made by public institutions. In particular, the latter are normally required to evaluate and justify their investment decisions within the confinements of particular frameworks, which have been designed in accordance with the 'regime of investment justification' (chapter

5). For example, I showed that Theta project's public funders, NLG, NDA and NRTA, justified their investments only because they drew demonstrable and tangible links between inputs (monies) and outputs (physical features). Notwithstanding the benefits of such a rationalised approach, I argue that some important limitations may be disregarded. By relying almost entirely on a regime of investment, non-monetised outputs and benefits, for instance, cannot be accounted for; e.g. building aesthetics and everyday users' perspectives. In the context of the Theta project, issues, such as user-experience and, could only be considered peripherally because significant engagement with users during design development was not legitimated, since they were not 'investors' in the scheme (at least in a direct way). Central and other government bodies need to be aware of the boundaries of an exclusive commitment to a 'regime of investment justification' and may need to consider more carefully about expanding and embracing a plurality of 'regimes of justification' (Thévenot, 2001b; Boltanski & Thévenot, 1999) in *the course of developing and implementing big public projects.*

In addition, important policy implications can be drawn with regards to the implementation of the EU procurement directive. Through the in-depth investigation of the CC procurement process, I showed how the EU legal discourse might have concretely impinged upon procurement practice and how procurement practitioners perceived such impingement, e.g. through planning carefully the various steps of the process at the very beginning; precautiously documenting all procurement activities; determining bid evaluation methodologies even if knowledge for constructing scoring techniques is limited; often coping with tensions due to the conflictual demands between the EU legal discourse (aimed to guarantee the good of a European 'internal market') and the procurement convention (aimed to guarantee the selection of the most suitable supplier).

Intriguingly, it emerged as another important finding that the EU procedural framework of 'negotiated procedure' (although not mentioned, it was used

by Railco) may not be very suitable for a 'partnering' contract award project. This is due to the fact that in order to finalise the complex content of the contract, input from bidders may be needed, e.g. regarding incentivisation arrangements, prior to the issue of the ITT docs. In conjunction with this insight, more awareness may need to be raised in connection to alternative procedural frameworks, such as the 'competitive dialogue' (EU explanatory note on Competitive dialogue; CBI, 2008), which may offer the required flexibility because detailed discussions with bidders (regarding the contract) are made prior to the determination of the content of ITT. For example, the Olympic Delivery Authority (ODA) used the 'competitive dialogue' procedure in 2006 to select its partner for the delivery of the London Olympics 2012 venues and, apparently, took advantage of the flexibility afforded by the framework (see OGC Lessons Learnt on Competitive dialogue, 2007); even though the 'customisation' of ITTs created problems concerning the comparability of offers made by different bidders. In short, new insights emerged with respect to the implementation of EU procurement directives.

9.4.4 Implications for Practice

In one of the introductory quotes in chapter 1, it was mentioned that leaders' role nowadays is less about 'command and control' and more about 'cultivating and coordinating actions of others' (Ancona et al, 2007). If we accept the rationale of that argument, what implications for practice could be drawn from a perspective of 'coordination as diarthrosis'? First of all, in order 'to coordinate' more effectively, leaders may need to shift their attention towards understanding their organisational contexts. By doing so, they can understand a lot more about the kind of compromises required to create effective diarthrosis, i.e. diarthrosis that enables them to accomplish their vision, aims and objectives more effectively.

Furthermore, leaders in organisations may need to be mindful of and think strategically about the demands of the process of diarthrosis. As said earlier, increasing communication is usually not enough, while new organisational structures need to be assessed in terms of their affordances to facilitate the *flexible engineering of compromises*. In conjunction with the core theme of this thesis, i.e. to resolve confusion about the notion of coordination, leaders should refrain from synonymising coordination with communication and from conflating conceptually two very different processes. Very frequently, increasing communication across team members is viewed as the essence of improving coordination (Hersleb & Grinter, 1999). Notwithstanding the criticality of communication for processes of diarthrosis, diarthrosis is not communication and problems of diarthrosis should not be conceived as communication problems. Think, for instance, the coordination that was necessary at the advertising stage of the CC contract. The Theta project members had to construct a composite solution that would address the problem of attracting the right suppliers under the auspices of the EU regulations. Increasing communication among team members, e.g. among Mathew, John and Gary, would not have resolved the coordination problem, since what was critical was not to use large amounts of information, but to search for appropriate kinds of information and exercise effective judgement, i.e. that the Railco supplier database was not a 'good enough' advertising medium and that an OJEU notice could 'open up' the market. In short, practitioners may need to revise their own conceptions of what coordination involves and re-evaluate the significance of communication as only one important way to improve the process of diarthrosis.

Furthermore, the issue of successful implementation of new information and communication technologies (ICTs), which may often be regarded as 'magic bullets' for improving coordination, should attract more attention. Practitioners need to be cautious of the 'merits' of new systems, not simply because employees may resist change selfishly, but also because new ICTs, and the kind of diarthrosis their use affords, may be incompatible with

legitimate conventions governing engagement with organisational problem solving. I will refer to an actual example of the failure to implement an 'e-tendering' system in the Theta project case. Railco has recently launched its new e-tendering system, which enables coordination of its corporate procurement activities and supposedly eases the work of practitioners. When I asked the Theta project members why they didn't use the system, they replied that such system would be impossible to use in the context of the CC contract award project, where interaction with bidders was a crucial part of the selection process; not to mention, that such system does not allow for assessing 'partnering competence'. In the Theta project case, aborting the new system was easily justified, yet in other organisational settings such justification may not be effortlessly accomplished. The role of leaders in organisations may thus be re-imagined as one of facilitating the assessment of new ICT implementations in terms of their capacity to enable effectively the actual coordination needs of their organisations.

Finally, they may need to be more mindful of the fact that structures, plans, procedures and other 'coordination mechanisms' are not panaceas for accomplishing diarthrosis in organisations. Although such 'instruments' may well facilitate some aspects of the process of diarthrosis, there will always be need for ad hoc diarthrosis. An example taken from the Theta project may illuminate this point. At the ITT preparation stage, the Railco ITT template was used in order to enable coordination of procurement activities across the entire corporation. Unforeseeably, however, the ITT template was not helpful at all when the Theta project team were striving to cope with 'critical uncertainty' and define the necessary 'contractual requirements'. Ad hoc diarthrosis was necessary in order to 'make things work out' (Fujimura, 1987) and to engineer workable compromises. In conclusion, tools and mechanisms have objective limits in their capacity to support coordination. In essence, leaders need to be receptive to any emergent needs for situated, contingent and provisional coordination work and direct others' actions towards that goal.

9.5 THESIS SUMMARY & CONCLUDING THOUGHTS

In the introduction (chapter 1), I stated that in this thesis,

I aimed at explaining how coordination is a distinctive organisational phenomenon.

In order to serve that aim I raised and addressed three interrelated questions.

In particular:

Q₁: How should I pursue my research objective to explain the distinctiveness of coordination through empirical organisational research?

Q₂: What new insights have been produced from my empirical study, which I designed on the basis a consolidated answer to Q₁?

Q₃: How does my research explain in an original way the distinctiveness of coordination as an organisational phenomenon, in light of a consolidated answer to Q₂?

With respect to the first question (Q₁), the answer I provided was grounded on an extensive meta-theoretical discussion. That discussion, I argued, was necessary because I was confronted with diverse, conflicting and unconvincing recommendations as to how I should study coordination. In view of this theoretical cacophony and puzzlement, I was sensitised by suggestions, such as the following:

Ideas are assessed and disputes are resolved by finding out which of the contested ideas is compatible with (or better, presupposed by) those agreed by all contending parties to be our most reliable and coherent ideas and practices. (Sayer, 1992, p. 205, parenthesis original, emphasis added)

I thus turned to 'critical realism' as a philosophy of science in order to find 'reliable and coherent ideas'. By drawing upon that philosophy, I took a step back from ordinary coordination research activity and reflected on how the assumptions of such activity ought to be revised and improved (Tsoukas & Knudsen, 2003). As a result, I put forward an argument that coordination should be studied as an actual processual organisational phenomenon, which is constrained and enabled by heterogeneous historically inherited conditions for coordination. In addition, I concluded that in order to study coordination and explain its distinctiveness, I should conduct abstract and concrete research and adopt an intensive research design.

On the basis of the above principles, I conducted an intensive empirical research project in the context of the NS redevelopment scheme (Theta project) and focused on the CC procurement process. I then presented my research findings and elucidated how the Theta project context, which created specific conditions for coordination throughout the CC contract award project, was endowed with historically assembled heterogeneous properties; namely, those of the NS station, of a 'regime of investment justification', of the construction industry 'delivery discourse' and of the EU-moulded procurement convention. I also showed that these properties manifested themselves as heterogeneous demands, which organisational actors had to take hold of. Effectively, my findings indicated that coordination throughout the CC contract award project pertained to a situated and very dynamic process of 'engineering' compromises among such demands and produced particular outcomes that were gradually enabling the identification and selection of the best possible CC.

From the multiple 'substantive' insights of my empirical research I drew more general conclusions and explained that coordination is a distinctive organisational phenomenon because it refers to: the process and outcome of 'engineering' compromises and connections among heterogeneous contextual demands in order to enable fulfilment of an organisational telos.

On the basis of this explanation, I raised claims for an original contribution to organisation theory. Furthermore, in order to highlight the distinctiveness of my contribution, I also developed an analogy/metaphor of coordination as diarthrosis (addressing Q₃). The new metaphor of 'coordination as diarthrosis', I believe, has important metaphorical advantages that accentuate the components of my new theory, since it: (i) connotes the dynamism of coordinated arrangements enabling organisational accomplishment, (ii) highlights the 'evaluative' and (iii) 'local' and 'global' dimensions of those arrangements, (iv) acknowledges that coordinating is inherently constrained and enabled by pre-existing conditions for coordination, and (v) embraces the idea that through the situated process of engineering compromises, the construction of some and exclusion of other coordination outcomes is brought about.

Finally, I attested to the 'practical adequacy' and 'intelligibility' (Sayer, 1992, p. 205) of the new epistemology of 'coordination as diarthrosis' by re-describing existing organisational theoretical perspectives of coordination and by demonstrating pragmatic resolution of theoretical confusion. I also drew some implications for the 'critical realist' meta-theory, the field of construction management and procurement as well as for policy and practice.

9.5.1 Research Boundaries & Limitations

Like all research, this thesis bears a number of 'limitations'. I thus attempt to help readers appreciate what the new theory and metaphor of coordination proposed here cannot be assumed to be suitable for by defining some theoretical 'boundaries' - things that I do not claim or have not been accounted for.

First of all, the theory and metaphor of 'coordination as diarthrosis' may need to be revised and/or used prudently in contexts where coordinated arrangements are characterised to a lesser extent as 'teleologically-driven'. For instance, in settings where scientific subcultures tend to interact on an ongoing basis, rather than in virtue of achieving specific projects' ends, the idea of creating compromises and connections among heterogeneous elements may need to be re-contextualised. For instance, Galison showed (1997) that in order to align and coordinate their activities, diverse scientific communities may create 'trading zones', i.e. general procedures of exchange, instead of striving for engineering composite solutions that guarantee the achievement of an overarching goal. In other words, the dimension of diarthrosis may be differentiated depending on the context of a collective endeavour.

Secondly, diarthrosis should be cautiously used in settings where organising endeavours take place in 'chaotic' and unprecedented circumstances. For example, Majchrzak et al showed (2007) that dealing with the aftermath of Hurricane Katrina required coordinated arrangements that hadn't been imagined before. Likewise, Quinn and Worline argued (2008) that the passengers from United Airlines Flight 93 (the airplane from 9/11 attacks, which missed its target) responded to the hijacking of their plane by organising and coordinating a spontaneous and courageous counterattack against the hijackers. In such contexts the idea that the process of diarthrosis is accomplished in accordance with pre-existing 'conventions' may need to be carefully applied and possibly revised. Nonetheless, the analogy of diarthrosis may be used as an analytical tool to probe such phenomena.

Thirdly, the theory and metaphor of 'coordination as diarthrosis' hasn't explicitly accounted for 'cultural dynamics' that may be involved in coordination endeavours (Gherardi & Nicolini, 2000, 2002; Lave & Wenger, 1991; Brown & Duguid, 1991, 2001; Barley, 1986). The cultural 'community effect' or 'project chemistry' (Nicolini, 2002), for instance, on the Theta

project members' efforts to 'engineer' compromises or differences in interpretations of procurement conventions were not taken into consideration. Notwithstanding this limitation, by viewing cultural dynamics as factors implicated in the process of coordination, the analogy of 'coordination as diarthrosis' may be useful to frame how cultural influences may be exerted. Similarly, the thesis has probably undermined the role of politics and power in the constitution of organisational arrangements (Swan & Scarborough, 2005; Levina, 2005; Ferdinand, 2004)³². Again, I would like to argue, the metaphor of 'coordination as diarthrosis' has the potential to embrace such factors, which may become salient in the process of diarthrosis.

Finally, in the process of abstraction, i.e. isolating in thought certain elements of concrete phenomena (Sayer, 1992), some important characteristics of the Theta project context were omitted due to space limitations and because I had reached 'theoretical saturation' (Glaser, 1978). For instance, 'national politics' or 'project visibility', which appeared to be salient forces influencing the Theta project practices, were not involved in the analysis. Also, getting the procurement strategy approved from various stakeholders was a laborious process, which was not discussed in the results chapters due to space limitations. I would like to defend those omissions on the grounds that the development of a new epistemology of coordination would not have benefited significantly from incorporating the above factors; although they would emphasise the contextual embeddedness of the project. Indeed, during the process of diarthrosis needed for the accomplishment of my research project, I had to make some critical compromises!

³² Actually, in the Theta project case study, some issues of power and domination were also observed, yet the information I gathered was insufficient to base the creation of some conceptual categories.

9.5.2 Directions for Future Research

The new theory presented in this thesis may provide the basis or inspiration for further research projects. As an important first step, it would seem sensible to explore whether and how a new epistemology of coordination sustains its 'practical adequacy' (Sayer, 1992) to explain related empirical phenomena. It would be potentially more promising, if comparative research designs were adopted to do so (Barley & Kunda, 2001). For example, carefully comparing and contrasting case studies investigating coordination in a number of different construction projects could be useful in order to develop deeper understanding of the sector's coordination practices. Another example of comparative research design is multiple case studies of contract award projects across industries; in order to examine e.g. how procurement conventions and their influence on coordination practices differ and resemble.

Furthermore, future research on 'boundary objects' (Star & Griesemer, 1989; Swan et al, 2007; Zeiss & Groenewegen, 2009; Boland et al, 2007) could build upon the new theory. Such research could be designed, for example, to investigate how artefact-mediated practices and interactions (Orlikowski, 2006) reproduce and/or transform pre-existing conventions for coordination; or to explore how through the design of new infrastructures (e.g. web-based) and IT-artefacts or classification systems (Bowker & Star, 1999) certain diarthroses are favoured and dominate at the expense of others.

The theory and metaphor of 'coordination as diarthrosis' could also sensitise future empirical research concerning the role of governance and social structures in coordinating inter-organisational arrangements (see Gerwin, 2004). Such research could investigate the ways compromises are constructed by a group of institutions and actors, who are related contractually. Finally and in connection to the introductory quotes presented at the beginning of

this thesis, the new epistemology of coordination can be used to explain global coordination efforts. It may now be possible to not only assist those embarking on improving coordination, but also (if not primarily) critically assess the consequences of envisaging and pursuing systematically 'global' coordinated arrangements.

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Appendix

Example contract notice

UK-Leiston: consultative engineering and construction services

2007/S 207-251800

CONTRACT NOTICE - UTILITIES

Services

SECTION I: CONTRACTING ENTITY

I.1) NAME, ADDRESSES AND CONTACT POINT(S):

Magnox South, Sizewell 'A' Site, Contact: Mark Scales, Attn: Mr M. S. R. Scales, UK-Leiston IP16 4UE . Tel. 01728 633685. E-mail: mark.scales@magnoxsouthsites.com. Fax 01728 633669.

Internet address(es):

General address of the contracting entity: www.magnoxelectric.com.

Further information can be obtained at: Magnox South, Sizewell 'A' Site, Contact: Mike Bray, Attn: Mr M. Bray, UK-Leiston IP16 4UE . Tel. 01728 633796. E-mail: mike.bray@magnoxsouthsites.com. Fax 01728 633669. URL: www.magnoxelectric.com.

Specifications and additional documents (including documents for a dynamic purchasing system) can be obtained at: Magnox South, Sizewell 'A' Site, Contact: Phil Smith, Attn: Mr P. Smith, UK-Leiston IP16 4UE . Tel. 01728 633625. E-mail: phil.a.smith@magnoxsouthsites.com. Fax 01728 633415. URL: www.magnoxelectric.com.

Tenders or requests to participate must be sent to: As in above-mentioned contact point(s).

I.2) MAIN ACTIVITY OR ACTIVITIES OF THE CONTRACTING ENTITY:

Electricity.

SECTION II: OBJECT OF THE CONTRACT

II.1) DESCRIPTION

II.1.1) Title attributed to the contract by the contracting entity:

Electrical, control and instrumentation support.

II.1.2) Type of contract and location of works, place of delivery or of performance:

Services.

Main site or location of works: Sizewell 'A' Site

NUTS code: UKH14.

II.1.3) The notice involves:

A public contract.

II.1.4) Information on framework agreement:

II.1.5) Short description of the contract or purchase(s):

To provide ongoing support to the site in combining a number of routine monitoring requirements, training key site personnel, along with the management of any defect repairs, whilst providing assistance and guidance in installing additional monitoring equipment for both the electrical, control and instrumentation divisions.

II.1.6) Common procurement vocabulary (CPV):

74231000, 74300000, 50000000, 74210000, 74542000.

II.1.7) Contract covered by the Government Procurement Agreement (GPA):

Yes.

II.1.8) **Division into lots:**

No.

II.1.9) **Variants will be accepted:**

No.

II.2) **QUANTITY OR SCOPE OF THE CONTRACT**

II.2.1) **Total quantity or scope:**

This is a call for 'expressions of interest' only.

Applications for pre-qualification and short listing onto a 'competitive tender list' are invited from individual groups of suitable Contractors for eventual award of this contract at the Sizewell A Site.

Sizewell A requires support with a number of routine monitoring requirements, along with managing any defect repairs and providing support and guidance in installing additional monitoring equipment for both the electrical, control and instrumentation departments.

The scope of works would consist of 2 categories, one for 'core' daily site activities and the other for 'call-off' activities that would be undertaken on an 'as and when' basis throughout the lifecycle of the contract.

Part of the core work will involve routine data back up and maintenance health checks on the following equipment: defuelling data logger; plant information equipment (SPIE); replacement structural temperature monitoring system; core monitoring system; temperature data processing overlay system; ponds mimic; effluent treatment plant supervisory control and data acquisition system (SCADA); chemical monitoring; network checks. Some of the other 'core' activities would include for: flask leak detection; flask dosing; defect maintenance on ETP; instrumentation and plant items.

Included in the 'core' activities would be a requirement to provide support to the site in terms of control and instrumentation engineering duties and the possibility of providing a full ongoing training programme to nominated site personnel for future transfer of skills.

It is expected that all of the above works would be completed over a period of 14 days per calendar month.

The 'call off' work is expected to include for: minor changes to systems (alarms); incorporating moisture monitoring information into the SPIE system; SPIE reconfiguration; instrument network reconfiguration; chemical monitoring; upgrade systems; removal of networks; specialist training.

This contract will form a vital part of the continued growth and development of the EC&I departments with supporting the site for all maintenance and development contracts in the future.

II.2.2) **Options:**

No.

II.3) **DURATION OF THE CONTRACT OR TIME LIMIT FOR COMPLETION:**

Starting: 1.4.2008. Completion: 31.3.2012.

SECTION III: LEGAL, ECONOMIC, FINANCIAL AND TECHNICAL INFORMATION

III.1) **CONDITIONS RELATING TO THE CONTRACT**

III.1.1) **Deposits and guarantees required:**

Not applicable at this present time.

III.1.2) **Main financing conditions and payment arrangements and/or reference to the relevant provisions regulating them:**

Not applicable at this present time.

III.1.3) **Legal form to be taken by the grouping of economic operators to whom the contract is to be awarded:**

Not applicable at this present time.

III.1.4) **Other particular conditions to which the performance of the contract is subject:**

No.

III.2) CONDITIONS FOR PARTICIPATION

III.2.1) Personal situation of economic operators, including requirements relating to enrolment on professional or trade registers:

Information and formalities necessary for evaluating if requirements are met: To be members of appropriate trade institutes.

III.2.2) Economic and financial capacity:

Any interested party must, as part of the pre-qualification criteria outlined below in Section III.2.3, ensure that the submittal of their audited company accounts covers the past 3 years' standings as part of the requirements of item 1.

III.2.3) Technical capacity:

Information and formalities necessary for evaluating if requirements are met: To qualify for participation in the proposed competitive tender exercise, you will be required to submit the following supporting information, which is detailed below in no particular order of preference or weighting: (1) financial and economic standings; (2) evidence of organisation structure, including site resource capabilities, management structure and local offices to site; (3) evidence of quality management system ISO9001; (4) evidence of health, safety, environmental policies and management systems; (5) evidence of competency, including information on suitably qualified and experienced persons; (6) evidence of previous experience working on a nuclear licensed site or in similar controlled environment, detailing success against scope, schedule and budget; (7) details of 2 or more references who will be contacted with applicants permission to confirm past performance over last 5 years; (8) ability to trade against Magnox Electric terms and conditions and the NDA flowdown terms (available on request).

III.2.4) Reserved contracts:

No.

III.3) CONDITIONS SPECIFIC TO SERVICES CONTRACTS

III.3.1) Execution of the service is reserved to a particular profession:

No.

III.3.2) Legal persons should indicate the names and professional qualifications of the staff responsible for the execution of the service:

Yes.

SECTION IV: PROCEDURE

IV.1) TYPE OF PROCEDURE

IV.1.1) Type of procedure:

Negotiated

Candidates have already been selected: no.

IV.2) AWARD CRITERIA

IV.2.1) Award criteria:

The most economically advantageous tender in terms of the criteria stated below

1. Health, safety and environmental provisions.
2. Compliance with the technical specification.
3. Competence of employees (SQEP).
4. Adequacy of past experience.
5. Cost.

- 6. Project management capabilities.
- 7. Quality assurance provisions.
- 8. Compliance with the terms and conditions.
- 9. Compliance with the invitation to tender.
- 10. Compliance with the programme of works.

IV.2.2) **An electronic auction will be used:**

No.

IV.3) **ADMINISTRATIVE INFORMATION**

IV.3.1) **File reference number attributed by the contracting entity:**

SZA C 01203.

IV.3.2) **Previous publication concerning the same contract:**

No.

IV.3.3) **Conditions for obtaining specifications and additional documents:**

Time limit for receipt of requests for documents or for accessing documents:

Payable documents: no.

IV.3.4) **Time limit for receipt of tenders or requests to participate:**

3.12.2007 - 11:00.

IV.3.5) **Language(s) in which tenders or requests to participate may be drawn up:**

English.

IV.3.6) **Minimum time frame during which the tenderer must maintain the tender:**

IV.3.7) **Conditions for opening tenders:**

Place: Sizewell 'A' Site

Persons authorised to be present at the opening of tenders: yes

'Appointed' Sizewell A tender opening panel.

SECTION VI: COMPLEMENTARY INFORMATION

VI.1) **THIS IS A RECURRENT PROCUREMENT:**

No.

VI.2) **CONTRACT(S) RELATED TO A PROJECT AND/OR PROGRAMME FINANCED BY COMMUNITY FUNDS:**

No.

VI.3) **ADDITIONAL INFORMATION:**

II.1.2) Type of contract and location of works, place of delivery or performance: service category No: engineering, maintenance and consultancy support.

VI.4) **PROCEDURES FOR APPEAL**

VI.4.1) **Body responsible for appeal procedures:**

VI.4.2) **Lodging of appeals:**

VI.4.3) **Service from which information about the lodging of appeals may be obtained:**

VI.5) **DATE OF DISPATCH OF THIS NOTICE:**

25.10.2007.