

AN 'ARTICULATION' PERSPECTIVE ON COORDINATION OF PROJECT WORK: THE CASE OF A COMPLEX CONSTRUCTION PROJECT

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Abstract

In this paper, I examine the coordination phenomenon in a surprisingly under-researched setting: the planning phases of major construction projects. I argue that existing perspectives of organisational learning and knowing offer insufficient insights primarily because most of scholarly attention has been paid to *cross-boundary* coordination. I thus attempt to reframe the coordination problem by exploring the usefulness of an alternative set of concepts, at the core of which lies the notion of *articulation* (Strauss, 1985). Articulation may help us re-imagine coordination as a more holistic process of 'making things fit together' (Fujimura, 1987). Findings from a longitudinal field study of the planning phases of a major construction project shed light on the multifaceted coordination processes that might take place in such settings. Under severe time pressures and resource constraints, coordination gets accomplished through the development of articulation strategies, *which align the necessary elements* of various work organisations and acquire particular purposes and forms at different stages; considering and procuring external support, understanding and incorporating regulatory constraints, coping with external and internal contingencies and achieving informational consistency across time and space. An articulation perspective, I argue, provides a useful and promising approach to studying coordination in contemporary organisational settings.

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1. INTRODUCTION

“The assumed efficacy of techniques and technologies of ordering seems a foundational premise for very large projects like bridge-building. As an observer, one is constantly struck by the thought “This is simply too complicated logistically, technically and politically; too hard; too much work; too unstable, etc.’. But one is equally struck by the recognition that such thoughts are simply not options (or at least not options very often) for practitioners committed to the project. The question then becomes how, as a practical matter (rather than only as a matter of faith, although I think it must remain that as well) do they do it?” (Suchman, 2000, p. 316)

Lucy Suchman’s question summarises the curiosities of most researchers looking at the organisational efforts and challenges, which are associated with the planning of insurmountably complex construction projects. Yet, studying such settings is not only fascinating, but also provides ample opportunities to enhance our current theoretical understanding of organisational processes, which become necessary in a multitude of organisational contexts.

In particular, a very important organisational process, which ‘major construction project’ teams need to perform, is coordinating and synthesising the most significant elements engendered by such multifaceted projects. Exploring the conceptual wealth of organisation theories on coordination, one may delineate that, very broadly, the literature is preoccupied with either understanding the design imperatives of interdepartmental coordination or explaining the ways cross-boundary sharing of expertise takes place in project teams. And although those may be important aspects of coordination processes in organisations, they are inadequate to explain how “the translation of a painstaking arrangement of myriad human and non-human elements as a single engineering artefact” (Suchman, 2000, p. 313) actually happens in major modern construction projects.

In this article, my aim is twofold: (1) to attempt to enrich our conceptual vocabulary of the organisational phenomenon of coordination, and (2) to illuminate those aspects of coordinative endeavours, which become salient throughout the planning phases of a major construction project. Serving the two objectives cannot be easily separated and literally constitutes one tightly coupled process. In what follows, I first outline an account of our existing organisational knowledge on coordination. I then present an alternative *articulation perspective*, which may help us overcome some important conceptual challenges. From there, I move on to describe the empirical setting and approach, which is then followed by a chronological overview of two planning phases of a major construction project, which I managed to observe. Possible interpretations of the coordinative activities of those phases complement this overview and also lead to a discussion around the conceptual benefits of re-thinking coordination as an *articulation process* (Strauss, 1988).

2. PERSPECTIVES ON COORDINATION

Coordination has been a standing theme in organisation research for almost half century. Since March and Simon (1958) suggested that work in organisations could be coordinated through predefined programmes or mutual adjustment, a number of scholars such as Thompson (1967), Van de Ven et al (1976) and Adler (1995) have examined coordination from an information processing view; a ‘contingency theory’ lens. From that perspective, coordination becomes a design option, which is inherently related to uncertainty. Central to the problem of coordination is the construct of

interdependence, which affects task uncertainty and, consequently, the information processing capacity of organisations (Adler, 1995; Pennings, 1975). According to Thompson (1967) interdependence is “the extent to which a task requires organizational units to engage in work flow exchanges of products, information, and/or resources and where actions in one unit affect the actions and work outcomes in another unit” (p. 54). If the activities of two units are interdependent we need to explore the levels of uncertainty that underlie their interaction. From a contingency theory perspective, coordination is thus conceptualised as a static task of estimating task uncertainty and of developing ‘matching structures’ (Carlile, 2002).

Contingency theory has offered important insights into the phenomenon of coordination. Yet, its value has gradually depreciated due to some important limitations. Firstly, it relies on the premise that “the environment is predictable enough to characterise existing interdependencies” (Faraj & Sproull, 2006, p. 1156), which becomes problematic if we account for contemporary conditions of intensified globalised competition, acceleration in the rate of change and widespread web-based interconnection of firms (Barley & Kunda, 2001; Orlikowski, 2002). Secondly, coordination is deprived of any notion of emergence and dynamism, while coordination structures are viewed only as design options ignoring a fundamental constitutive aspect of structure: its situated, provisional and ongoing accomplishment (Barley, 1986). Thirdly, coordination is explored only in relation to how different groups communicate to a greater or lesser extent. A number of studies has yet revealed that coordination also depends on the kind, not just the amount, of information and knowledge to accomplish a certain task, while task interdependence does not originate only from the contingent relations among units (Terwiesch et al, 2002; Staudenmayer, 1997).

More recently, ‘practice-based’ research on coordination (Bechky, 2003, 2006; Kellogg et al, 2006; Gherardi & Nicolini, 2002) has generated valuable insights into the micro-processes of coordination, which contingency theorists have disregarded. ‘Practice-based’ studies have been instrumental in illuminating how coordination structures and enactment interrelate and are ‘always in the making’ (Orlikowski, 2006). In addressing some of the limitations of contingency theory, the implications are that coordination cannot be viewed merely as design options. Rather much more is understood if one investigates coordination as it is performed (Bechky, 2006). For instance, Kellogg et al (2006) show that coordinating across community boundaries in a Web-design company is not a matter of simply creating the right plans or other procedures, but by enacting those and other communicative genres, such as using specific PowerPoint presentation outlines, in an ongoing, situated, and emergent fashion. An additional insight is that a more holistic image of coordination is gained if one explores the *nature of the boundaries* across different interacting groups. And that it is important to examine ‘within-community’ practices, before one investigates ‘across-community’ practices (Carlile, 2002); “the distinctions are key to analysing how knowledge is shared.” (Bechky, 2003, p. 317) Finally, looking more closely at the performative dimensions of knowledge sharing *across* communities a rich vocabulary - ‘boundary objects’ (Carlile, 2002), ‘common ground’ (Bechky, 2003), ‘trading zone’ (Kellogg et al. 2006) – has been developed to conceptualise coordination processes across groups.

While a shift of focus on the activity constitutes an important step forward to advancing understanding of coordination in organisations, a preoccupation with *cross-boundary communication* appears to be problematic. Existing ‘practice-based’ theorising is tied to the assumption that coordination happens *only* when communities interact. And although much coordination takes place when different groups communicate (Heath &

Staudenmayer, 2000), it cannot be reduced to communicative performances. Coordination may need to be thought of as a much more inclusive process, being accomplished when developing and enacting strategies, which aim to pull together everything needed to carry out production tasks (Fujimura, 1987). That necessarily involves more than interacting with other interdependent groups. In other words, the unit of analysis has remained unproductively ‘fixed’ and focused primarily on the ‘boundary’. As a consequence, ‘practice-based’ theorising on coordination has also ‘black-boxed’ the influence of interdependence on coordination. It contributes to “the counterproductive tendency to say that ‘the number of interdependencies is infinite’ or ‘everything depends on everything else’” (Staudenmayer, 1997, p. 222).

In summary, contemporary organisation theory on coordination appears to be ‘enclaved’ in a premise that, difficulties in coordination are ultimately constituted by difficulties in interaction among communities; thus equating the coordination phenomenon with cross-boundary communication. In attempting to address, what I believe to be an important limitation, I dust off some work done in the 1980s on the concept of *articulation* and exemplify its alternative connotations.

Coordination as Articulating Work

The concept of articulation as developed by Strauss (1985, 1988), Corbin and Strauss (1993), Gerson (1983), Gerson and Star (1986) and Fujimura (1987) provides an alternative insightful means to think about *project work* and the relationship between production and coordination tasks. Gerson and Star define that: “articulation consists of all the tasks involved in assembling, scheduling, monitoring, and coordinating all the steps necessary to complete a production task.” (1986, p. 266) The distinction between articulation and production work is key to understanding how project work as a total is accomplished (Strauss, 1985). The following example extracted from Fujimura (1987) provides a glimpse into those dimensions:

“Just as one person’s emergency is another person’s routine, a particular bit of work can be a production or articulation task depending on the context. For example, a lab technician needs an ultra-centrifuge in order to carry out her experiments. Making certain that he has an ultra-centrifuge available is an articulation task for her. For the laboratory director, however, purchasing the ultra-centrifuge is a production task. He obtains funds, orders the machine, negotiates with the manufacturer for modifications, fills out the purchase order, and sends it off to the university’s purchasing department. Thus, an articulation task in one perspective is a production task in another. Moreover, this difference in perspective need not be due to a division of labour by persons. A set of articulation tasks may be packaged into a standardised and repeated set of procedures – that is, a production task – to be performed by the same person.” (p. 260)

Even though the distinction may at times be difficult to discern, the point here is that articulation *serves* production, rather than facilitating boundary crossing, in order to achieve a given project’s ends (Strauss, 1988). More than a predefined task, articulation entails the situated development and accomplishment of *strategies*. Gerson and Star (1986), for example, show that developing representations for information systems entailed a repertoire of articulation strategies to reconcile viewpoints and incommensurate assumptions and procedures. Such strategies may be planned or developed in response to unanticipated contingencies that necessarily arise in real world environments. Articulation may well be instantiated as ‘workarounds’ (Strauss, 1988), which resolve “inconsistencies by packaging a compromise that “gets the job done”, that is, that *closes the system locally and temporarily* so that work can go on.” (Gerson & Star, 1986, p. 266 – emphasis original) Rather than resolving communicative challenges, articulation resolves production challenges.

Most importantly, Fujimura (1987) proposes that, in order to conceptualise project work accomplishment, it may also be useful to classify tasks by *levels of work organisation*. In cancer research, for instance, she shows that there may be three levels: the *experiment*, the *laboratory* and the *social world* in which the experiments and laboratories are situated (e.g. biological or cancer research). And Fujimura argues that scientific problems become ‘doable’ and are solved only and only if:

“... *all* the necessary parts at all levels of work organisation are collected and made to fit together. Scientists decide what those necessary parts are and then collect and integrate them in order to craft and carry out an entire problem (a set of tasks). That is, articulation between levels is required to bring all the tasks at different levels of work organisation together into alignment to create a doable problem.” (1987, p. 262 – emphasis original)

Outlining objectives and completing an experiment, for example, is possible only if *all the necessary* elements of experimental work, laboratory level and social world are aligned, i.e. articulated to make the completion of production tasks at all levels possible. This implies that one may need to discern the kinds of ‘organisations’ and their relationships, which project work depends on, and explore any articulation processes that *must* happen in order to achieve alignment between different levels; to examine how “the diverse discursive and material, human and artifactual elements *must be assembled together* in the construction of stable organisations and artefact” (Suchman, 2000, p. 312 – emphasis added). This approach diverts attention from investigating only the contingent relationships between groups and/or their communicative performances.

In short, articulation and its ‘baggage’ provide an alternative lens to examine coordination and its use may well advance our current understanding of that important organisational phenomenon. Investigating how articulation *serves production work*, is accomplished through *situated strategies*, and *aligns levels of work organisations* constitutes a worthwhile experiment.

3. EMPIRICAL SETTING AND RESEARCH METHODS

3.1 Research Site

One of the biggest public organisations in the UK, organisation ‘P’¹, has the strategic priority to enhance most of its building infrastructure over the next decade. This is important because the buildings, and especially its major buildings, are heavily used by thousands of people everyday due to the nature of the services, which organisation ‘P’ provides (think of an airport or a hospital). Especially in the very big city ‘Nurham’, the central building has major capacity problems. More than that, there have been forecasts about significant growing capacity demands in the short and long term. In collaboration with the government and local stakeholders, organisation ‘P’ has developed a scheme for the redevelopment of the very large building structure in city ‘Nurham’. For the last two years, the redevelopment scheme has been known as the ‘Theta Project’ (a pseudonym); an ‘integrated project’, according to the stakeholders, which aims to fulfil multiple and diverse objectives of the different parties involved. The *outline design solution*, i.e. the development of a selected single option and in sufficient detail to allow for the completion of the business case and scheduling of delivery resources, of the

¹ Names of the firm, its organizational units, titles, names of individuals, project characteristics, and locations have all been disguised.

Theta Project was completed in 2006. The total value of the scheme (scaled slightly for purposes of anonymity) has been estimated at approximately £600 million (approx. €745 million or \$1.2 billion), most of which needs to be funded by the UK government. The business case has also been submitted to the government for approval.

In the meantime, organisation ‘P’ decided to create a special project team responsible for delivering the very complex, due to its design and delivery objectives, Theta Project. The recruitment for the executive positions of the ‘Theta Project Team’ took place after the development of the outline design solution. A project director (or senior responsible owner of the project²), a design director, a construction director, a programme director and a director of contracts were hired; most of them are very experienced professionals in the construction industry. Since summer 2007, they, along with an administrator, have been co-located in an open-desk office in the local branch of organisation ‘P’ in ‘Nurham’.

At around that time, when the author started his observation ‘journey’, the Theta project team were preoccupied with the procurement of two major services suppliers; a ‘principal engineer’ (PE) and a ‘construction consultant’ (CC). Due to the high complexity, ambiguity and longevity of the project, the Theta team have decided to use a construction delivery model (Jackson, 2004), which emphasised ‘collaborative working’, rather than traditional contracting methods. Instead of firstly developing the design and then throwing the architectural and other engineering drawings ‘over the wall’ to the constructors, collaborative working arrangements encourage a ‘dialogue’ between design and construction before the final detailed design is completed; issues of ‘constructability’, ‘buildability’, ‘whole life value’, ‘value engineering’ etc. constitute core objectives of this dialogue (Cacciatori & Jacobides, 2005; Brady et al, 2005). The aspiration for the Theta Project has been that the project team, the PE and CC teams (along with other ‘intermediate’ consultants) will work together within a so-called ‘Integrated Project Team’³ to ensure that design and construction ‘talk to each other’.

3.2 Research Methods

The author has had the opportunity to conduct an eight-month field study of the Theta project using primarily qualitative, and multiple data collection techniques (Bryman & Bell, 2003; Barley & Kunda, 2001). As a nonparticipant observer, I shadowed the Theta project team in most of their meetings and workshops, which primarily related to the procurement process of the CC. After each meeting (more than 20) I recorded my observations in type-written notes. Detailed observations were supplemented with a few formal and numerous informal interviews (which are still ongoing). In addition to interviews and observations, an invaluable source of ‘data’ has been provided by my access to hundreds of documents, such as project reports, project plans, emails, company policies, websites, press articles as well as different versions of such documents, i.e. while they were being developed. All those ‘docile and tractable materials’ (Law, 1994) provided traces of the work and enhanced my understanding of the articulation challenges and strategies.

My approach to early data analysis is focused on developing understanding of the ways the Theta project team accomplished their procurement work and thus of the strategies they devised to “make things fit together” (Fujimura, 1987). The unit of this exploratory

² http://www.ogc.gov.uk/User_roles_in_the_toolkit_senior_responsible_owner.asp

³ <http://www.ogc.gov.uk/documents/CP0065AEGuide5.pdf>

analysis has been the accomplishments of procurement tasks. Through first level coding (Strauss and Corbin, 1990), memoing (Miles & Huberman, 1994), and analytical summaries (Pettigrew, 1990) the process of data collection and analysis so far has unfolded in a dynamic and iterative (and definitely not linear) fashion, being exploratory and more focused on constantly sharpening my developing understanding (Glaser & Strauss, 1967). I have gone through multiple readings of my data in order to identify patterns and enhance the data collection process. The use of various software packages (especially mind map software) has been a particularly useful way to visualise connections and interrelationships among concepts and to facilitate the organisation of the gathered information. Conducting my early analysis gradually sensitised me to appreciate the ‘articulation lens’ for making sense of the Theta project work accomplishment.

4. RESEARCH FINDINGS

In what follows, I provide an overview of the evolution of the first stages of the selection process for the CC. This overview is accompanied by an interpretation of the coordination processes, which appeared to have taken place throughout those stages.

4.1 Selecting a ‘Construction Consultant’ (CC): An Overview

Selecting and appointing a professional services supplier has not been a novel process for organisation ‘P’. However, the services required by the CC were something totally new as Gary (director of construction) explained to me:

“The Theta Project team initiated this (idea of ‘integrated project team’). Nobody asked us to do it this way. It is the first time that organisation ‘P’ does this. We decided to follow that (procurement) route in order to have better risk management and to control cost.”

In summer 2007, John (director of contracts), who was the only one in the team with knowledge of internal procedures of organisation ‘P’ (he has worked in other executive positions in organisation ‘P’ for 12 years – prior to his joining the Theta project team), considered external support for the procurement process of the CC. Being very familiar with industry developments, the Theta team identified organisation ‘Σ’ (sigma) as quite suitable, since it had provided consultancy support for the procurement process of a similar very large contract – type of a CC. In an interview John confessed to me:

“At the moment, you know, we got relatively small team. And we got a few posts... I have got potentially two people in my 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. But also to make sure we capture that knowledge and information and experience they (organisation ‘Σ’) have got from doing this (supporting the selection process of a construction consultant) with the organisation YYY (and its very large project). 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 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. And they can bring that lessons learnt, and we don’t actually have to go through the same problems... we then (could) do it quicker.”

Having selected organisation ‘Σ’ as their procurement advisors, the Theta project team worked with them to plan the entire process of selecting and appointing the CC. The plan, which was outlined in a respective document (for short the ‘plan doc’), involved

several stages, which, conventionally, need to be followed in selection processes (Hatush & Skitmore 1997); *advertising*; *initial screening of organisations expressing an interest* (the so-called ‘long list’); *subsequent screening* (the so-called ‘short list’); *bid evaluation*.

4.2 Stage A: Advertising the Contract

One of the most significant parameters, which the Theta team had to consider, was the fact that organisation ‘P’ is a public organisation, which is legally enforced to abide by the European Union (EU) Contracts Regulations. Those regulations dictate a set of advertising and procedural requirements:

“The value of the proposed contract exceeds the threshold value of €422,000 (as currently adjusted) for a services contract and therefore needs to comply with the advertising and procedural requirements of the Regulations (Reg. 11). In addition to compliance with the specific requirements set out in the Regulations, organisation ‘P’ must also ensure that the procurement process adheres to the principles of equal treatment, non-discrimination, transparency and competition upon which the Directives and Regulations are founded. Under the Regulations, organisation ‘P’ may select to use the open, restricted or negotiated procedure (Reg. 14).” (Plan doc)

In their initial effort to select and appoint the CC, the Theta project team had to plan and make sure that there was no breaching of those regulations. Organisation ‘P’ has already had an industry-wide system in place, which was ‘EU-compliant’, for procuring works and services. Yet, the Theta team chose to follow an alternative path: “that the negotiated procedure with a call for competition (through the issue of a contract notice published in the Official Journal of the European Union (OJEU)⁴⁵) is the most appropriate procedure to use in this procurement process.” (Plan doc) Their view was that, since organisation ‘P’ had never procured services of a similar kind (i.e. those of a CC), using the existing system would not give them the ‘right list’. More than that, publishing a contract notice would give the project some profile and would “open up the market” (rather than restricting it to those using the existing system). In short, the Theta project team now had to accomplish the production of a short document, i.e. the OJEU contract notice.

At the very beginning of their effort, however, the Theta team faced a significant roadblock. Organisation ‘P’ had an Overarching Contracts Unit (OCU), which approves of the procurement and contract strategy of every major project. As John (director of contracts) explained to me:

“That is out at the centre and... really it is for any strategy above £3 million... and the reason we want to make sure... there is an EU threshold... EU legislation... so to make sure that you have got a strategy, that has to go to the centre... because it then seems to be a high value project... we want to make sure that the strategy that we will deliver is EU compliant... make sure we are not going to get any fines... because if you get a fine for breaching the EU legislation the max fine is up to 10% of the company turnover... so it is a phenomenal fine...

But also when you start getting that kind of size of project, you want to make sure that due processes and consideration has been given. We want to make sure that we operate in some kind of consistent level across the company...

And making sure that what we were trying to do was commercially sound. And then trying to make sure that in a way to try and bring in a new lesson learnt... and they might say... “oh what you are proposing

⁴ www.ted.europa.eu,

⁵ http://www.ogc.gov.uk/documentation_and_templates_ojeu_advertisement.asp

there we did recently and we ended up through a disaster!”... So they can try and point the right direction, usually helps support... to some extent it was a bit spike chair... that they, as an independent body, challenge you... to make sure that you are doing things for the right reasons. But they are also trying to bring in lessons learnt... and they are also trying to help us.

The OCU didn't approve of the procurement strategy, as outlined by the Theta project team in a document (for short 'strategy doc'). As John explained to everyone at the 'kick-off' workshop (end of summer 2007) held at the local branch of organisation 'Σ', the OCU were confused as to what had to be approved and the director of the OCU was also objecting to the terms 'integrated project team' and 'construction consultant'. After several negotiations and after the appointment of a new director of the OCU, the Theta team managed to get the green light; "he was on board and that was a big win!" Without their approval, the process could not go forward. There was a delay of approximately 6 weeks.

Having set a deadline for the production of the 'OJEU notice', the Theta team started compiling this short document, the format of which was fairly predefined. The basic information requirements were: *object of contract, type, description of scope, title, common procurement vocabulary, duration, conditions for participating, minimum requirements, outlining further steps of the selection process, procedure, award criteria, and supplementary information*. Most of the 'filling in' was discussed at the 'kick-off' workshop, while some requirements had to be discussed with other units of organisation 'P'. Some standard 'ticks' were made, such as financial capacity and insurances requirements, while legal advice was also sought especially with respect to the specified award criteria. The contract notice was eventually published in the beginning of autumn 2007.

An interpretation of articulation processes at stage A

Lacking the necessary financial resources and under important time constraints, the Theta project members initially resolved an important articulation challenge: that of acquiring appropriate skills and knowledge for delivering such a novel procurement process. They planned an articulation strategy to use organisation 'Σ' in order to secure a kind of external support, which would be suitable for the objectives of the novel selection process. Having those resources in place, the Theta team now had to align its procurement process with the EU regulations. Internally related with the public organisation 'P', the Theta Project faced important constraints and hence, the alignment between EU regulations and its procurement process had to be carefully planned and articulated. The Theta project team had been given a number of options to do that, i.e. selecting among three procedures and using the OJEU notice or the existing 'EU-compliant' system of organisation 'P'. The Theta members considered the options and regarded the existing system as insufficient to achieve alignment between two additional work organisations; demands originating from the construction delivery strategy (i.e. the special kinds of services to be provided by an CC) and sufficient access to the market in order to increase the chances of 'getting the right list' (organisations that could provide those services). The construction of an articulation strategy had to account for the simultaneous alignment of the *necessary* elements of three work organisations (Fujimura, 1987); the EU regulations, the project's delivery strategy and access to the market.

Although that strategy seemed to be adequate, the Theta project team were faced with the results of different and unsuccessful articulation attempts. The Theta project team failed to appreciate the relationship between the Theta project and the OCU; alignment

between those two work organisations had not been achieved. The OCU had not been ‘bought into’ the construction delivery strategy. The ‘strategy doc’, which was used as an articulation device or boundary object (Star & Griesemer, 1989), proved insufficient to achieve alignment between the OCU and the Theta procurement strategy. Faced with that contingency, which created major disruption to the selection process – delay of ‘kick-off’, the Theta team had to strive for achieving the necessary alignment. After several weeks of discretionary work to deal with that contingency (Gerson & Star, 1986), the Theta team achieved the kind of articulation – alignment of the necessary parts of EU regulations, construction delivery strategy, access to the market, and OCU demands – that would allow the project to move forward.

They now had to produce the contract notice, which, in order to get published in the OJEU, had to satisfy certain information requirements. Doing so involved more than ‘filling in the form’. The acts of providing information under predefined sections performed at the same time necessary articulation work; that is, alignment between the OJEU publications demands, which would also have to be aligned with the EU regulations, and the advertising information requirements. The fact that articulation was performed faster and unproblematically is due to ‘standardisation’ and ‘packaging’ of that work (Fujimura, 1987). The forms or ‘standardised’ information requirements constitute a piece of history of prior articulation work (Gerson & Star, 1986), which facilitates alignment when conditions remain constant (Fujimura, 1987).

4.3 Stage B: Preparing the Pre-Qualification Questionnaire (PQQ)

The PQQ would be a document to be sent to organisations expressing an interest in the contract. The structure and content of such document, which would be much more detailed and of different purpose to the OJEU notice, was not predefined. In compliance with the EU directive:

“The Regulations recognise the need to exclude economic operators (candidate CCs) that are unable to deliver the required services but also the need to select from those capable of providing the works to select the tender list (Reg. 27(4)). The Regulations set out two main provisions on selecting providers to tender. Firstly the selection must be on the basis of objective criteria and rules that are available to those economic operators, which request them (Reg. 27(2)), and sets out criteria for rejection of economic operators (Reg. 26) e.g. bankruptcy.” (Plan doc)

In addition, the Theta team would have to be very careful to ensure consistency between the contract notice and the PQQ:

“once issued (the contract notice), no material changes to the project, terms or procedures set out in the notice can be made without issuing a new notice, which restarts the relevant time periods.” (Plan doc)

In other words, the PQQ as well as the subsequent ‘Invitation to Tender’ (ITT) had to be aligned with what is mentioned in the contract notice, which would be published at the very beginning of the selection process.

Taking all those issues into consideration, organisation ‘Σ’ supported the Theta project team to plan accordingly. At the ‘kick-off’ workshop, the participants structured their discussions in such ways so as to be able to ‘see the linkages’ between the *kind of services the CC should be doing*, the information to be given at a *contract notice stage*, as well as the information required at a *PQQ and ITT stage*. On a whiteboard they developed four respective columns and thus structured their ‘brainstorming’ session in

order to fill those in. More than that, Daniel (senior member of organisation ‘Σ’) warned that, according to EU regulations, information provided at PQQ stage *cannot be re-evaluated* at tender stage and therefore careful consideration of the whole evaluation process, the methodology, evaluation criteria, weightings, scoring and the like must be made at the outset. They were thus trying to make sure that the *PQQ column* and *ITT column* included different information. Acknowledging those constraints, the Theta team throughout the PQQ production were ‘checking’ whether the information provided was consistent with that in the contract notice and that it didn’t undermine future evaluation process at ITT stage.

As John explained to me, while we were walking from the Theta team offices towards the local branch of ‘Σ’ for a meeting (1 day after the publication of the OJEU notice), they wanted to ‘get the scope (of services outlined in the PQQ) done’, and then develop the criteria for ‘shortlisting’. What they did was to split the document in two; (1) one consisting of all the sections of the PQQ and (2) one including only the section relating to the scope of services. The latter section had to include information about the different kinds of services, the role of the CC in the ‘Integrated Project Team’, its relationship with others, the level of its involvement in delivering the project etc.

The completion of the document (2) was delayed for more than 10 days and through a cumbersome iterative process of ‘reviewing’. Using the MS Word and its reviewing functionalities, the Theta team preferred to email John (the accountable coordinator of the process) their various comments and contributions to the ‘scope’ by adding, deleting and commenting on the text. Depriving themselves of face-to-face interactions, the Theta team members focused on different aspects of the scope, had different expectations for the role and responsibilities of the CC as well as diverse ‘wording’ preferences. In his effort to coordinate all the contributions, John was overwhelmed by the hundreds of changes he had to embed in the document and by MS Word’s complex reviewing ‘environment’. He called off this ‘reviewing activity’ and requested a meeting with the Theta team: “we cannot keep doing this... let’s get into a room... and we don’t move until we complete the scope!” (John). In addition, he and Sara (from organisation ‘Σ’) decided to get all the versions printed off so as to be able to incorporate all the comments they received. Relying only on electronic versions, they felt, was impinging on the effective accomplishment of the task.

With regard to the rest of the PQQ document, information had to be included in relation to the following: *background to the project, summary of outline design solution, outline of delivery model, evaluation criteria, questions in four different areas* in order to assess suitability at the PQQ stage. Interestingly, Sara (‘Σ’), who did most of the editing of the document, was instructed to use a previous PQQ document (that for the ‘Principal Engineer’ or PE) as a template. It was the Theta team’s conviction that there should be consistency between the two documents. What Sara did was to copy most of the text of the PE PQQ and to work on the CC PQQ from there by making the necessary changes, especially in relation to the questions, which the team would develop, for assessing suitability at that first screening stage. Most of the other sections, with minor modifications in the delivery model and evaluation criteria, were almost identical. Having access to a multitude of documents (produced since 2005), I managed to observe striking similarities (literally identical sections) across a number of documents, which had been produced for the last two and ½ years! Stakeholder objective documents (docs), business plan docs, strategy doc, and outline solution docs etc., while serving different purposes at different temporal locales and contexts, had been developed through a recurrent and diachronic practice of ‘cloning text’.

An interpretation of articulation processes at stage B

Having achieved the first ‘milestone’ or ‘end’ of their procurement project, the Theta team oriented their actions towards achieving a subsequent goal. The articulation strategies devised at this stage were of different kind and served different purposes in response to the circumstances at hand. The production of PQQ still had to align the necessary elements of EU regulations and of the selection process for the CC contract. Those elements were now different. Recognising the vital constraints of the information interdependencies between contract notice, PQQ and ITT, the Theta team, with the support of organisation (‘Σ’), were in a position to plan in advance their articulation strategy. That strategy took the form of brainstorming and of using visual means, which would represent those interdependencies in a comprehensible manner. ‘Looking for linkages’ constituted an articulation attempt to *align the necessary elements* between the EU regulations and the selection project *throughout its entire process*.

The scene was different, however, for the ‘scope’. Splitting the PQQ in two – another kind of articulation work – would not be sufficient for accomplishing the project’s ends. The devised articulation strategy of ‘reviewing’ by relying on MS Word’s reviewing functionalities proved unsuccessful. The root of this ‘articulation dead-end’ was due to failure to cope with internal contingencies of the articulation work. Different perspectives, expectations and preferences could not be ‘meshed’ through a mode of electronically facilitated reviewing practice. That articulation strategy had to be ‘called off’, not due to its aims, but due to the insufficient provision of practical resources, which were emergently provided by performing it. ‘Working around’ those unanticipated contingencies and resolving the ‘dead-end’ took the form of ‘getting into the room’ and of ‘getting all the versions (of the scope) printed off’. In the absence of direct EU regulations demands, ‘getting the scope done’ entailed *reactive articulation* work, which could not be planned beforehand. “Open systems are irremediably open” (Gerson & Star, 1986) and achieving local closure to a problem inevitably becomes a continuous and at times painfully explicit articulation process (Strauss, 1988).

Under severe time constraints and pressures for consistency across documents, the Theta team also devised a different set of strategies to articulate the production of the rest of the PQQ. Using the products of previous articulation work, i.e. the PE PQQ, seemed an efficient way to do so, since it saved a lot of time and effort. Yet, the observed diachronic practice of ‘cloning text’ manifests more than an epiphenomenal strategy of taking advantage of articulation history. It also exemplifies an effort to cope with a ‘silent’ demand for consistency with respect to specific information content, which may be provided to third parties. For instance, by ‘cloning the text’ relating to stakeholders’ objectives (which ‘froze’ in 2005) in the project background information section, the Theta team made sure that their objectives were represented accurately, in a ‘historically agreed’ way and in sufficient detail in the PQQ doc (dated autumn 2007). The characteristics of complexity, longevity and multi-actor involvement in the Theta Project called for some kind of diachronic consistency of information, which the Theta team responded to by enacting the ‘cloning practice’. Unaware of the consequences of that practice, the Theta Project team articulated a heterogeneous array of elements associated with the involvement and demands of multiple and diverse work organisations, which had to be aligned for various reasons and purposes at different temporal locales and contexts.

5. DISCUSSION AND CONCLUSIONS

I have attempted to revive research interest in the foundational organisational phenomenon of coordination through my demonstration of how procurement work gets accomplished by way of devising articulation strategies in the Theta Project. My exposure to the project practices enacted by the Theta team has reinforced the belief that, existing theorising falls short of providing the necessary conceptual vocabulary to understand coordination in contemporary organisational settings. I have attempted to provide possible avenues for enriching that vocabulary with a set of concepts, which, I believe, afford the re-imagination of organisational learning and knowing to coordinate as a much more holistic *articulation process* (Strauss, 1988).

In the context of accomplishing the procurement process of the major construction project Theta, coordination appears to manifest itself in unanticipated (by the current literature) ways. Instead of merely *crossing boundaries* across occupational communities, coordination in the Theta project required articulation work to pull everything together to make the accomplishment of production tasks possible. The production of the contract notice, for instance, required the consideration and acquisition of the necessary *and* suitable for the job resources, such as the knowledge and experience of organisation 'Σ'. More than creating 'boundary objects' (Bechky, 2003; Carlile, 2002) or developing standard procedures of exchange (Kellogg et al, 2006) to cross occupational boundaries, the Theta members articulated the necessary elements of various work organisations in order to get their job done. Demands originating from the EU regulatory framework, the outlined construction delivery strategy, and the organisational OCU had to be synthesised and aligned by the Theta members in order to get the procurement project off the ground. And although coordination may be an ongoing, provisional, and emergent accomplishment, which is 'always in the making' (Gherardi & Nicollini, 2000; Orlikowski, 2006), its situated enactment may acquire distinctive forms, depending on the degree of difficulty in coping with particular constraints and contingencies for achieving alignment. 'Looking for linkages', for instance, at the 'kick-off' workshop constitutes a *proactive form* of articulation strategy, while coping with the unanticipated consequences of the 'reviewing' practice reveals the devising of a *reactive articulation strategy*.

Informed by an *articulation perspective*, interpretations of procurement work accomplishment in the Theta Project illuminate novel pragmatic ways by which organisational actors enact coordination. The following table summarises the results of those interpretations.

Table 1.

	Stage A: Advertising the Contract			Stage B: Producing the PQQ		
	<i>Considering external support</i>	<i>Selecting procurement procedure</i>	<i>Producing contract notice</i>	<i>Planning the procurement process</i>	<i>'Getting the scope done'</i>	<i>Producing the PQQ</i>
Articulation Purpose	<i>Securing the necessary resources</i>	<i>Understanding constraints and coping with contingencies</i>	<i>Defining the necessary advertising information</i>	<i>Understanding constraints and future considerations</i>	<i>'Meshing' viewpoints and contributions</i>	<i>Achieving diachronic informational consistency</i>
Articulating Alignment: work organisations	<i>Experience of procurement advisor and construction delivery strategy</i>	<i>EU regulations, access to the market, Construction delivery strategy and OCU</i>	<i>EU publication demands and advertising requirements</i>	<i>EU regulations and procurement process</i>	<i>Theta Project team members' viewpoints</i>	<i>Theta project context and PQQ information</i>
Form of Articulation Strategy	<i>Proactive</i>	<i>Proactive and reactive</i>	<i>Conforming</i>	<i>Proactive</i>	<i>Reactive</i>	<i>Guaranteeing consistency</i>

The initial findings from the Theta Project case study remind us that, even though focusing on the interactions, which aim to resolve disruptions in the coordination of project work, is an important research objective, studying articulation as a more encompassing process of “pulling together everything needed to carry out production tasks” (Fujimura, 1987, p. 258) generates an alternative and more holistic understanding. Accomplishing project work in the Theta Project entailed that work objectives, processes and products were woven into an alignment of the necessary elements of the work organisations, whose demands became salient at particular phases. In addition, creating articulation strategies may require considering options for balancing and meeting multiple and diverse demands as well as reusing articulation products developed at different temporal locales and contexts. That was particularly the case manifested by the ‘cloning practice’. In a project with a projected lifespan of more than 10 years and with objectives and decisions, which have to ‘froze’ in order to get the job done, consistency of information becomes a vital imperative. The Theta team’s response in the form of ‘cloning text’ should thus be viewed not only as an effort to save time and effort, but also as an attempt to address that articulation imperative.

The analysis presented in this paper constitutes an exploratory attempt to examine coordination processes in a surprisingly under-researched setting, the planning phase of a major construction project. This exploration was also motivated by particular conceptual challenges with respect to framing the coordination phenomenon. Rethinking coordination as a more holistic articulation process reveals significant benefits to addressing those conceptual challenges and to providing fruitful avenues for generating understanding of the multifaceted and complex coordinative endeavours necessary for the accomplishment of procurement work in modern construction projects.

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