Abstract

In the present paper we draw attention to a missing link in the research on interfirm projects. Research, so far, has paradoxically tended to focus either on the time period prior to the completion phase or the time period between projects. However, what happens during project completed has been under-emphasized. In this paper we focus on the interaction between client and contractor in large interfirm industrial projects during the completion phase. Generally, such projects are complex in several respects and, since they frequently are not embedded in a long-term relationship between client and contractor, one might assume that these projects take on forms that would make them problematic to coordinate. Based on an exploratory case study of a project within the ABB Group, we develop two concepts. One is pacing, which focuses the mutual coordination of activities between client and contractor. Pacing refers to the temporal orientation of the two parties involved in the interfirm project. From our case study we can conclude that when the parties have different temporal orientations, being positioned in different phases of the project this is a major source of problems. The second concept developed in the paper is matching hierarchies, which focuses on how the interacting parties establish joint-decision making in order to handle overall project-related issues. We argue that client and contractor need a well-functioning order to attain coupling and conflict resolution in a project setting. We believe that these two concepts, pacing and matching hierarchies, point to important characteristics of the type of project studied, and provide an understanding of both process and structure dimensions of the interaction during project completion.

Introduction

"What is happening?" The project manager of one of ABB's most important industrial project couldn't believe what he was experiencing. During the latest eleven month period, some 10,000 letters, all full of questions and demand for new and renewed tests kept flooding, not only the project manager, but the entire company. In the previous project, a project in Finland that he had been in charge of, the number of letters only amounted to 75 during the entire project! 11,000 meant roughly 50 per day! And as if the sheer number of letters wasn't enough, the tone, seemingly insinuating lack of competence and expressing distrust, really irritated those who were targeted.

"It is impossible to work with a client who engages almost everyone in the organization with his questions. We don't get the time to plan and think ahead when all of our time is consumed by reacting to the client's requests. And I haven't the faintest what we should do to stop this."

The above text is a short excerpt from our material on a project carried out by the well-known Swiss-Swedish firm ABB, a firm with extensive experience and knowledge within project-based business and systems deliveries. This time, as the previous
paragraphs shows, something obviously did not work out as planned. In this paper we will give one explanation of the case – an explanation that we believe also has some important theoretical implications.

**Framing the problem**

Several attempts have been made by researchers to increase our understanding of client-contractor relationships in project-based industries. A significant trait in these attempts is that the project completion phase has nearly always been neglected. Either researchers have focused on the time period prior to signing the contract (e.g., Ova and Holstius, 1993; Bansard et al., 1993) or the focus has been on the period between projects (Hadjikhani, 1996).

In industrial interfirm projects, the joint effort of several companies is naturally of major concern. According to Stinchcombe (1985), a key facet in these types of projects is how the cooperation is configured. Stinchcombe particularly emphasizes the importance of the “decoupling principle” (p. 70). The principle asserts that if two activities are highly interdependent, they should be carried out by the same organization, under the same authority. The problem with complex projects, involving joint effort from several organizations is, however, that the decoupling principle is often violated. Interdependent engineering work is often split up between two organizations, thus resulting in a decoupling of activities which, according to Stinchcombe, should have been carried out under a single authority.

Another interesting facet of industrial interfirm projects is a frequent lack of long-term client-contractor relationship. In situations where contractors with turnkey responsibility use the same sub-contractors for repetitive projects a kind of quasi-firm configuration emerge (Eccles, 1981). The institutionalization of such relationships makes an organization adjust its culture, methods and practices to the other party. Continuing relationships are generally a source of trust, stemming both from historical interactions and/or from expectations of future transactions. Both in Macneil (1980) and Axelrod (1984) cooperative strategies are tied to the existence of real potentials of future transactions. Institutionalized behavior manifests itself in standardized interaction sequences supported by common experience, common knowledge base, common interests and routines that lead to reduced uncertainty (Sahlin-Andersson, 1989). Reduced uncertainty has the potential to trigger action (Sahlin-Andersson, 1992). The marriage metaphor is sometimes used to describe such a relationship (see e.g., McCall, 1966; Levitt, 1983). However, in most project settings this metaphor is not applicable. Projects are in this respect like a “one-night stand” (Meyerson, Weick & Kramer, 1996). Thus, from a client perspective a product or system with a long service life, as e.g., an electrical power station, makes it more or less unnecessary to build strong long-term relationships with the contractor. Moreover, with a time perspective of some thirty years, the client needs to be independently able to manage the installation after the take-over.

During the completion phase, a mutual and tight relationship must, however, be established. Due to the lack of expectations of future transactions, one might assume that this leads to a reliance on formal mechanisms (e.g., contracts). Contracts are hierarchical in nature, as they specify roles, rights, and obligations of each party. A contractual framework forms an important structural background to processes of interaction but can also sometimes be seen as an obstruction to control in these contexts.
The argument here is that projects are often carried out in environments and situations of high complexity and uncertainty, which call for organic structural characteristics (Söderlund and Andersson, 199X). Furthermore, contracts are typically incomplete due to bounded rationality and uncertainty and become therefore "self-organizing" (Rosseau, 1995; Strauss, 1978).

Macaulay (1963:56) considers contracts to be a sort of ‘rational planning’ of the transaction. Such planning has to be carried out with careful provision for as many future contingencies as possible and the existence or use of actual or potential legal sanctions to induce performance of the exchange or to compensate for non-performance. Certainly, such an arrangement causes problems in an empirical context problems that are related to both environmental and individual aspects. Furthermore, Macaulay (1963:61) found that some business people objected to elaborate contracts because such planning indicates a lack of trust and blunts the demands for friendship, turning a cooperative venture into "an antagonistic horsetrade." Hence, legal ordering is only applied when private ordering fails and consequently the use of legal ordering is thus also a sign of lack of trust.

Aim of paper

The overall aim of the present paper is to increase our understanding of the problems related to project completion in a situation where the two main actors, client and contractor, are highly interdependent. In this paper we will especially focus on two features of such interfirm projects. First, the issue of timing in the coordination of projects where we suggest that increased understanding of interaction processes can be gained by using knowledge from studies within the area of time and organization. Controlling projects is seen, as for instance in Sayles and Chandler (1971), as a form of handling rates of time and organizational processes. Project management becomes an act of implementing a "giant metronome," that enables the parts of the project to respond to the same "beat." As will be discussed later, the problem with authoritative beat or common macro-cycles (Ancona & Chong, 1996) in interfirm settings will be emphasized. Secondly, our study indicates that hierarchy is another important feature of projects in an interfirm context and also connected to the problem of common macro-cycles in such settings. We will argue that hierarchical order is functional and important in order to obtain and maintain a workable atmosphere between parties involved in interfirm projects.

Methodology

The study started in January 1995, when we met with the top management of one of ABB’s subsidiaries to discuss possible cases for describing and analyzing client-contractor relationships in industrial projects. We were looking for international projects that had caused the firm some problems and which were interesting from several perspectives and levels of analysis in hope that the case would generate good descriptions of ‘typical’ project management problems in international interfirm projects. After discussing different types of projects we decided to make a pre-study of the project presented in the present paper. We soon realized that this project had several interesting aspects, both on practical and theoretical levels. The pre-study consisted of a day of discussion with the former project manager and one of the site managers, in order to get an overall picture of the project. They described the project, its scope,
objectives, and major problems, and how the project finally had been executed and finalized a couple of months before we started our study.

The study was divided in four intervals to make it possible for us to reflect upon the interviews and also to sum up and transcribe the interviews, and after that make a decision about the future direction of the study. At every visit to the company we met with the project manager to make follow-up interviews. Every visit lasted for two days, where we approximately conducted interviews for six hours per day. At every interview we used a tape recorder. In sum our study required 20 interviews lasting between one and five hours. Apart from the interviews, we had access to most written material about the project.

From a methodological point of view we believe that the best way to generate theory based on deep understanding is to use a case study approach. In a first step of our research we use just one case study mainly because we are interested in developing a framework for future analysis of client-contractor interactions in the context of complex projects. Thus, we believe that it is at this stage more important to get a rich description of one case than to compare different projects. We believe that a comparative approach could be the next step in this research project. Furthermore, as researchers using an exploratory case study approach, we believe that the dialogue between theory and empirical observation is of utmost importance to be able to construct a theory that is both empirically grounded and theoretically reflexive.

The Case

ABB (Asea Brown Boveri) is one of the largest companies in the world. The company consists of several business areas. Within the business area of power transmission, ABB has more than twenty companies around the world. The companies develop, manufacture, and market a magnitude of products, control systems, plants and services. This deep knowledge and worldwide network give ABB the possibility to offer their customers a whole range of products, turnkey projects and other complex services. Every turnkey project in the business area in question consists of a wide range of activities and actors. On the average, a plant such as the one in this case, is an investment of about 500 MUSD. The buyers of these kinds of plants are mostly state-owned companies. The market is concentrated and competitive, consisting of three major competitors on the supplying side and with state-owned enterprises throughout the world on the buying side. The number of projects on this market is limited, hence every single project is considered to be of importance for the suppliers within the industry.

In 1965 ABB delivered the original plant built for National Electric. The delivery was carried out successfully and became the starting point for international activities within this business area of ABB (then ASEA). In the middle of the 1980s ABB got indications that National Electric was planning to upgrade the existing plant.

In 1988 National Electric had carried out different tests in cooperation with one of the major competitors of ABB. Shortly afterwards, ABB sent a delegation to National Electric in order to get information and discuss the plans for the upgrade. It turned out that some technical features of the project were very complicated. In particular, these problems concerned the parallel connection with the existing plant. The seismic
conditions, the layout of the sites, the short time schedule, but also other aspects such as the possibility of industrial disputes. To this came requirements on noise reduction.

A project in the pipeline

National Electric had several options for configuring the project. They primarily considered the following alternatives:

a) A turnkey project with a major equipment manufacturer, e.g. ABB, GEC or Siemens.
b) Use of an international project management organization, e.g. Fluor, Bechtel, Badger or Davy McKee.
c) Use of a national organization, which had previously worked with similar projects.
d) Use of internal resources from National Electric together with additional individuals and companies with a proven track record in project management.

In what was seen as a bold step, option (d) was adopted as it appeared to be the most cost effective, the most controllable and the most likely to have long term benefits to National Electric. It avoided the disadvantages of the (a) to (c) options that included:

(i) The lack of technical and quality control of a turnkey project on such a vital part of the national grid.
(ii) The perceived high cost of international and national project management organizations and their previous limited success in managing industrial relations in the country.
(iii) The need to avoid compromising National Electric’s long term social and environmental obligations.

As it turned out, National Electric employed several international consulting firms, to an extent that ABB thought was above normal. As the project was crucial to National Electric, they contracted several experienced consultant companies (both technical consultants and administrative support). They also hired additional consultants for quality and delivery inspections. National Electric made it clear that nothing was allowed to go wrong. After several pre-studies and internal discussions, National Electric decided to divide the overall project into eight separate work packages chosen to be managed as either stand-alone fixed price contracts or small sets of fixed price contracts. The next step was to formally invite companies to tender for the projects.

The tender phase

After being invited to take part in the tender process, ABB started to work in order to present a competitive offer, both technically and economically. At the beginning the work was handled by a temporary group managed by the sales manager. A proper project manager was appointed as late as in the final discussions with the customer. The project manager explained it in the following words:

“"The reason why I entered the project so late was because I was in the middle of finalizing another project. However, I was able to hand over that responsibility to others mainly because only details were remaining in the project. I discussed the new project with our division manager and he asked if I was interested in being project manager. I had about ten days to read through all the material and documentation about the project before we flew to National Electric to discuss the final parts in our bid. It was a stressful situation. “

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It soon became obvious that an unusual amount of effort had to be put into answering questions from the customer’s representatives. As expressed by one of the members in the project management team:

“It is rare that the customer drives the negotiations like this. They wanted to know and cover everything. They got into the details and covered them thoroughly. They were so detail-oriented that it looked like they were trying to avoid all the risks in the project, no matter how minor. They wanted to make sure that nothing went unnoticed.”

“Theyir technical director had a lot of questions during the final negotiations. It seemed like we were writing formal letters to deal with each question before the contract even was signed. We had expected to answer most of these issues after the contract was signed.” (Project Manager)

ABB took, however, at this point in time National Electric’s involvement as a positive sign. Although it generated a lot of extra work in the early phases, it might avoid some problems later on, the ABB people reasoned.

Prior to the final bid, representatives from ABB flew out to meet the National Electric people to discuss and clarify different aspects of the project. After a week with intensive work together with the people back home in Sweden, ABB handed over the final bid to the customer. The day after the representatives from ABB got back to Sweden, the sales department got the word – the customer wanted to enter into final negotiations with ABB. The sales manager and the project manager were back on a plane to the customer. The final discussions on price and details took only one day, and the contract could be signed. At that occasion, the ABB project manager was also interviewed by people from National Electric who accepted him as their counter-part.

Project start-up

ABB started to establish their project organization. The contract stipulated, among other things, that there should be a resident manager locally, whose task it was to, so to speak, smooth operations and handle day-to-day communication. The ABB project organization slowly began to take form. One of the project manager’s concerns was to get the right people:

“I was most worried about getting a technical director. My problem was that everyone I wanted was working on another project. But when ABB management told me that I could recommend anyone, I did. I had worked with a very professional engineer in the past and knew he understood the project and its issues. He was ready for a new challenge. He particularly appreciated the fact that he would be responsible for commissioning the new plant.” (Project Manager)

National Electric had decided to employ some of the consultants that had been working in the preparation of the project. Most importantly, their project manager was a consultant. ABB experienced early the effects of the high involvement of consultants in National Electric:
"We were worried from the first day. They came in with a lot of questions about details that clients normally don't get involved with. They were asking detailed questions about implementation while we were still trying to put together an organization here at home. We didn't even know what team we would have on site, and we were already trying to handle detailed client questions. The questions went much further into ABB's organization than what normally was the case. We were busy trying to understand all of the aspects of the business we had agreed to perform. It takes a while to get ready for implementation in a project like this. We had to read and re-read the contract and the specifications to truly understand the scope of the technical solution and some of the technical problems."

(Technical Director)

The high involvement of consultants also had other consequences:

"They wanted both braces and belts. A consultant can not give, he can only take, and he has to have documents to be able to show what he has done and why he has done it. It creates a whole lot of bureaucracy."

(Technical Director)

The concerns worked their way up in the ABB organization. The division manager was informed of the problems being encountered in the project. There was a real fear that the questions and demands for further tests and studies, would create delays in the project schedule.

During the build-up phase of the ABB project organization, there was no real time for handling the client's questions and proposals. ABB was therefore forced to react to the client's proposals rather than being able to themselves formulating the rules of the game:

"We built our project organization far too late and far too slow. I was alone but they had their organization going at full speed."

(Technical Director)

"I think that we failed in controlling the project. Everything was already decided when we entered the project. We have to be in early to affect the rules of the game."

(Sales Manager)

Ten months after the project had started, the project manager and the technical director from ABB met with the technical director from National Electric. The project manager of ABB knew he had problems when he learned that the client did not want to approve the "equipment specifications," something which ABB needed in order to purchase equipment. The client also demanded more extensive tests than ABB's schedule and budget permitted. The project manager thought that they were losing control over the situation and that the relation with the client was deteriorating. He realized the project could not be managed properly if he constantly had to follow all of the client's directives.

The project manager decided then to call in his division manager in order to explain these concerns to the client.

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"Our division manager had been around for a long time and knew how to handle these kinds of issues. I called him in because of that experience. Our division manager explained to their technical director exactly what would happen. If the client kept pushing us with detailed questions, the project would be delayed. Our division manager raised his voice a few times in the discussion. They finally agreed to ABB's approach, but made a note that the sound levels might not meet the requirements of the specifications."

The project manager felt it was a drastic measure to call in the division manager.

"I would normally never escalate a project to that level of the organization. I would much rather take care of the problems myself, but I saw the project deteriorating and his intervention as the only way out. I think it was the only move to make at the time."

The project manager was not the only one who was frustrated with the client. The technical director had his share of concerns as well. The arguments with the client were significant enough for ABB project staff to begin to notice the contentious atmosphere at the client meetings.

"They flooded us with letters. Each person involved in a minor facet of the project would have to answer, and each person would answer from his/her perspective. The client felt like they were getting conflicting information. Minor questions were driving an enormous amount of work. Whole studies were developed to deal with nonsense." (Technical Director)

Even as ABB tried to tolerate the additional burden, the requests for communication from the client escalated and it remained a source of irritation. ABB was forced to take drastic action. The local office was overloaded with questions and correspondence while trying to deal with concerns associated with the development and design work. The evidence of the problems was extensive, with over 10,000 formal letters from the client during a period of eleven months, compared to an average of 75 in Nordic projects.

Discussions began on how to solve the problem. Within ABB, everyone involved had a feeling that little was getting accomplished. The client’s consultants had become an ongoing source of irritation, and ABB’s operational analyses showed that the situation was becoming critical. It was then decided that ABB’s top management, including the division manager, would visit the National Electric head quarter and discuss the situation with the client.

After the meeting, the division manager realized that he had to be more pro-active. ABB had no qualified engineering competence on site, forcing extensive work on the part of the technicians located in Sweden.

"The situation became untenable. Division management and the CEO were spending a lot of time on this. If we’re being called in to resolve issues, the system isn’t working. It’s at the wrong level. There was a risk that the project was going to be delayed and more costs would occur if it continued like this. We had to come up with something." (Division in McLoughlin, Damien. and C. Horan (eds.), Proceedings of The 15th Annual IMP Conference, University College, Dublin 1999
After discussions within the top management of ABB subsidiary, a new project manager was appointed. Management wanted to back up the project and therefore moved the initial project manager to the client’s country in order to handle questions and relations locally.

"After about one year after the project start we decided to move the present project manager down to them, and I became the main project leader. We wanted to have more competence concerning the technology on site to handle all the questions from the customer and the consultants."

(Project Manager II)

ABB’s strategy was to increase their competence locally and try to organize in a way that mirrored the client’s organization. The new project manager therefore asked for a copy of the client’s organizational chart. It took a long time before it arrived, something ABB interpreted as being a result of unclear organization on the part of the client. The new project manager also demanded that any communication from the project manager of National Electric should be channeled through him.

Problems continue

The new organization did not, however, produce any noticeable difference in Sweden. Questions still continued to pour in. ABB still wanted to keep cost and time limits. The world market is small and any information of a failure spreads easily, affecting the reputation of the company.

In 1990, the management of ABB met members of the top management of National Electric in Sweden. The purpose of the meeting was to discuss and agree upon responsibility for corrosion effects that had been discovered in other projects. A top management agreement was reached as to how responsibility should be divided. The meeting ended, however, abruptly.

"We met in Sweden to reach an agreement. We discussed and made minor changes. Their project manager rose suddenly and declared that the National Electric representatives were leaving. They went to Arlanda Airport. We sat down very confused. We managed to reach them and they then said that they wanted to discuss with our CEO. This was arranged and they met at Arlanda Airport. At a later occasion their project manager said that if he had been sitting closer to the National Electric board member when shared responsibility was agreed on, he would have kicked her leg."

(Project Manager II)

Despite the efforts of ABB, the problems continued for the project management. The engineers thought National Electric was asking the wrong questions—questions they believed were to be sorted out in later stages. Moreover, the different milestones were not fully compatible. National Electric had their priorities, while ABB thought other priorities would be better for the sake of system. The project was finalized but caused ABB several problems and a lot of extra work. The plant was successfully installed, somewhat delayed, which was caused by other parts of the project than the one ABB
was in charge of. National Electric considered the project to be successful in both technical and economic terms.

A theoretical interpretation

Projects have for long been an empirical phenomenon. In recent years an increased amount of research has started to focus on the theoretical characteristics of projects or temporary systems. Here a major question has been how temporary organizational (interaction) settings differ from permanent ones. Traditional practice-oriented project management theory, as reported by inter alia Engwall (1995) and Packendorff (1995), has, however, applied a rather rationalistic view of organization processes, focusing on planning techniques, such as CPM (Critical Path Method), WBS (Work Breakdown Structures), Gantt-schedules, etc. Such techniques, however, frequently fall short due to complexity, change, and turbulence, which make it difficult to have planning as the main mechanism for coordination. Other approaches seem to be required that do not treat projects as a number of activities in a work breakdown structure, but instead as aggregates of individuals (or organizations) (Packendorff, 1995). A recent stream of research in the area of project management strongly emphasizes organizational aspects, and tries to formulate a theory of temporary organizations (Lundin and Söderholm, 1995). The uniqueness of temporary systems (such as projects) is pointed out by Meyerson, Weick and Kramer (1996) who maintain that “temporary groups turn upside down traditional organizing.” A project as a kind of temporary group, “exhibits behavior that presupposes trust, yet traditional sources of trust /.../ are not obvious in such systems.” Furthermore, several other aspects of projects in an interfirm setting lead us to further investigate its specific managerial issues. The most intriguing ones are the lack of complex synchrony of organizational rhythms due to lack of routines of coordination. Hence, we have on a general level both a cooperation problem, that is the lack of trust, and a coordination problem in the lack of routinized behavior and coordination routines.

Generally speaking, we would normally regard individual behavior as influenced both by personal traits and environmental factors. The individual’s values and predisposition is of course of great importance for the study of any social relation, but, given our ambition to understand our case, we will here instead focus on the external influence on the outcome of behavior in a social context.

Already in 1967, Lawrence and Lorsch recognized that different time perspectives had implications for organizational structure and organizational processes. This has however, according to Bresnen (1990), not led researchers to examine the implications of such considerations for the distinction between permanent and temporary settings. In the words of Bryman et al (1987:256; emphasis in original):

"The important point is that the most significant feature of the temporary system is that it imposes a clear time horizon on a project. People know that their participation is almost certainly going to be limited. This recognition is likely to affect the way in which their participation is perceived and the appropriate management and organizational apparatus relative to permanent systems. In other words, it is the recognition and anticipation of transience that constitute the vital facet of a temporary system."

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We will in the following analysis first discuss and give a theoretical overview of the concept of pacing, after that follows a similar presentation of the concept of matching hierarchies. Finally, we return to the case in order to apply the concepts in the empirical setting.

The concept of Pacing

Adaptation processes can on a general level, using a term borrowed from biology, be labeled 'entrainment'. Entrainment is generally defined as "the adjustment of the pace or cycle of an activity to match or synchronize with that of another activity" (Ancona & Chong, 1996). In a biological setting the process is inward directed as a modification of an endogenous cycle by an external pacer (McGrath, 1988). Entrainment involves the adjustment of an activity's phase, periodicity or magnitude. Entrainment alerts scholars, according to Gersick (1994), to look for rhythmic patterns in organizations. Furthermore, the concept also directs researchers to analyze how well an organization's overall pace matches the rate of change in its particular environment (ibid). The idea is sometimes illustrated by the analogy of a tuning fork. If one tuning fork is set in motion by an external force, it also sets another close-by tuning fork with the same frequency in motion. A situation where two activities are not synchronized is described in the Figure 1.

As a theoretical concept, rhythm is defined as "recurrent cycles of behavior" (Warner, 1988). Our interest in processes of entrainment is sparked by the fact that this type of adaptation goes on not only between the individual (or organization) and his/its physical environment, but more importantly, also in social contexts. When a company, for instance, finds that a competitor has managed to get a lead in product development, it needs to speed up its own process, in order to keep pace (see e.g. Brown & Eisenhardt, 1998). Further examples can be found in contexts where individuals from different cultures need to cooperate, but do not share the same perception of time (Levine 1988). Additional examples of joint action can for instance be observed in counseling, where...
the counselor and the client need to maintain a balanced relation of activity (Maple, 1985).

A typical approach in this line of research would be Chappie (1978). One idea that emerges from this research is that for any well-functioning social relation, there is a need for the establishment of a shared view of actions and time between the parties of the relation. Strauss (1978) has labeled the necessary “bi-partisan common understanding” as a “negotiated temporal order.” As presented above, the entrainment concept applies to individual and group levels. We are, however, proposing that the concept is equally applicable to the organizational level and for the analysis of two interacting organizations (McGrath, 1988). Organizations have (idiosyncratic) rhythms in the form of time-schedules, cultures and similar “rhythms,” which in an inter-organizational context need to be attuned to each other for any cooperation to function properly. In a biological context, entrainment processes are characterized by the adaptation to non-human rhythms, which are external to the individual. In our social context we, however, prefer the term of pacing. There are several reasons for this: (i) pacing refers to a context with interacting human beings and not to individuals interacting with the physical environment, (ii) pacing gives a connotation of a process with mutual adjustments and not a one-sided adaptation, (iii) pacing does not assume any special rhythmic process for either party in the interaction although such processes might exist (e.g. the budget period). As put by Gersick (1994:13) “Not only does pacing regulate the speed and intensity of work efforts; members’ choice of temporal milestones determines the duration of momentum periods and the timing of opportunities for transitional change.” According to Gersick (1994), temporal pacing may be most likely to occur for three main reasons. First, when the system members have a deadline, which they perceive as important, for creating a novel outcome. Second, when the system members have significant control over their own actions. Third, when the path to and specification of the final outcome are at least partly indeterminate. These conditions, according to Gersick, imply that system members are willing and able to alter their course at interim points, in the interest of meeting the deadline. The uncertainty of this situation imposes strains but also permits and requires the use of initiative and inventiveness to solve emergent problems.

Our main purpose with using the concept of pacing is to understand how behaviors of members in a social interaction, whether they be individual, groups or organizations, become coordinated and why coordination sometimes fails. Our idea is that each member brings his or her preferences about type of activity, timing, operation, etc. to any organizational setting and that these preferences need to be synchronized for the organization to function smoothly. The pacing concept and the conditions listed above leads us to investigate the cooperation problem in more detail. To explain the failure of pacing, as was observed in our case study, we need to further elaborate on the system members’ control of their own action. We believe that the concept of matching hierarchies offers a complement to understand pacing and its problems in an inter-organizational setting.

The concept of matching hierarchies

One of the fundamental principles of systems theory is that open systems for their survival are dependent upon the environment of the system to the extent that the internal structure of the system is governed by the structure of the environment. In terms of Ashby’s (1956) well-known law: only variety in R can force down the variety due to D.
only variety can destroy variety. In dyadic project relations between organizations, the principle leads to a mapping of organizational structures. Project-based companies have their organization mirrored by a project organization of the client. This process results in a configuration with matching hierarchies. This is shown in Figure 2.

The figure shows that apart from the vertical relations within each organization, the interaction process results in a structure where lateral relations are established. At the bottom of the hierarchy, the relations involve lateral contacts between the organizations at site level. For the middle part the structure is made up of the project management while the top part consists of the management of each organization respectively. This type of configuration also represents a lateral approach to the fundamental organizational principle of division of labor. By opening up the lateral relations between the organizations, each such relation economizes on management capacity, allowing top management to get involved only in the rarest of cases, and only as a last resort to solve disputes on a more personal ordering basis.

![Figure 2: Matching Hierarchies](image_url)

The matching of hierarchies can be seen as a way of coupling two otherwise separate systems. One traditional way of solving this problem of coupling is through the use of contracts. According to Stinchcombe (1985), the elements of a contract are (a) command structures and authority systems, (b) incentive systems, supporting authority systems and also guiding the use of a contractor’s discretion by a structure of differential rewards partially isolated from the market, (c) standard operating procedures, which describe routines that involve actions by both contractors and clients, (d) dispute resolution procedures, partially isolated from the court system and from the market, and (e) pricing of variations in performances partially isolated from the market, including especially pricing based on contractor costs. The matching hierarchies is one way the standard operating procedures are structured. The matching hierarchies has, however, yet another further function. As mentioned by Stinchcombe, contracts normally contain clauses that specify the appropriate method of settling conflicts and disputes out of court. By not letting top management become involved in the operative decision-making and conflict resolution processes, the contracting parties are provided with an arena to solve problems out of court. Top management in each organization represents so to speak, a last resort, when communication and cooperation on the lower levels, has for some reason failed. It also seems that these out-of-court conflict solution processes are preferred by businessmen even in situations where a contract between the parties clearly specifies otherwise. Matching hierarchies is thus a way to economize on personal ordering, instead of entering into legal ordering processes in which focus is on
dividing the responsibilities between the interdependent organizations. Upper management levels probably also have, compared to lower ones, more cases of experience to draw from when settling conflicts and are thus in a position to regulate overall project issues.

The relation between pacing and matching hierarchies is that of process and structure. Different companies have different time frames, which govern their actions, both internally and externally when cooperating with other companies. Pacing represents the on-going interaction between the parties, whereas matching hierarchies gives the structural background in which the pacing problems resulting from different time frames can be handled.

The case revisited

Problems of pacing

When the management of ABB realized that their old client was contemplating an upgrade of its plant, they contacted the client and held a seminar to inform National Electric of the technical developments that had occurred since the previous installation. The client, however, did not seem to act as quickly as might have been expected and it wasn’t until ABB learnt National Electric was carrying out tests in plants owned by a competitor that it was clear that the client was actively working on the project. ABB, together with two competitors, were invited to tender and a normal amount of work was devoted to making calculations, designs, etc. in preparing the bid. At this stage, ABB personnel was tied up in finalizing projects both in USA and Finland and consequently there was no project organization in ABB. The entire work with the bid was instead managed by the sales manager. It was, however, clear, that in the event that ABB got the project, a new project manager would be appointed.

At the end of the bidding phase ABB brought in additional personnel, including a would-be project manager. After it was decided that ABB got the project, additional personnel was recruited, among others the technical director. Given this sequence of events, the ABB project team was forced to start its work by studying all the documents that formed part of the basis for the contract with National Electric.

ABB’s relatively slow start was not at all compatible with the pace of the client. National Electric’s consultant had been preparing the project over a long time and had worked intensely with the details during the bidding phase. They were clearly prepared to start with the project right away and began asking for details and tests as part of the implementation of the contract. The number of questions increased like an avalanche and ABB received 10,000 registered letters during a period of 11 months, which amounts to an average of 50 per day! The solution for ABB was to increase their effort in the project, most importantly by placing the project manager close to the client as a deputy project manager and appointing a new project manager at home. They never, however, succeeded in catching up and never made up for the slow start.

In the present case, this structural logic was violated, something which accounted for much of the subsequent difficulties to resolve the pacing problems between ABB and National Electric. The top-management level of ABB got in several occasions involved in conflict resolution together with people at the project management level of National Electric. This happened for instance at the meeting in Sweden in which the project...
manager of ABB met with the technical director of National Electric. The project manager of ABB then decided to call in his division manager to help resolving a conflict over how much testing was to be done before the equipment specifications could be accepted. It further occurred in a meeting in Sweden where the CEO of ABB met members of the board of National Electric, but where also the project manager of National Electric took part (see Figure 4).

**Violating the principle of matching hierarchies**

The project management level at National Electric was therefore on several occasions given access to the top management level of ABB. Although this might be regarded as a way of bringing in necessary expertise or increasing the hierarchical push in the discussion, it had one very dysfunctional effect: it destroyed the conflict resolution mechanism where the management of each organization could meet without any previous involvement and commitment in the operative process of the project. In the previous project in USA mentioned earlier, such a contact between the management level of each organization had succeeded in keeping both ABB and its American client out of the courtroom and avoiding a costly legal process.

![Figure 3: Pacing problems between National Electric and ABB](image)
One possible explanation to why the principle of matching hierarchies was not honored in this case, is that no truly dyadic relation existed between ABB and National Electric. The consultants, the project manager and the technical director that National Electric hired early in the process, played a far too important role. To a certain extent one can assume that they dominated National Electric, although without totally replacing the decision capacity of National Electric. Originally ABB intended to let their resident project manager function as a contact with National Electric in order to smooth the relations between the organizations. Since it turned out that National Electric did not come to play any dominating role in the relation and that most of the issues and sources of conflict dealt with technical matters, this idea did not prove workable.

We believe that organizing using matching hierarchies gives the necessary coupling on operative as well as on the management level. It does seem, however, that there is a great risk that this principle will be violated, creating a triadic relation, when the client employs consultants and the power to represent the client is transferred to the consultants. This is of course particularly the case in technical dominated construction or development projects where the client is likely to lack a competence necessary for matching the contractor. The result is, however, increased fragmentation in interfirm projects and, if we believe the findings of Stinchcombe (1985), a situation of excessive bureaucracy.

Concluding Comments

The concepts presented in this paper were generated in order to understand and explain the problems that arose in the interfirm relationship between ABB and National Electric. From ABB’s point of view, although including some difficult technical problems, the type of project was not unique, representing more or less “normal business” For the client, however, the project had long-term effects, which made it necessary for him to acquire knowledge that could be used for managing the project after it was completed by the contractor. In a short-term relation, the client needed to apply a long-term perspective, while, on the other hand, the contractor’s involvement was focused on the completion phase. We maintain that this situation is not uncommon. We further argue that these characteristics are major sources for the problems of pacing observed in our case study.

Understanding project contexts, such as the one described in our case, requires consideration of both structure and process dimensions. When analyzing the structure dimension, the problem is to find a configuration that allows for a certain degree of coupling and joint decision making in an otherwise decoupled organizational context. An additional requirement is that the configuration should include mechanisms for conflict resolution. The concept of matching hierarchies provides such a model.

In the process dimension, the problem is to find a well-functioning interplay between the parties, i.e. a way to solve the coordination between client and contractor. Since the supplier (contractor) and buyer (client) have different time frames, the solution lies in designing a process built on this insight, trying to find compatibility between the speed and intensity of work efforts in each organization. The concept we use for this is pacing. The connotation is that in a well-functioning relationship between firms, the pace of
each organization is synchronized, signifying a continuous and mutual adaptation process.

Finally, as with process and structure, pacing and matching hierarchies are two sides of the same coin. In order to solve the pacing problems where interdependent actors are located in different time and intensity frames, you need a structural configuration to provide the arenas necessary for mutual adjustment. The matching hierarchies, with its lateral cooperation, provides such arenas, including arenas for conflict resolution. On the other hand the structural arrangement in matching hierarchies presupposes a driving mechanism whereby the different organizational levels are connected. The need for pacing of interdependent activities provides such a mechanism.

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