Clients, Contractors, and Consultants: The Consequences of Organizational Fragmentation in Contemporary Project Environments

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In most technology-based firms, key activities are performed in two very different organizational structures. First, there is the permanent organization, which is the structure represented on the organizational chart, the structure for ongoing operations, and the structure for official financial reporting and legal purposes. Second, there are all the temporary organizations: the various projects with their focus on one specific goal, strict time-limits, and unique assignments put together for developing new products, as well as, for organizing important events, or for designing, configuring, and commissioning systems and equipment to specific customers. These temporary structures may include only a minority of the company’s personnel but often determine a majority of its business deals and, certainly, a majority of its renewal efforts.

According to Slevin and Pinto (1987), project-based work tends to be very different from other organizational activities. However, this insight has not led researchers to further discuss what characterizes project-based industries and what effects different organization changes have on the management of projects. Many senior managers and management consultants seem to be unaware of the relations between the permanent and the temporary structures within the company. Changes to improve the accountability and performance of the permanent organization, restructuring, downsizing, divisionalization, and so forth are implemented often without considering the consequences for the environment and execution of projects. Conversely, project management handbooks pick up themes from mainstream management, such as the topical interest of decentralization and empowerment, without thoroughly analyzing their feasibility in project environments (Williams, 1997). Moreover, project management handbooks and articles seldom discuss the increasing organizational complexity and the role of third parties in large-scale engineering projects.

In a simple setting, an interfirm engineering project is a process involving two actors—the client and the contractor, or prime supplier. For a long time, this was the common way of carrying out large-scale engineering projects. Nowadays, the situation has become much more complicated for several reasons. Contractors outsource activities at the same time as clients trim their own organizations and reduce engineering staffs. This has led to an increasing role for third parties, such as management and technical consultants. Concurrently, new actors, operators, or both are being established in several industries. In the power industry, independent
power producers (IPPs) have emerged outside of the traditional utilities. Lacking engineering and project management skills, IPP projects typically are managed by consultants who are hired to prepare the bidding process, to choose contractors, and to manage the project during the execution phase. All these changes have resulted in a fragmentation of the project environment in several respects.

The overall aim of this paper is to understand the consequences of this fragmentation for project execution. The focus is on capital projects (Winch, 2000) in industries where no long-term or repetitive contracts exist between clients and contractors. In industries with repetitive business relations, clients and contractors tend to establish various forms of cooperative patterns, where project performance could be balanced against future transactions and opportunistic behavior is curbed by prospects of these future benefits (Eccles, 1981). Research has shown that the unique characteristics of nonrecurring project-based industries generate important management problems that require investigation (Lundin & Midler, 1998). Our intention is to contribute to this particular field of inquiry by discussing three major problem areas observed in our field studies. The perspective taken in our research is the one of the contractor, which makes it possible to balance the “client bias” in transaction cost and agency theories. We believe that the issues discussed are relevant to many industries organized around complex engineering and construction projects.

Linking Projects to Theory

Project management traditionally has been associated with down-to-earth handbooks that tell managers what to do, when to do it, and how to do it. Recently, a new stream of research has emerged, which takes a closer look at projects from a theoretical perspective (e.g., Lundin & Söderholm, 1995). This particular strand of research is more interested in posing how and why questions about project management and temporary organizations.

There also are general theories, which contribute to understanding the intricacies of project business and, at the same time, may be enriched by integrating research findings from project studies. Two important cases are the transaction cost economics (Williamson, 1975) and the agency theory (e.g., Eisenhardt, 1989). Transaction-cost economics investigates the boundaries of a firm, for instance, when an activity should be performed in-house or contracted out. The unit of analysis is the transaction, or in our case the focal project. If a project is associated with a low frequency of purchase, the preferred way is to use the market. Uncertainty and degree of uniqueness are other important facets that should be taken into account. When uncertainty and degree of uniqueness are high, the theory predicts that projects are better performed inside the firm, to avoid opportunistic behavior by an outside firm. However, transaction cost economics tends to consider only opportunistic behavior on the supplier/seller end. There is much less interest in studying opportunistic behavior on the customer side. This also is true for the agency theory. Agency theory discusses the problem when a principal hires an agent to perform certain activities affecting the principal. It could be an owner hiring a manager to act in the name of the principal or a lawyer acting on behalf of a client (principal). This theory centers on the problem of handling the risk of opportunistic behavior by the agent that is the one supposed to act.

Interestingly, in projects such as the ones to be discussed, the principal also is a key actor in the project. The client performs certain tasks, supplies key information, makes decisions about interfaces between contractors during the execution phase, and so forth. Since there is no real interest or possibility for the client to develop a long-term relationship with the contractor, a risk of opportunistic behavior on both sides opens up. In many respects, as put by Meyerson, Weick, and Kramer (1996), a project is like a “one-night stand.” Put simply, one might say that projects have no history or future. Meyerson et al., continues by arguing that projects “turn upside down traditional notions of organizing” (p. 167). Furthermore, related to the agency and transaction cost theories, the theories normally focus on dyads (that is relations between two parties), whereas the project situations to be discussed are of a triad type, making problems of control, cooperation, and opportunism substantially more difficult.

The Three Problems of Organizational Fragmentation

On the basis of three studies of large-scale engineering projects, we will focus particularly on the effects of the increasing use of engineering and management consultants at both customer and supplier ends. Three specific problems have been identified.

The Problem of Coordination. Comprehensive contracts and plans are not enough to navigate and coordinate large projects in today’s turbulent and changing environment. Market-based approaches to coordinating independent and complex engineering activities lead to a bureaucratization of communication and increased control costs. Even though contractual innovations have been brought forward in recent years, there are a number of interdependencies and a high degree of uncertainty that cannot be resolved by sophisticated contract language and call for other forms of coordination. In this business, turnkey contracts, for instance, are not executed in isolation. There always are interdependencies between the prime supplier, other contractors and subcontractors, and the activities of the client.

The Problem of the Absent Customer. When end customers, operators, or both delegate all responsibilities to engineering and management consultants, suppliers lose opportunities to reach tradeoffs between project cost and
operation benefits. Adapting solutions to unforeseen technical problems to real customer needs becomes difficult. The incentive chain often is deformed and the doctrines of the quality movement do not give any advice on this matter.

The Problem of Learning. Learning between projects always is difficult in project environments. However, it is key for project-based companies in order to develop and maintain competitive advantage. When suppliers outsource on-site project management to external consultants, it becomes even more complicated, due to the fragmentation of the learning cycle and the weakening or breakdown of crucial feedback loops.

Exploring the Consequences of Organizational Fragmentation

More than 10 years ago, Randolph and Posner (1988) wrote an article in Sloan Management Review titled, "What every manager needs to know about project management." Their message was focused mainly on how to successfully carry out projects, and how to plan and implement project management principles in the firm. This focus also has dominated several other writings on management and project management. We argue that it is about time to take a more comprehensive look at the relationship between the permanent and the temporary organization. The lack of awareness on the part of many managers of the role of projects within the organization might be a threat to the whole organization. Our argument could be summarized in the following way: What every manager today needs to know about projects is the relationship between the permanent and the temporary organization and what consequence changes in the permanent organization have on successful project execution.

The aim of the present paper is to discuss the different ways of controlling projects and to analyze the identified problems of fragmentation in contemporary project environments. We also want to shed some light on the seemingly paradoxical situation of excessive bureaucracy when relying on market-based control mechanisms in project settings. Thus, the paper contributes to the theory of management of projects in multiorganizational settings.

The Increasing Role of Project Management Consultants

In developing countries, consultants always have played an important role in infrastructure projects, for example power generation and transmission projects. In these cases, the customer/operator often lacks both managerial and technical capabilities and, therefore, hires an international consultant to act as project manager and technical adviser. The same applies to the start-up of large-scale exploitation of newly discovered resources. A case in point is the offshore oil production in Norway in the 1970s and early 1980s where international engineering consultants initially played a prominent role.

Recently, the trend toward increasing organizational complexity also has become much more widespread in the industrialized world. This is evident in the power generation markets in Western countries. Previously, engineers at the equipment suppliers, be it Siemens, ABB or General Electric, teamed up with their colleagues at the utility organization, both driven by a similar engineering ethos: to build facilities with the highest possible technical standards and functionality. In this often very close teamwork, contract stipulations were not the law. If better technical solutions, generated during contract negotiations, were found in the execution phase, it was not difficult to implement them. Now, deregulation of electricity markets, privatization of public utilities, and the concomitant downsizing of their engineering staffs have resulted in more competitive, more commercial, but also more complex relationships, in which clients resort to outside consultants to complement their own trimmed-down staff. At the same time, equipment providers do their best to downsize their own permanent organizations, and outsource fabrication, as well as staff resources, which tend to make them dependent on outside consultants as well.

Quite apart from these economic and management trends, projects by themselves tend to be increasingly complex in terms of scope, technologies, and regulatory requirements, which call for a prominent role for international engineering firms as providers of critical competencies. So, to a large extent, the organizational complexity of modern project execution is inevitable. However, for suppliers, as well as clients, it is important to understand the consequences of this development, to be aware of trade-offs and complications, and to evaluate consultants from a comprehensive view, including their ability to orchestrate efficient and smooth cooperation in the project. There are consultants with excellent reputations in this respect (e.g., the Finnish Jaakko Pöyry); not all are of the same caliber, however.

The three cases to be discussed give evidence of a number of difficulties arising in fragmented project environments, such as complex and costly communications, excessive bureaucracy, and reduced opportunities of "system learning" and transfer of experience. All three cases are about major investments in physical infrastructure. The first two cases (case A and case B) discuss projects in which consultants represent the customer, not only in the tendering process, but also in the role as project manager in the execution phase. In both cases, "constant contract control" was the dominant approach and we will present some findings pointing to the difficulties of applying the wisdom of the quality movement regarding cooperation and customer interaction in this situation. Then, we will change perspective and consider the opposite situation: when the equipment supplier outsources overall project management to
consultants (case C). Here, the focus is on the overlooked consequences for organizational learning. The different actors and structural relationship in each of the projects is presented in Figure 1.

**Methodology and Sources**

The case studies were conducted separately, each of them guided by an ambition to explore the execution phase in-depth from the perspective of a major equipment supplier. The first study was initiated when the project had just been terminated. The authors interviewed executives, project managers, and technical specialists within ABB, most of them several times. In sum, 25 interviews were conducted, lasting between 1.5 and 4 hours. In the two other case studies, we used a participation approach. One of the researchers spent several weeks on-site as a participant observer, supplementing his field observations with interviews at headquarters. In total, eight weeks were spent at the company. For each of these two studies, around 20 interviews were conducted. In all cases, we distributed the full case stories to relevant managers and discussed the final version with them to correct any misunderstandings. Two of the projects were carried out in Europe and one in the Pacific region. The consultants involved originated from several different countries.

**Fragmented Customer Number 1: Flooded by Faxes**

The first case study concerns a major upgrade of a power transmission link in a geologically complex area, in the Pacific region. ABB, a world-leader in this specific transmission technology, had built the previous installation in the area. After a competitive bidding process, ABB was awarded the new contract. The overall project was divided into six different subprojects; ABB was awarded one of these contracts, which also was the most significant subproject. The contract was a turnkey-type, to a fixed and firm price. However, the interdependencies between the client’s activities and the activities of the other contractors were relatively high, as is usual in this type of project.

A project manager was appointed at the relevant ABB company’s headquarters and set out to assemble a project organization drawing on various technical specialties. The focus was how to solve the technical problems involved, such as the risk of earthquakes, or how to design the new control and supervision system. Very soon, however, it turned out that there also was an important relational aspect to be considered: how to deal with the fragmented customer. The commercial environment was very different compared to the time when ABB delivered the previous installation. The customer, formerly a public utility, had been privatized and its engineering staff significantly...
reduced. To act as the customer's project manager, an international consultant had been hired, supported by several other consultants. ABB was engaged on the basis of a so-called FIDIC contract, which provides for a special "technical referee" position, called the engineer. When there are unforeseen difficulties in project execution, his role is to decide if there is any need for cost or time adjustments. Ideally, this is a referee not involved in the actual execution, but, in this case, the consultant/project manager also was appointed the engineer, which gave him a very powerful position.

The consultant set out to use this position to exercise a very close and detailed supervision and surveillance of the ABB company involved. Before its project team had mobilized properly, it was flooded by questions concerning various technical details. Since ABB organized the project in a decentralized way with a broad customer interface, the barrage of questions requiring new investigations and reports threatened to choke the entire project. At one stage in the execution phase, the project file contained 10,000 faxes and letters from the customer/consultant, compared to 75 letters in toto at the completion phase in a comparable project in Northern Europe! Much energy also was spent in checking, interpreting, and arguing about minutes from official project review meetings. These minutes were written by the consultant and could extend to 55 pages after one meeting, compared to five pages in other similar projects. The minutes were used to reinforce the position of the consultant concerning technical as well as administrative issues. According to ABB's personnel, many of the detailed technical inquiries also served another purpose: to increase the consultant's knowledge of the technology way beyond what was stipulated in the contract. The technical director at the supplying company expressed his frustration in the following way:

"They ripped us off. They don't want to pay for things that other clients pay huge amounts for, and it's very hard for us to do anything about it. We want customers that are satisfied, but we also need to make good money. We also want customers who know about the things we sell, so that they can run the plant without difficulties. This is definitely a major problem for us."

The difficult relationship affected project execution, causing delays, demotivation, and exhaustion among the supplier's project personnel. After a period of accelerating difficulties, ABB appointed a new project manager. He decided to institute a number of policies to protect the project from exaggerated consultant/customer interference. All correspondence with the consultant was centralized to him personally. ABB's representatives on-site were reinforced and organized to act as a filter in relation to the customer organization. In spite of the difficulties, ABB's project personnel had a strong commitment to deliver and commission a high-class transmission system. In this global industry, a strong reputation is a key supplier asset, and to stay in business, basically every delivery has to be a success. In the end, that also was the result, in terms of the new facility's operating performance, reliability, up-time, and maintenance costs.

This did not happen, however, because ABB adhered to conventional maxims of "customer satisfaction." An axiom of the quality movement is that a supplier of goods or services should strive to maximize and possibly exceed customer expectations. This gospel also has penetrated into the project management literature, where project managers are advised to involve the customer as much as possible in all relevant activities. One representative example is The New Project Management by J.D. Frame, former Director of Certification at the Project Management Institute (PMI). According to Frame (1994):

"Obsession with customer satisfaction is part of the new project management. ... For example, a customer-support environment must be created, enabling project staff to respond quickly and incisively to customer concern. ... Customers must be seen as kings and queens. Customer satisfaction must be touted as the highest goal." (pp. 95, 107, 113)

Being an expert in the field, Frame also includes a section on what to do when customers do not cooperate. However, there is no mention of the situation when consultants assume managerial and technical responsibilities on behalf of the customer and how this may affect the ideals extolled above. When consultants are discussed, it is only in the traditional project context: the contractor's use of consultants to do part of his project assignments (pp. 222–223).

In What Every Engineer Should Know About Project Management, Ruskin and Estes (1995) convey the same message, without any qualifications:

"The single most important responsibility of the project manager is to ensure customer satisfaction. If the project is successful in every respect in terms of meeting its stated objectives, schedule, and budget but the customer is somehow not satisfied, then the job was not done well enough. ... Keep the customer informed and up-to-date so that he or she is prepared for the eventual results and has an opportunity to influence the way that they are developed and presented." (pp. 29–30)

Again, the problem with this handbook is that it does not deal with the situation when external consultants act as powerful intermediaries. The final success of ABB's transmission project was not—and could not have been—brought about by "an obsession with satisfying the customer [consultant]." Instead, the project was concluded only after a determined effort from the new project manager to protect and guard his project organization from the
consultant/customer’s obsession with control and supervision. The simple maxims about “customers as kings” assume that the customer has a long-term interest in the delivery and that this very customer is approachable and negotiable. However, in this case, the end-customer was not approachable, since effective authorities and powers had been delegated to the consultant/project manager. The consultant, too, had long-term interests, of course, to strengthen his reputation as strict enforcer of project execution according to contract and, as necessary, partner in controlling equipment suppliers. These are not necessarily the same interests as the end-customer’s. In critical aspects, the fragmentation of the customer tended to break down a previously consistent incentive chain.

Fragmented Customer Number 2: The Consultant as Contract Slave
Is the case reported above exceptional? The volume of correspondence and meeting minutes may be, but the commercial and organizational structure with its new interfaces is becoming increasingly widespread in infrastructure projects. Our second case is a very different project technically, a huge waste incineration plant in Western Europe constructed in the late 1990s. An ABB company was responsible for the delivery of the exhaust control and elimination system, a complex installation involving a number of different filters. Formally, the contract was of a turnkey, fixed-price-type, however, during execution the contract was under constant discussion between the parties. The end-customer consisted of a consortium of municipalities, which had joined forces and engaged an international engineering firm to act as their project manager. This included the overall responsibility for scheduling, coordinating and checking deliveries from the many different firms taking part in the construction. The ABB company had a long experience of technologies for air pollution control, such as wet flue gas desulfurization and electrostatic precipitators, but this project represented an order-of-magnitude increase in size and complexity. One of the most important purification steps involved technology not fully developed at the time of contract signing, which added to the difficulties and the necessity of interaction with other project participants, in spite of the formal turnkey status of the delivery.

To cope with this challenge, a strong project team was selected and dedicated to the project. Team spirits were high due to an unusual level of management attention and publicity within the firm. Many efforts at the project center were devoted to solving the technical issues involved. On site, in a different country, the main difficulties did not concern technical issues, however, but relations to external parties to secondary suppliers (a problem not dealt with here) and the customer, or rather the engineering firm representing the customer. The consultant/project manager had determined to exercise close supervision over all the project’s prime suppliers. As in the previous case, this translated into a flood of questions concerning detailed technical issues, a flood ABB’s young, ambitious engineers totally were unprepared to meet. Experienced ABB personnel viewed this process as another case of technology transfer free of charge:

"[The engineering and management consultants] poked into every detail and we went along with them. We should have put down our foot long time ago [sic]. They have asked a lot of questions which basically only serve to develop their own competence, so they will be able to master this technology in the future. We have been teaching them for free. It has been expensive and enormously time-consuming for us."

The consultant firm used the contract as a basic management and administration instrument: "[The engineering and management consultants] are contract-slaves. In virtually all of their faxes or letters they are referring to the contract ... and the language and behavior were hard-nosed."

From the consultant’s point of view, however, a regimen of arms-length control and supervision was consistent entirely with its own interests of building a reputation as a reliable enforcer of contracts and a strict controller of expectedly late suppliers. From the perspective of the equipment suppliers, the consultants represented divergent incentives. Since they were paid on a time-reimbursable basis, they had no interest in finding smooth solutions not envisaged at the time of the contract negotiations. Accordingly, they tended to be rigid and conflict-prone. As put by the project manager: "Arguing with him [the consultant] is like wrestling with a pig in mud—after a while you realize that he likes it."

According to their own opinion, the ABB engineers had to change to a much tougher attitude later in the execution phase, and also had to employ a designated contract engineer. The end-customer maintained a low profile but ultimately reacted to the hard-nosed attitude of the consultant and demanded several of its leading personnel to be taken out of the project. In the end, the project turned out to be commercially unsatisfactory but a technical success for ABB. But, this achievement had an enormous human cost in terms of hard work and project member exhaustion. The difficult relationship to the customer/consultant was only one reason for these hardships, but had the project team been prepared for the hardball being played in this project, they probably would have been much better off.

Market-Based Control as a Source of Excessive Bureaucracy
Both of these cases illustrate the problem of “the absent customer,” which leads to a deformation or partial breakdown of the incentive chain as intermediate agencies control suppliers in accordance with their own agenda. The
treatment of the contract tends to become rigid, and opportunities for shortcuts and problem solving with a view to long-term operating performance are lost. The two cases also illustrate another phenomenon, discussed by Stinchcombe (1985) in his analysis of the large capital projects in the Norwegian offshore industry in the early 1980s. In his analysis of the organization of engineering work between the various actors—owners, operators, engineering consultants, manufacturers, and building contractors—Stinchcombe noted a number of inefficiencies. Control was based on market relationships, but far from being flexible and nonbureaucratic, the overall system was burdened by a disproportionate amount of time spent on administrative supervision:

"Much of the appearance of excessive 'bureaucracy' in project organizations in the North Sea is actually a consequence of non-bureaucratic [sic] administration. Because contracts require certification before payment, extra work is created because the project organization is set up through the market rather than through an integrated bureaucracy ... before an invoice is submitted or a product delivered to another organization it has to be certified and inspected and approved in the submitting organization as ready to base a legal claim to reimbursement on, and has to be examined and certified and investigated by the client to make sure they are not paying more than they ought to." (pp. 230–231)

Duplicated layers of supervision were another reason for "excessive bureaucracy" in the fragmented North Sea project environment. In this case, clients (operators of the new oil fields) supervised their engineering consultants very closely. The client's supervisory structure did not replace, but was added to, the consultant's own supervisory system. Moreover, the extra layer of supervision, in many cases, increased the time spent on administration within the consulting firm, because, as Stinchcombe observes, "each person in the client organization is a possible inventor of organizational complexity for the consultant" (p. 251).

Stinchcombe analyzed an infant industry in which main actors were still riding the learning curve and groping for a suitable organizational set-up. Our cases report a trend toward fragmentation and market-based control in mature industries, resulting in similar types of excessive bureaucratization and costs of communication. In the offshore industry, many of these problems seem to have been overcome by a process of institutionalization, similar to the pattern in the construction industries. When in this industry the same general contractor and subcontractors interact from project to project, relationships are stabilized, and a new mode of coordination emerges that differs both from pure market transactions and formal vertical integration. Eccles (1981) introduced the concept of the "quasifirm" to describe this relational contracting. The desire for future work is an incentive, both to the subcontractor and the general contractor, to establish a good working relationship. In the North Sea oil projects, for instance, recent organization developments have launched "co-engineering" as a solution to the problems experienced in the early stages of the industry's development. Co-engineering, however, builds on repeated relationships between clients, consultants, and contractors. In an open and strictly competitive bidding system, a quasifirm structure might smack of collusion, especially for clients lacking genuine competence in the field. As a result, organizational set-ups based on arms-length relationships may be preferred.

The Fragmented Supplier: Who Learns?
So far we have discussed fragmentation on the customer side, when clients outsource project management to external consultants. In the third case, we will change focus and consider the situation in which the supplier externalizes his own project management to consultants. Here the focus is on the consequences for organizational learning.

The very strengths of the project-based structure—its focus and concentration, intensity, and results-orientation—also discourage project members to expend efforts on things not contributing immediately to project progress, such as developing and documenting standards and procedures for use in future projects (Lindkvist, Söderlund, & Tell, 1998). At project completion, the project manager or administrator sometimes is required to write a post mortem report on problems encountered and solved during various phases of the project. Such chronicles, however, seldom reach the status of bestseller of the month (Winch, 2000). Perhaps the next project manager takes a quick glance; according to experienced practitioners, the most important information is the list of names and addresses of participants. As Professor Thomas J. Allen has emphasized: "Science is universal, but technology is local." In his studies of research and development organizations (1996), he early on discovered: "Engineers and scientists do read, certainly. ... However, most such knowledge reaches practitioners through face-to-face contact with colleagues. Technical professionals keep themselves current in their specialties most effectively through colleague contact" (p. 23).

If this is true for researchers and technical specialists, it is likely to be even more relevant for project managers. In order to transfer key experiences from a complicated capital project, direct personal contacts are difficult to substitute.

Now, what happens if a key supplier in a large-scale infrastructure project not only meets a consultant acting on behalf of the customer—which makes it difficult to build on previous relations and experience with this customer—but also confers a key part of his own overall project management tasks to an outside firm? In power plant projects, a very important part of project coordination and control takes place directly on the construction site, where the timeliness, quality, and cooperation of every supplier influence
overall results. According to industry sources, the drive toward downsizing among equipment suppliers has meant an increasing tendency not only to outsource installation tasks but also to contract external firms to take care of site management. In this sector, business always is volatile; one or a few years of peak orders could be followed by a steep market decline in the following years. If all project management resources are kept in-house, there will be slack resources now and then—an anathema to the modern lean management ideal. However, it could be argued that organizational learning is very difficult to bring about without any slack. Nohria and Gulati (1996) put forward a similar argument concerning innovation. Naturally, learning will take place in projects within a fragmented management structure, but the question is: Who learns?

This question was posed quite distinctively in a power plant project in Germany featuring a combined-cycle process where gas and steam turbines are used in sequence to achieve maximal thermal efficiency. Six primary suppliers, including one Swedish and one German ABB company, were organized in a consortium, with the German ABB firm as its leader. All the primary suppliers had their own personnel on-site to direct and supervise their specific part of the process. Actual construction was carried out by various contractor firms, many of them using low-wage labor from Eastern Europe. Similar to other large projects of this type, total work was finely divided between different equipment suppliers and labor contractors. In this case, however, the consortium leader went one step further and outsourced the on-site coordination of the primary suppliers and various subcontractors to an external project management firm.

The trend toward fragmentation operated on several levels. It was obvious within the operations of the various equipment suppliers, for example, the Swedish turbine supplier. Previously, this company used to have a more or less self-sufficient site organization in-house, including technical specialists, managers, and mechanics. In this project, mechanics were supplied by outside contractors. Their wages were lower than that of ABB's own personnel, but so were their skills and experience in installing turbines. In the relationship between site managers from ABB Sweden and this local (East European) labor, language difficulties caused obvious communication problems. Less conspicuous (but perhaps even more numerous) were the incentive problems, since the temporarily hired mechanics had no big interest in sharing ideas and experiences with the ABB organization.

This incentive problem was repeated at the overall site level, as the external project manager explained frankly:

"ABB Germany cannot learn very much from me and my experience, that is right. I keep my secrets of course. Well, we write a report when the project is finished, but I want to be good at this and I want ABB to be dependent on me. So, I don't want to teach them too much. [sic]"

The suppliers of major equipment, such as turbines or boilers, could, of course, do a lot to improve their own organization in terms of communications, teamwork, and feedback from site organization to manufacturing, purchasing, and design. However, the fragmentation of the structure and incentives of overall project management means that it was much more difficult to analyze and come to grips with inefficiencies and coordination problems at the site level. If the manager of a similar future project at ABB happens to look at the report from this project consultant, he will find after looking at the address list that key participants are neither easily accessible, nor eagerly sharing their experience with him.

Authors comparing and analyzing the merits and demerits of project organization—its focus on one specific goal, strict time limit, and unique assignment—have pointed out that organizational learning in a project-oriented environment is difficult to accomplish in any case. One example is lessen, who emphasizes that "efforts on a new project seem to derive little benefit from knowledge gained in previous projects due to a lack of effective transferability of knowledge from earlier failures or successes" (Lessen, 1996, p. 16). Individuals and teams in a project certainly learn a lot. However, when the project approaches completion, the team is dissolved, and it is hard to transfer lessons learned to a new project with a new goal, different personnel, and a different customer. Organizational learning requires some form of repetition; it requires comparative analyses of different approaches and outcomes, and a perspective beyond the immediate assignment. So, if outsourcing project management is an increasing trend, how should it be explained? Is it because the advantages of staff reduction and specialization are dwarfing the problems of disintegration and divergent incentives? Or, is it because the consequences for overall project efficiency—across several projects—have not been analyzed or understood before decisions are taken? If so, the increased obstacles to organizational learning could be seen as unintended outcomes.

It seems to be a common problem that changes and policies are initiated by corporate management (often on the advice of management consultants) without considering consequences for long-term project performance. In a study by Selin (1990), it was demonstrated how decentralization in medium-sized companies made effective project management more and more difficult. For each new round of decentralization, project managers were placed further down the hierarchy. At the same time, they had to cross an increasing number of boundaries between new divisions and profit centers in order to coordinate a comprehensive customer delivery. In a similar fashion, Engwall has pointed out that the break-up of previously integrated companies into a plethora of divisions and subsidiaries each with its own balance sheet and bottom line to nurture generated an extensive internal trade within corporations.
"In the internal-trade projects, the role of the client and the contractor are unclear and complex. Consequently, there is a risk that too much time is devoted to internal company negotiations and politics and—if worst comes to the worst—destructive competition between different departments. [sic]" (Engwall, 1990, p. 101)

Concluding Discussion
In this paper, we have discussed the trend toward increasing fragmentation in large engineering projects, both on the customer and the supplier sides. Three problematic consequences of this trend have been illustrated:
- The problem of coordination;
- The problem of the absent customer;
- The problem of organizational learning.

The increasing fragmentation often is the result of efforts to streamline and cut costs in the permanent organizations of clients and suppliers, and changes at the industry level. As demonstrated by our cases, this cost reduction does not come free of charge. We argue, based on our research, that the following are the most important ones:
- Strictly market-based forms of managing complex engineering work tend to increase communication costs, introduce rigidities, and obstruct innovation in project execution;
- Client outsourcing of project management and control threatens the incentive chain between supplier and client, tends to make the commandments of the quality movement irrelevant, and complicates the relationships between principal and agent in project-based transactions;
- Contractor outsourcing of on-site management erodes informal feedback loops that increases the hurdles for overall organizational learning.

Managerial understanding of the requirements of effective project execution is vital for avoiding costly mistakes in organizational restructuring and to prepare project teams for the new complexities. In the future, we may see more acceptance of slack in critical project management areas and more comprehensive assessment of the consequences of downsizing and outsourcing. In industries where this is possible without evoking the fear of collusion, there probably will be stronger efforts to build more intimate relationships between major engineering firms and key equipment suppliers. For clients, such as privatized utilities, it is important to evaluate consultants from a broad perspective: Technical competence and track record in contract enforcement are important, but so are the abilities to build a cooperative project environment, where all key parties strive to find win-win solutions and make efforts to counteract the bureaucratic, formal and antagonistic tendencies inherent in non-recurring contracts, especially in fixed-cost sole responsibility contracts. Research seems to indicate that such improvements could be handled not only by elaborating new forms of contracting (Hartman, 1994), but also in new organization forms that proactively address the observed problems. For international consultants, it will be increasingly important to augment a reputation for technical and contractual skills, with a strong track record in building temporary problem-solving and conflict-resolution arrangements in situ.

Such efforts may include joint management committees, which meet periodically to solve problems quickly and informally, to establish rapid approval and fair compensation mechanisms for changes, as well as procedures for resolving emerging disputes and offsetting imbalances without recourse to. For contractors, it is important to complement traditional project structures with a structure for direct client interaction also in fragmented project environments by using the so-called "principle of matching hierarchies" (that is, the separation of hierarchical layers to facilitate conflict resolution) and by establishing of top management relationship between client and contractor in order to provide conflict-resolution mechanisms (Dahlgren & Söderlund, 2001). Experience seems to indicate that project management consultants are better off not involved at the top management levels because of the risk of violating the top layer as a last resort for conflict resolution. At this level, the traditional dyad probably is preferable.

This paper has focused on a fairly narrow problem in contemporary project environments. Of course, the argued changes might not be observed in every industry, however, we believe that the discussion and analysis about the relationship between top management decision and organization structure is of importance for the key business process of managing projects (Winch, 2000). Our studies indicate further that many decisions are made without considerations of the effects on the project level. Much more research is needed to clarify these issues. So far, much project management research has been based on relatively dry and mechanistic theorizing (Morris, 1994), which is based on either nonempirical research or very broad surveys. We argue that more in-depth case studies are called for, where important themes from organization theory are elaborated in extensive field research. This paper has used a multiple case study approach to analyze contextual changes from one particular perspective; the next step would be to combine a multiple-case design with a multiple-perspective analysis.

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