Inter-organisational Project Management in Context: Managing Differences

P.M. (Nel) Wognum, Edward C.C. Faber

University of Twente, Faculty of Technology and Management, P.O. Box 217, 7500 AE Enschede, The Netherlands, e-mail: {p.m.wognum,e.c.c.faber}@sms.utwente.nl

Abstract

Although in many organisations projects are run according to a standard procedure many projects run out of time and budget, don't achieve the required quality standards, or don't even finish at all. This is especially the case for large and complex projects with large differences between the parties involved. Although there is much knowledge and experience on what the causes are of sub-optimal project performance, this knowledge is still rather experential and anecdotal.

In this paper, we will present a systematic approach towards building knowledge on factors influencing multi-site project behaviour. For this purpose, we will consider projects as temporary organisations. We will identify three classes of problems, which may lead to project failure. The paper addresses part of the causes of problems, namely differences between project parties. Our research focuses on new product development projects performed at multiple sites. A model will be presented of essential classes of differences to take into account in managing a project. In addition, a learning approach towards supporting project management in identifying and managing differences will be presented. The approach is illustrated with examples from a longitudinal case study into Dutch-Mexican collaborative projects.

Keywords

Project management, inter-organisational collaboration, product and process development

1 Introduction

Projects are increasingly accepted as an organisational form suited for the management and execution of temporary, unique, and complex tasks. The development of new products and processes is one such task. Because of the complexity of this task and constraints in terms of time, costs and quality, many new product and process development projects involve multiple disciplines and functions as well as multiple (divisions of) organisations (see e.g., [Clark, Wheelwright, 1993; Contractor, Lorange, 1988]).

Although most projects are run according to a more or less standard procedure, many of them fail to meet time, budget, or quality constraints. Moreover, many projects are stopped before they are even finished. Some of these projects may still be considered successful on one or more secundairy aspects, such as the development of new knowledge and technology [Gilbreath, 1986]. Nevertheless, these projects fail to meet primary expectations [Gilbraeth, 1986], some of which may have been unreasonable or unrealistic.

Knowledge on the causes and impacts of failure is necessary to systematically improve project management. However, current knowledge is to a large extent anecdotal and experiential (see e.g., [Aken, 1996]). Knowledge based on systematic studies into project management is still limited. In this paper we will describe a systematic approach towards building such knowledge. We will limit our approach to identification and management of differences between parties involved in a project, because we found that unacknowledged differences may impact project performance to a large extent. We will illustrate our approach with results from a longitudinal study of Dutch-Mexican collaborative product development projects.

The outline of the paper is as follows. In section 2, we will introduce the process-based contingency model of organisations (PMO) as a basis for describing and analysing projects. In section 3, the PMO will be applied to projects by considering them as temporary organisations. In addition, three classes of problems will be identified, which may lead to project failure. We will discuss into more detail differences stemming from the environment of a project, which have a large impact on project organisation and performance. Examples of a longitudinal case study into Dutch-Mexican collaborative projects will be presented to illustrate these differences and their impacts. In section 4, a learning approach will be presented to support project management in identifying and managing differences between project participants as well as gradually building knowledge on how they influence project behaviour. The paper will end with a summary and a list of references.

2 Process-based contingency model of organisations (PMO)

The process-based contingency model of organisations (PMO) has been developed in the Department of Technology and Organisation of the University of Twente (see e.g., [Boer, 1991; Weerd-Nederhof, 1998]). The PMO provides us with the essential elements and relationships to take into account when analysing and (re)designing organisations. Recent research in our group, relevant for this paper, has been focused on analysing and redesigning product development systems in a Concurrent Engineering context [Weerd-Nederhof, 1998; Wognum et al., 1997]. In Figure 1, the PMO has been depicted for a New Product Development system.

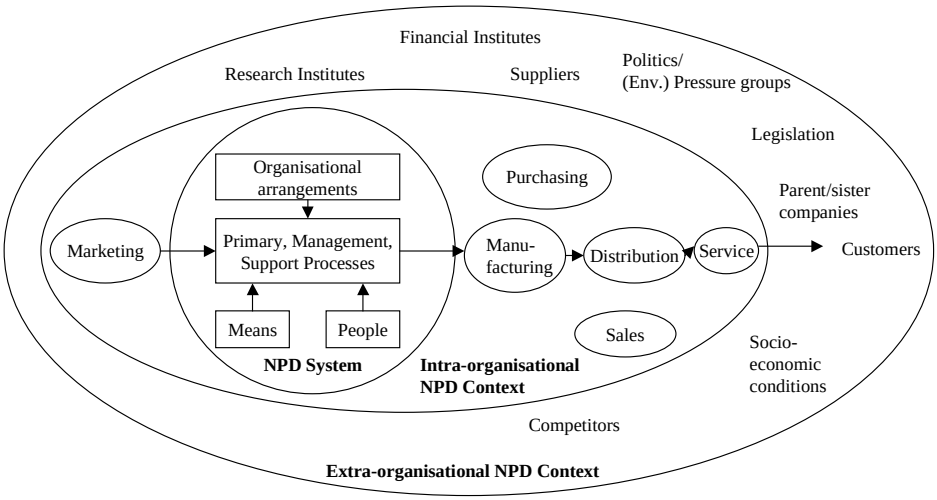

Figure 1: Process-based contingency model of organisations applied to a New Product Development System [Weerd-Nederhof, 1998].

According to the PMO, an organisation can be viewed as a purposeful system of people and means. People, using means, conduct processes to achieve certain goals, e.g., survival. To achieve its goals, an organisation should satisfy certain needs in their environment.

The environment consists of several parties that are directly or indirectly related to an organisation, such as customers, legal bodies, government, financial institutions and suppliers. The environment of a New Product Development (NPD) system within an organisation consists of an extra-organisational environment such as the one mentioned above and an intra-organisational environment. The intra-organisational environment consists of all upstream and downstream functions in an organisation involved in product creation, such as development, production, distribution, maintenance, and disposal. The environment of the NPD system puts requirements and constraints that have to be satisfied by the product and processes to be developed. Nowadays, the intra-organisational context is not necessarily restricted to one organisation, since the development of new products and processes is more and more performed

in a network or chain of collaborating organisations. Since many NPD processes are performed in projects, these projects determine the organisational borders for NPD. These borders may comprise several, possibly very different, companies.

Goals can be stated at the strategic level, the adaptive level, and the operational level for the organisation as a whole as well as on subsystem levels. Goals on lower levels should be formulated in accordance with higher-level goals. Conversely, higher-level goals should take into account constraints on lower levels. Strategies are developed on all levels to achieve goals.

Processes are performed to achieve the goals of an organisation. In general, a process consists of one or more related activities. These activities can be transformation activities, transforming inputs into outputs, or communication activities, in which information is transferred between a sender and a receiver, which are people in most cases, but can also be computer systems or machines. The transformation processes consist, first of all, of the primary processes. These processes are primarily aimed at the creation of the organisation's products. Secondly, support processes supply the primary processes with sufficient, qualified, people and means. Thirdly, management processes are needed to absorb environmental shocks to maintain optimal conditions for optimal performance of all other processes in the organisation.

With organisational arrangements co-ordination of activities is realised. These arrangements are the glue between activities and people and means. Organisational arrangements are the structural and cultural, formal and informal rules, norms, traditions, and rituals in an organisation. In many organisation a large part of the formal rules are recorded in handbooks and procedures.

The people and means involved in an organisation can be characterised by the technology they incorporate, in terms of knowledge and skills. For people, the level of education and the experience are important descriptors as well as attitude, social skill, etc.. Means can be characterised, e.g., by the functions they can fulfil, the speed in fulfilling these functions, the level of the technology incorporated, and the nature of the user interface.

As already mentioned above, the PMO provides us with elements and relationships to take into account when studying and analysing (processes in) organisations. Projects can be considered as organisations, albeit temporary ones. We will apply the PMO to projects below.

3 Projects in context

In the next subsection we will describe projects as a temporary organisation. By using the PMO, we will identify potential problem areas. These areas are further explored in section 3.2. In section 3.3 we will discuss into more detail one of these areas, namely differences between project participants.

3.1 The PMO applied to projects

The essential characteristics of projects are that they are unique, temporary, and are often aimed at achieving ambitious goals with lots of uncertainties involved. Since projects involve the definition of goals, are performed in an environment that puts requirements and constraints, require people and means to perform the necessary processes as well as organisational arrangements to achieve a sufficient level of co-ordination, projects can be considered as organisations. However, projects are different from normal, permanent, organisations, because project life is restricted. Projects are, therefore, temporary organisations (see e.g., [Packendorf, 1995]).

When we describe a project in terms of the PMO, the similarity with permanent organisations is that a project can also be considered as a purposeful system in which people and means performed processes in a co-ordinated way to achieve the project's goals. Most projects are run according to a more or less standards procedure (see e.g., the PRINCE 2 method [Prince 2,

1996]). Documents have to be delivered at predetermined milestones, while review meetings are held to assess the project's progress in terms of time, budget and quality. Support processes are needed to provide, for example, the data needed for monitoring the project progress. In addition, team building and specific education programmes are needed to improve performance. There are, however, many differences with permanent organisations.

First of all, projects are unique, which means that they are aimed at goals not realised before. The processes to be performed in projects are characterised by possible high levels of uncertainty and ambiguity. Consequently, processes cannot be fully planned ahead. Management of projects differs therefore from management in permanent organisations because of the dynamics involved in projects. Moreover, since projects are performed outside the normal daily operation in companies, projects have to prove their value continuously. They have to compete with tasks in the permanent organisations as well as with other contemporary projects for time, budget and qualified people and means. Project managers need to be a jack-of-all-trade to be able to manage both the project as well as the relationships with all parties involved.

Second, the complexity of the project tasks requires decomposition into subtasks. The decomposition often occurs according to a standard procedure, which comprises a number of sequential phases separated by more or less formal transition points. Co-ordination of these tasks can be characterised as standard for the decomposition in phases. Co-ordination is hierarchical for managing the sequential dependencies between the phases [Thompson, 1967]. Within each phase, decomposition into subtasks often leads to mutual dependent subtasks, especially in the earlier phases of the project. Mutual adjustment is essential to achieve the necessary co-ordination [Thompson, 1967; Mintzberg, 1979]. Because of the information-processing requirements within phases, specific co-ordination mechanisms are needed to enable project members to interact frequently [Galbraith, 1974;Paashuis, 1997].

Third, unless they are co-located, people and means involved in a project remain part of their departments or parent companies. Especially new product and process development projects involve many functions and disciplines, functional departments and from different companies. Even if they are full-time involved in the project, project members usually perform a large part of their project tasks within their own environment. Project members, therefore, have to deal with or be loyal to multiple contexts.

Fourth, although structural arrangements are present in most of the projects, cultural arrangements are often weakly developed especially when project members have no previous collaboration history. This means that there is not a commonly accepted way of working or common norms and rituals. Cultural arrangements gradually evolve over time. This process stops when the project ends. Only when partners from previous projects together start a new project will such arrangements continue to develop.

Each of these circumstances may cause problems that may lead to project failure. We will discuss these problems below.

3.2 Problems related to projects

As already noted by Gilbraeth [1986] from his practical experience as a consultant, we can identify three classes of problems related to projects:

- *Uniqueness of a project*. As already remarked above, each project is unique, aimed at achieving new goals. Expectations, although present, cannot be fully justified beforehand. Nevertheless, new product and process development projects can be classified according to the level of uncertainty involved (see e.g., [Clark, Wheelwright, 1993]), although general agreement on such classification not yet exists [Kerssens-van Drongelen, 1999]. Each class requires a different project organisation, both structural and cultural. Van Aken [1996], for example, has found that the degree of structuring, the amount of planning and control, and

the use of instruments depend on the project class. In many organisations, however, there is only one procedure to organise and manage projects [Wognum, Weerd-Nederhof, Boer, 1997].

- *Environment of a project.* Projects are performed in an environment that put several requirements and restrictions. Moreover, the environment is dynamic. For example, several changes may occur during project execution, like changes in technology, customer demands, legal rules, competitive pressure, etc., which influence the importance of and pressure on projects. Organisation and management of projects have to be adjusted when such changes occur, including stopping of a project.
  Another important factor consists of differences between the parties involved in a project as far as they influence project behaviour. These comprise difference between technical disciplines, functional departments, and companies. Unacknowledged differences may lead to large problems and even failure of a project. We will come back to this point later.
- *Project process*. Besides the environmental dynamics, projects frequently encounter disturbances from within the project. For example, people may leave, new people are added, conflicts may arise due to differences in expectations, commitment of people may change, etc. Such disturbances may lead to projects not meeting expectations, requiring either expectations to be adjusted or measures to be taken to adjust the project organisation.

These classes are distinct, but not independent. Changes in one class will influence elements in others. The classes identified above nicely coincide with the process framework presented by Pettigrew [1990]. Pettigrew's framework identifies context, content, and process, which relate to environment, project uniqueness, and project process, respectively.

In the next section, we will discuss into more detail the dynamics inherent in projects. We will specifically focus on differences between parties that influence these dynamics.

3.3 Differences between project members

In this section, we will identify differences between project members that may influence project performance. We will do this by using our PMO. We will illustrate differences with examples from a case study into the process of Dutch-Mexican collaborative projects. The collaborating companies are subsidiaries of one multi-national organisation in the telecommunications area. Although project members from the two companies are subject to the same company procedure for organising and managing projects, we have observed many differences that caused unexpected behaviour.

The differences that can be identified are the following, clustered according to the different elements:

- Goals. Although a project has a specific primary goal, several secondary goals exist. These goals can be identified on the individual level, the group level, and the organisation level.
  For example, the Dutch subsidiary wished to outsource activities, for which their capacity was insufficient; the Mexican subsidiary on the other hand wishes to become a qualified design centre through participation in the project.
- People. Project members involved in the primary tasks of the project bring their technical knowledge and skills, as well as their local culture (organisational and national) and norms. Project leaders bring next to their technical knowledge and skills their managerial knowledge and skills and leadership style. These managerial knowledge and skills and leadership style are also influenced by culture. On the program management and steering board level, similar differences can be identified.
  For example, in one project, a Dutch project leader was appointed, while the whole team consisted of Mexican engineers. The difference between the Western project leader and

the Mexican project members with respect to communication style has lead to many misunderstandings, conflicts, and delays.

- Means. Means consist of methods, tools, and techniques that support people in executing their task. These tasks can be divided in project management and support tasks as well as (primary) technical tasks. The application and use of means depends on the specific partners in a project. People have to be flexible when they are involved in several projects with different partners, because the methods, tools, and techniques in use may be very different. In addition, partners may have expectations concerning certain facilities, stemming from experiences in their parent company.
  For example, the Dutch subsidiary has test facilities dedicated to a specific project. This is not the case in the Mexican subsidiary, which has fewer resources for setting-up and maintaining such facilities. The Mexican test facility had to be built each time it was needed, leading to much delay.
- Management. Management processes are influenced by the local culture, organisational as well as national.
  For example, in the Dutch subsidiary, planning and tracking according to standards forms, both on the individual and group level, is an accepted way of working. In the Mexican subsidiary, extensive planning and tracking is not accepted. People like to be trusted to achieve the results on time, prepared to work over-time when needed.
- Primary process. Differences in technical vocabulary may hamper communication between disciplines and functions. Moreover, difference in experience and competency may lead to differences in the way the activities are performed.
  For example, although in both subsidiaries the same procedure is applied to structure the tasks in the primary process, the Dutch engineers take much more freedom in applying the procedure due to their higher level of experience.
- Support process. The way documents are managed, project data are recorded and maintained, the team building process is performed, or education possibilities are offered to team members depends on the specific partners in a project.
  For example, Mexican project members do not like to provide individual hour registration data.
- Organisational arrangements. Each project is executed according to a more or less standard procedure. This procedure may be either delivered by one of the partners or agreed upon by all project partners. Such a procedure determines, for example, the assignment of roles, responsibilities, and reporting structure. However, a procedure does not guarantee behaviour according to this procedure.
  For example, Mexican project members are not used to report technical problems when they occur. They wish to solve problems by themselves, also when this requires more time.

Although differences are specific to each project, we can identify generic classes of differences based on the elements of the PMO as we did above. For each new project, these classes of potential differences need to be considered to anticipate as much as possible on potential conflicts. When conflicts nevertheless occur, insight into these differences is needed to take effective measures. In addition, insight into and management of differences will support companies participating in projects to develop knowledge to influence and improve effectiveness and efficiency of future projects. We will present an approach towards management of differences in more detail below.

4 Management of differences

Because of the characteristics of projects, as described in the previous section, it will hardly be possible to develop a normative model that can be used by management to effectively and efficiently organise and manage projects. Next to the willingness to deal with the unexpected, effective and efficient project management requires for a large part learning by doing, and the building of so-called cases from which others can learn. However, as indicated above, some general guidelines can be formulated to support management in organising and managing projects. These guidelines, however, are subject to learning as well.

Our approach to management of differences can be characterised as a learning approach (see figure 2). At the start, knowledge on organising and managing projects, also called capabilities (see e.g., [Lebrun, et al., 1998]), exists in one or more environments, like departments, divisions, companies, or networks. This knowledge is present in strategies, processes, people, means, and organisational arrangements. These organisational elements act as structuring devices for capabilities (see also [Wognum, Faber, 1998]). For example, a rule may exist that says that before a project is started the goals of all potential participants must be made explicit and communicated to all partners.

Next, the project is organised taking into account the potential differences between environments that deliver the people, means, and processes, as well as the characteristics of the specific project. By monitoring the result of the project during project execution gaps between expected and experienced behaviour can be observed. The nature of the gaps may lead to adaptation of the project organisation in terms of processes, people, means, or organisational arrangements, or the adaptation of expectations. Not all of these adaptations may be successful and may be subject to another learning cycle. Knowledge generated by this type of adaptations is called 1st order learning [Argyris, Schön, 1978].

For example, in an attempt to reduce schedule delays the Dutch project leader implemented an incentive plan. This action led to much frustration at the Mexican site, because such a plan was interpreted as a proof of distrust.

Experiences with the project and knowledge thus built may require adaptations in the environments that participated in the project. In other words, the knowledge on how to organise and manage project may need adaptation. This type of adaptation is called 2nd order learning [Argyris, Schön, 1978].

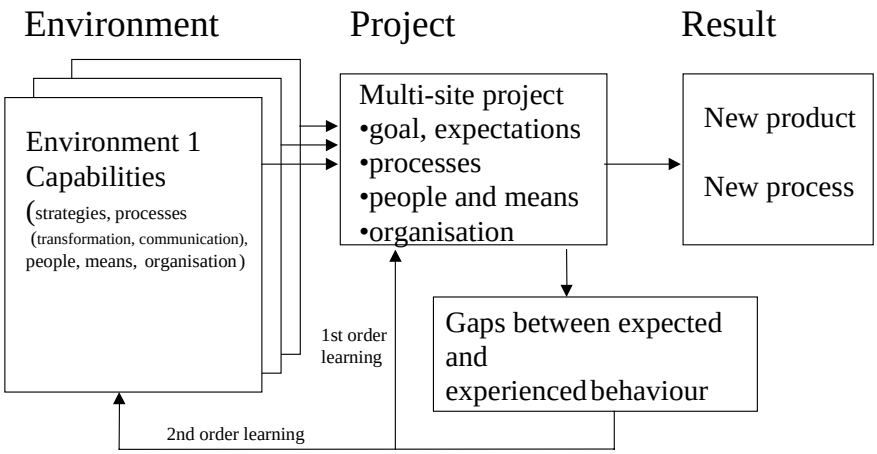

Figure 2: Strategic and adaptive

Figure 2: A learning approach to support identification and management of differences between project members

For example, experiences with the projects studied have led to a new rule in the Dutch subsidiary. For future projects, Mexican engineers are trained at the Dutch site to get acquainted with the Dutch level and style of engineering activities.

This approach can be used to study projects in progress as well as projects already finished. Acknowledged and unacknowledged differences can be identified as well as conflicts that occurred as a consequence of these differences. Measures taken to remedy the conflicts can be identified as well as their, successful or unsuccessful, consequences. The knowledge thus built can be consolidated for further use in the specific contexts studied. By comparing results from many different projects in different contexts more general guidelines may be formulated.

5 Summary

We have presented a learning approach towards organising and managing differences in multi-site product and process development projects. The approach is based on a process-based contingency model of organisations, which provides a classification for differences that can be observed in specific projects.

We have illustrated our approach with results from a longitudinal study of Dutch-Mexican collaborative product development projects. Application of our approach will support organisations in developing capabilities to collaborate in multi-site projects. By comparing capabilities between different organisations more general guidelines may be developed.

Acknowledgement

We thank all people from the Dutch-Mexican organisation that participated in our study for their co-operation and support.

References

Aken, Teun van: The road to project success. Rather through working style than through instruments. Elsevier/De Tijdstroom, 1996. (In Dutch)

Argyris, Ch., Schön, D.: Organizational learning: a theory of action-perspective. Addison-Wesley, Reading, MA, 1978.

Boer, H.: Organising innovative manufacturing systems, Avebury, 1991.

Clark, K.B., Wheelwright, S.C.: Managing new product and process development. Harvard Business School Press, Boston, 1993.

Contractor, F.J., Lorange, P.: Why should firms cooperate? in: F.J. Contractor, P. Lorange (Eds.): Cooperative strategies in international business. MA: Lexington Books, Lexington, 1988, pp. 205- 226.

Galbraith, J.R.: Organization design: an information processing view. Interfaces, Vol. 4, No. 3, 1974, pp. 28-36.

Gilbraeth, Robert D.: Winning at project management. What works, what fails and why. John Wiley & Sons, New York, 1986.

Kerssens-van Drongelen, Inge C.: Systematic design of R&D performance measurement systems. Ph.D. Thesis. University of Twente, Enschede, the Netherlands, 1999.

Lebrun, J., Gosset, P., Pallot, M., Roux, P., Gandelot, D.: FREE Capability Assessment Framework (FREE-CAF). Volume 3: Reference Model. Deliverable 132-3, ESPRIT project 23286 FREE, 1998.

Mintzberg, H.: The structuring of organization – A synthesis of the research. Prentice-Hall, Inc., Englewood Cliffs, 1979.

Paashuis, Victor: The organisation of integrated product development. Ph.D. Thesis. University of Twente, Enschede, the Netherlands, 1997.

Packendorf, Johann: Inquiring into the temporary organization: new directions for project management research. Scandinavian Journal of Management, Vol. 11, No. 4, 1995, pp. 319-333.

Pettigrew, A.: Longitudinal field research on change: teory and practice. Organization Science, Vol. 1, No. 3, 1990, pp. 267-292.

Prince 2: CCTA, Norwich, 1996.

Thompson, J.D.: Technology and structure. in: Organizations in action. McGrw-Hill, New York, 1967, pp. 51-65.

Weerd-Nederhof, P.C. de: New product development systems. Ph.D. Thesis. University of Twente, Enschede, the Netherlands, 1998.

Wognum, P.M., Faber E.C.C.: The FREE organisational model. Deliverable No. 122. ESPRIT Project 23286 FREE, 1998.

Wognum, P.M., Weerd Nederhof, P.C., Boer, H.: Challenges in organising and managing integrated product development processes. Results of case studies into state-of-the-art in Concurrent Engineering in industry in the Netherlands. Research Report 97W-001/T&O-001. University of Twente, Enschede, the Netherlands, 1997.