



Problems in managing internal development projects in multi-project environments

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Abstract

This article identifies problems in managing multiple internal development projects. The research methodology employed organisation-specific interviews, surveys and workshops on two case project portfolios. Project portfolio management studies provide one view on existing knowledge in this area. The study results in six relevant problem areas: (1) Inadequate project level activities, (2) Lacking resources, competencies and methods, (3) Lacking commitment, unclear roles and responsibilities, (4) Inadequate portfolio level activities (5) Inadequate information management and (6) Inadequate management of project-oriented organisation. The article suggests further analysis and development of managerial practices on these areas.

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1. Introduction

Today's business environment is complex and requires faster decisions, better allocation of scarce resources, and a clearer focus. An organisation consisting of a constantly changing mix of large and small projects presents senior management with new challenges in resource planning, prioritisation and monitoring. Adherence to time, scope and cost requirements in single projects may provide a company with increased income and value for the near future. However, to complement this view, the project portfolio management introduces doing the right projects, creating a link from the projects to the organisation's strategy and, simultaneously, adopting the long-term view.

The literature on project portfolio management mostly focuses on investment projects, management of technology and innovation, or R&D management.

Cooper et al. [1] have identified the problems encountered in inadequate portfolio management and respective solutions which limit to new product development projects. Combe [2] has, in turn, identified problems related to cross-organisational project management. However, in general, studies relating to the identification of problems in managing multiple projects are few. Furthermore, studies concerning the management of internal development portfolios seem rare. This paper makes an attempt to bring more insight into problems in managing entire portfolios of internal development projects.

2. Project portfolio management

In the literature, the concept of *project portfolio management* appears in various guises. *Programme management* and *multi-project management* are examples of closely related terms. Archer and Ghasemzadeh [3] and Dye and Pennypacker [4] define a project portfolio as a group of projects that compete for scarce resources and are conducted under the sponsorship or management of a particular organisation. The three well-known

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objectives of portfolio management are: maximising the value of the portfolio, linking the portfolio to the strategy and balancing the portfolio [1]. According to Platje et al. [5], a portfolio is a set of projects which are managed in a co-ordinated way to deliver increased benefits.

The definitions of portfolio management [3,4] are similar to many definitions introduced for a project programme management. For example, Turner [6] emphasises that, in a programme, projects form a coherent group of projects that are managed in a co-ordinated way, for added benefit. Murray-Webster and Thiry [7] define a programme as a collection of change actions (projects and operational activities) purposefully grouped together to realise strategic and/or tactical benefits. According to Turner [6], programme management includes, among others, management of interfaces between projects, prioritisation of resources and balancing responsibilities against corporate objectives. CCTA [8] uses the term portfolio while defining programme management as the co-ordinated management of a portfolio of projects that change organisations to achieve benefits that are of strategic importance.

Based on the earlier discussion, we appreciate both the project portfolio management and programme management areas with their contribution to the strategic and business-oriented management of multi-project environments. We use the term project portfolio management in the following. However, our broad view on portfolio management includes aspects of both portfolio and programme management studies, including management of interfaces between projects and co-ordination of collections of projects, and management in accordance with resource and other constraints.

3. Research question

Identifying the problems and understanding their relationship in the organisation provides a basis for overcoming them. The problem identification also enables bringing forth the areas relevant in multi-project management, both in the field of research and in deriving organisation-specific managerial solutions.

This paper investigates problems encountered in portfolio management in matrix organisations. The research question is:

What are problems and problem areas in project portfolio management?

Answers to the research question are sought from literature and from two case portfolios. The emphasis is on empirical findings and in comparing them to the existing knowledge.

4. Two case portfolios—internal development projects in matrix organisations

This paper employs empirical data gathered in two project portfolio management research projects at the Helsinki University of Technology, Finland. The research projects were initiated in the early 2001 and they aim at developing project portfolio management practices for one chosen case portfolio in both organisations. The case portfolios consisted of internal development projects. Both case portfolios include projects that cross organisational units. The organisation and management structure in both organisations is a matrix. The role of projects in a matrix organisation and related problems are discussed widely in the literature (e.g. [9,10]).

Both the type of the project and the organisational environment presumably affect the recognition of problems and features in the case portfolios. Both organisations have, since several years, introduced local processes and guidelines for managing single projects.

Shenhar et al. [11] classify projects into external and internal. External projects are typically preceded by developing products to the market, Wheelwright and Clark [12] call such projects commercial development projects. Shenhar et al. [11] divide internal development projects further into problem solving, utility, maintenance and research projects. They can be either strategic or operational in their nature. Internal development projects typically aim at performance improvements. Typical examples of internal development projects in our two empirical case portfolios include development of business processes, internal information technology development, organisational change or re-engineering, and investments in new equipment, major software, and other capital projects.

5. Existing research on managerial problems in project portfolios

We have not found studies on problems related directly to the management of a portfolio of internal development projects. However, in the following, we introduce problems encountered in managing portfolios of other project types. Cooper et al. [1,13] have identified six problems in project selection and portfolio management faced by companies developing new products. We use the categorisation of Cooper et al. to study the current knowledge on problems:

1. *No link between strategy and project selection.* Despite clear business and new product strategies, the spending on R&D projects does not often reflect the stated strategy and priorities. Thus, there is no clear link between the strategy and the selection of projects.

2. *Poor-quality portfolios.* Too many new product projects are weak, unfit and mediocre. In addition, success potential at launch is inadequate. A Brookings Institute Survey [14] even reported a trend among information system professionals regarding their evaluation of new project ideas: fully 86% of those responding stated that their organisation had no selection criteria to separate half-baked ideas out from viable projects.
3. *Reluctance to kill projects.* As soon as a project has been started, it takes on a life of its own and is allowed to proceed until the end of the development work, even if its implementation is no longer justified on a business basis. Poor projects are hardly ever stopped in the midst of the implementation.
4. *Scarce resources, a lack of focus.* Most companies have too many on-going projects for the available resources (referred also to in Ref. 15). Inadequate balancing of resources often translates to additional pressure to multitask which leads to a greater time to complete the project. The result often is a delayed time for a product to market, thinly spread resources across projects, higher failure rates, poor quality of information and lowered morale.
5. *Selecting short-term and easy projects.* Combe [2] states that a traditional bottom-up identification of projects is often inadequate to ensure selection of the most important things on which to spend the resources. Companies have a tendency to implement the short-term, easy, and cheap projects, such as product modifications and extensions (also referred to in Ref. 16). As a consequence, they are reducing their future success potential and competitive advantage.
6. *Information overflow and lacking quality of information.* Managers may become confused with the amount of information available for decision making but may not be able to identify the relevant information or realise the inaccuracy of information and estimates. Regardless of elegant and sophisticated portfolio selection and decision tools, if the information input is poor, so will the decision making be.
7. *Decision making basing on power* (also referred to in Ref. 17). Pfeffer's [18] study indicates power to be more important in major decisions where there are interdependencies; for domains in which performance is more difficult to assess; and in instances where uncertainty and disagreement are likely. Thus, the field of portfolio management is particularly fraught with political processes. For example, getting approval for a project start-up is not just a rational exercise of informing others that a project is important; rather, it is a long process of generating support [19].

6. Research procedure

The empirical research was conducted in five steps. All the five steps were carried out independently for the two case organisations, here referred to as Alpha and Beta. The first step comprised a company-specific present-state analysis (Step 1). The data to the analysis was gathered with interviews and by getting familiar with the organisation and related material. Fourteen people were interviewed in Alpha and six people in Beta.

Step 2 was a survey that served as getting an overview of the current problems in single and multi-project management of the case portfolios (Step 2). The survey was executed by sending an open questionnaire to 17 employees in Alpha and to 13 employees in Beta. The respondents were persons closely related to the management of the case portfolios or respective projects. Six employees from Alpha returned the survey (response rate 32%) and 12 employees from Beta (response rate 92%). For each problem, the following data was gathered: short description of the problem; influence of the problem on everyday operations; suggested courses of action for improvement; and order of importance in respect to the other problems listed by the respondent.

In step 3, the survey data was grouped into preliminary problem areas which were then put in order of importance (Step 3). The preliminary problem areas were developed from the survey data in such a way that presenting the areas of the organisation to its employees would reveal the field of problems in the management of single projects and the case portfolio. After the preliminary problem areas had been identified, each problem was placed into an appropriate area. Respondents ranked problems in order of importance. The preliminary problem areas from both organisations were integrated into five common problem areas. The organisation-specific weightings of the problem areas of the two organisations were given equal weights when deciding on the importance of the integrated preliminary problem areas.

A better understanding for each company-specific preliminary problem area was developed for both case portfolios in separate 1-day workshops (Step 4). The idea behind this step was to identify causes for the problem areas, to find new problems, to study the inter-relatedness of problems and to help better understand the content and nature of the preliminary problem areas. This was conducted through creating a cause-effect map for each preliminary problem area. The workshop of Alpha had 10 participants and that of Beta had nine participants.

After the problems had been identified in Steps 2–4, a post-workshop analysis on the data was conducted (Step 5). The problems identified in the survey and their causes were combined to replenish the understanding of the problems existing in the management of internal development projects.

7. Problems found in case organisations

7.1. Preliminary problem areas (results of steps 1–3)

The analysis of the surveys resulted in the identification of preliminary problem areas. Fig. 1 represents the weighted scorings that reflect the order of importance of

the integrated areas. The symbol “*” in the figure denotes that the problem area has been identified in both organisations. Table 1 presents the content of preliminary problem areas. Each issue included in the table fulfil at least one of the following conditions: the issue was identified as a problem by both organisations, or it was mentioned to be a problem at least twice in the

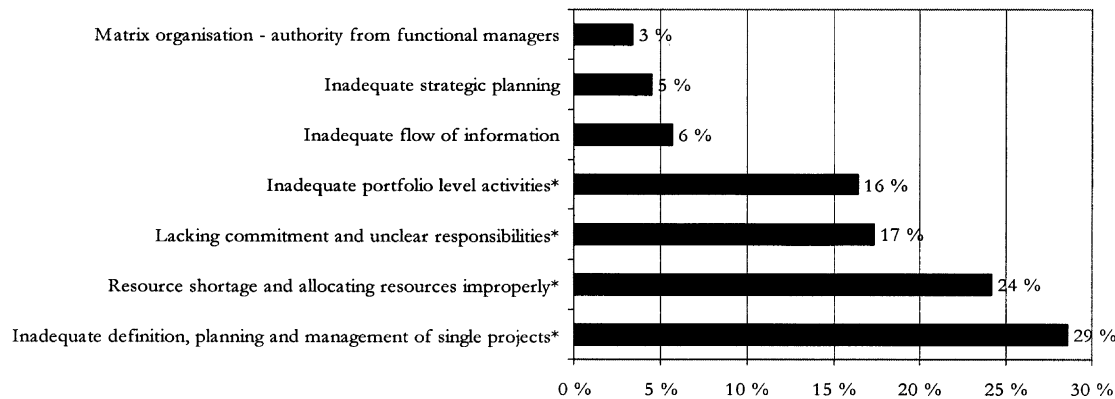


Fig. 1. Prioritised graph of preliminary problem areas.

Table 1
Preliminary problem areas and their relevant content

Inadequate definition, planning and management of single projects*

The importance of the pre-phase of projects is neglected. The project scope is not defined detailed enough before the project start-up. Thus, reliable estimates on benefits, resource requirements and costs of the project are difficult to make.

Too strict schedules and resource estimates for projects.

Cost and resource use of the project is reported and monitored occasionally or not at all.

Project output is not aligned with objectives due to unclear definitions, changing objectives and/or improper monitoring of project work.

Progress and quality of a subcontractor's work is difficult to monitor and control.

The need of the real customer of the development work is not always considered properly. The need for the development work is not analysed properly.

Resource shortage and allocating resources improperly*

Resource shortage in general (i.e. too many projects for the resources available).

A lack of competent project managers and other project personnel.

A high turnover of workers.

Project work is frequently on the shoulders of the same experts. Experts suffer from resource shortage but the other staff are involved in the project work only occasionally.

Project work has often second priority. 'Official' full-day responsibilities are prioritised over project work, and at the same time, allocated resources are taken away from projects.

Lacking commitment and unclear responsibilities*

Organisational responsibilities are not defined clearly. Roles and responsibilities differ from a project to another and authority issues between projects are not considered.

Business managers do not seem to commit to guiding and monitoring projects.

Inadequate portfolio level activities*

Overlapping projects and tasks both within an unit and between units.

Objectives of different projects are not systematically integrated to the strategy or to holistic end results of the portfolio.

The links between projects are not considered systematically.

No project prioritisation and no methods for prioritisation.

Others

Information on all projects is not available centralised. Information on projects does not flow adequately within one unit and between units. Short-term development initiatives.

Conflict of interest between functional management and management of the cross-organisational portfolio. Priority and resources for cross-organisational projects come from functional management—cross-organisational priority for projects is not considered.

Table 2
Causes for preliminary problem areas

Inadequate definition, planning and management of single projects*

Too long projects. Project borders are not defined. Difficulty in planning the development phase realistically and detailed enough. Work not broken down to several smaller projects.

Objectives of the project change during the project. Red line is missed.

Monitoring and controlling of resource use and cost is infrequent.

Methods and guides are not sufficient and they are not used sufficiently for planning a project, estimating resource requirements, and managing projects uniformly.

Human resource shortage of project managers, project personnel and members of steering groups. The workload is concentrated in tasks of few experts.

Unclear roles and responsibilities at the project and portfolio level. Roles and responsibilities of the steering committee and project personnel are unclear.

The unit responsible for projects at the portfolio level is not clearly defined.

Project and steering committee personnel is not competent to manage the pre-phase and the development phase of the project.

Inadequate portfolio level activities.

Project work is given a second priority. Operational work is given priority over projects.

Organisation has not yet digested how to capitalise on projects.

Resource shortage and allocating resources improperly*

Pre-phase of the project is not done properly. Resource and schedule estimates are too strict.

Go decision is made on a project without considering available resources properly and the value of the project to the portfolio. Projects are not prioritised.

No common database of all projects. It is hard to link projects and identify overlaps in projects between organisational levels and between units.

Workload of the projects is concentrated in tasks of few experts. Too many roles in too many projects per an expert.

Project personnel's competencies are not managed properly. It is difficult to identify the persons capable of performing a required task.

Unclear roles and responsibilities between project steering committee, project manager and project team. Project manager brings issues to steering committee which is not prepared sufficiently beforehand. Steering committee does operational project work and does not focus on its official tasks.

Composition of the steering committee and the project team is generally too extensive and rigid. The resource use is not optimised. Persons are included

into the teams to ensure their commitment to the project, not to bring value to the project work.

Projects are not stopped. There is no criteria for evaluating the value of a project. Stopping a project is considered as a failure.

Lacking commitment and unclear responsibilities*

Improper implementation of the pre-project phase. Project borders are not defined adequately and objectives of the project change during the implementation phase. End users are not committed to the project output and the development phase of the project is extended.

No common database of all projects. It is hard to get an overview of the projects in a portfolio. It is hard to link projects and identify overlaps in projects between organisational levels and units.

Overlapping projects and tasks.

Unclear roles and responsibilities between the managers deciding on project 'Go' decisions and the other parts of the organisation.

Monitoring and controlling of resource usage and cost is infrequent.

Portfolio managers have not adapted their own importance, role and responsibilities as project decision makers. They make decisions also on operational project issues. There are no methods or guides for making a decision on the portfolio.

Feedback on projects is rarely given to the project level by the portfolio level.

Resource shortage. Members of the steering committee (often an extensive composition) do not have the time for the role and its responsibilities. Portfolio managers do not have time to discuss and decide on projects due to operational duties.

Management is not committed to reviewing projects, besides large strategic projects.

Project personnel does not commit to the project work because it is given a second priority. The project work is not rewarded systematically similar to rewarding operational work.

Rapid and recurring changes in roles, responsibilities or organisation structure. Deficient feel of continuity.

Inadequate portfolio level activities*

A lack of project information on projects. No transparent database of all projects, project information does not flow fluently in the organisation between the levels and the units.

Project borders are not defined adequately.

Go decision is made on a project without considering properly available resources and the value of the project to the portfolio. Projects are not prioritised.

Overlapping projects and tasks.

Owner of or the strategy for the portfolio is not specified.

Several organisational bodies are entitled to set up new projects and allocate resources to them: top management, divisions, business units and cross-organisational portfolios. Projects are scattered in the organisation and only little integration exists between them.

Project work is given a second priority. Operational work is given priority over projects. The management does not seem to be committed to reviewing project work. Project work is not rewarded systematically, as is operational work similar to the rewarding operational work.

Others

Information flow from projects to the other parts of the organisation, and vice versa, is not defined: 'Who' should be informed, 'when', 'on what', and 'how'. No common database of all projects. It is hard to link projects and identify overlaps in projects between organisational levels and between units. Management does not seem to be committed to reviewing project work, especially cross-organisational. Project work is not rewarded systematically, as is operational work. Every unit has its 'own' objectives.

Projects are implemented separately from each other. It is hard to find links between projects and to identify overlaps in projects between organisational levels and units.

Unclear roles and responsibilities between the managers deciding on 'Go' decisions and the other parts of the organisation.

The strategy for the portfolio is not defined properly. Personnel strategy is not defined cross-organisationally.

Rapid and recurring changes in roles and responsibilities. Deficient feel of continuity.

survey of either organisation. Approximately 70% of all the problems identified in the surveys fulfil at least one of the two of those conditions. The problem areas shown in the table are explained briefly in the following.

The areas of *Inadequate definition, planning and management of single projects* and *Resource shortage and allocating resources improperly* stand out from Fig. 1. This reflects the fact that single projects in the case portfolio are not being managed properly. The problems in this area mostly refer to the pre-project phase and project monitoring and control. As far as the resource management is concerned, the organisations pursue, in general, too many projects for the available resources. Another problem is the lack of competent project personnel.

Lacking commitment and unclear responsibilities and *Inadequate portfolio level activities* indicate that organisational responsibilities have not been clearly defined. The most often mentioned problem within *Inadequate portfolio level activities* is the overlapping of projects and tasks. It indicates that the same work is done several

times in one project or in different projects. Moreover, the objectives of different projects are not systematically integrated to the strategy. Additionally, the projects are not prioritised, partly due to a lack of methods for prioritisation.

7.2. Analysis on causes for the preliminary problem areas (results of step 4)

Table 2 presents the identified relevant causes for the preliminary problem areas. The causes included in the table fulfil each at least one of the following conditions: (1) the issue was identified in a cause–effect map of both organisations, (2) it was marked in the workshop as being a significant problem in a cause–effect map of either organisation, or (3) it was identified several times in the cause–effect maps of either organisation. Approximately 80% of the causes for the preliminary problem areas identified in the workshops fulfilled one of the above three criteria, and accordingly, were included in the table of causes.



Fig. 2. Summary of problems in managing multi-project environments.

7.3. Analysis of problem areas (results of step 5)

The result of the combination of problems of the survey (Table 1) and the causes produced in the workshops (Table 2) were finally categorised into six relevant problem areas (Fig. 2).

The major problems in *project level activities* (Fig. 2) were improper implementation of the pre-project phase with regard to many aspects, infrequent project progress monitoring and too long projects that are difficult to plan realistically in detail. In *portfolio level activities* (Fig. 2) there were five major problems. First, the projects were overlapping both within one portfolio and between portfolios. Second, the results of the projects were not integrated into each other. Third, there was a lack of critical considerations of portfolio managers when making decisions on projects. The available resources, the value of the project to the portfolio and the priority of the project were not considered properly and no projects were stopped although new projects are all the time added to the list of active projects. Fourth, the roles and the responsibilities of the portfolio level decision makers were not clear or managers had not fully digested them. Fifth, too little feedback was given from the portfolio level back to the project level to guide projects to a right direction. And lastly, there was a reluctance to kill projects (Fig. 2).

In the area of *management of project-oriented business* (Fig. 2), project work is often given a second priority and not rewarded equally to the other tasks. Also, an owner or a strategy for the portfolio is not defined clearly or tangibly enough. Furthermore, there are rapid and recurring changes in roles, responsibilities or organisational structure hindering the development of continuity in the project work. Moreover, many organisational levels and bodies are entitled to set up projects, which seems to make the management of multiple projects more challenging. In the field of *information management* (Fig. 2), there is generally a lack of transparency in project information and its quality. Information does not flow fluently and the personnel is not clearly informed about when information should be delivered, on what, to whom, how and in what format. This relates closely to a lack of an appropriate database on project information.

The last two problem areas are *Commitment, roles and responsibilities*, and *Resources, competencies and methods* (Fig. 2). The roles and the responsibilities between the portfolio decision makers and the other parts of the organisation are not clear. Also, management does not seem to support project work. In addition, roles are not clear between the steering committee, the project team and the project managers. Monitoring of the project progress is infrequent and there are no adequate methods or guidance for portfolio evaluation and project planning and management. On top of that, there is a

continuous shortage of resources, lacking commitment to the project work and inadequate competencies to manage a project.

8. Conclusions

The literature on problems in managing entire multi-project environments with internal development projects is almost non-existent. This paper made an attempt to bring forth some relevant areas in managing portfolios in internal development projects and, consequently, to clarify the important areas for respective managerial activities. The analysis of the problems with two case portfolios introduced six relevant problem areas. Comparing those empirically derived problem areas to the problems introduced in the literature encourages us to suggest that the six problem areas resulting from our empirical study would be considered as a relevant starting point for further studies and development of managerial applications:

1. Inadequate project level activities.
2. Lacking resources, competencies and methods.
3. Lacking commitment, unclear roles and responsibilities.
4. Inadequate portfolio level activities.
5. Inadequate information management.
6. Inadequate management of project-oriented business.

The project portfolio management literature recognises similar issues that these areas cover. Furthermore, the literature introduces *information overflow* and *decision making basing on power* as two additional issues that are not emphasised in our empirical findings. Our empirical analysis introduced such managerial problem areas that represent a wider scope than what has been seen relevant in existing project portfolio management literature. However, this study limits its empirical findings to only two internal development portfolios in a matrix organisation. The problems found in the two case portfolios were quite similar. This encourages suggestions for further studies that would investigate if similar problems would occur in other organisations, or in other types of portfolios. Future research could identify solution areas and suggest specific solutions for the managerial problems highlighted in this study.

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