

Portfolio management for investment projects in the construction industry

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Abstract. The Russian business community has realized the need for project/targeted programme management procedures; therefore, the demand for customized project-oriented management methods goes up. In the meantime, this demand is not supplied in full, and the supply is far from being efficient. Project management methodologies need further improvement, including development of portfolio management processes applicable to investment projects developed and implemented in the construction industry. The article considers General approaches to the formalization of the management of portfolios of investment–construction projects. For the main groups of processes portfolio management (“Formation and alignment”, “Monitoring and control” and “Support and development”) deals with their constituent sub-processes. The proposed decomposition can be used for both portfolio construction and investment projects and also has an invariant character, which allows extending the proposed approaches to other system target–oriented and project–oriented management.

1 Introduction

The construction industry of Russian Federation according to the Federal state statistics service is currently one of the most sustainable sectors of the economy. [1]. One of the factors that can support the sustainability in the construction industry is the diversity of building organizations of various types of activities, by form of ownership and number of employees.

A variety of companies on the construction market allows us both to satisfy requirements of construction activities and to realize projects of various complexity.

According to market conditions, construction companies, especially large ones, are supposed to create and develop innovative management strategies and new ways of making and implementing decisions.

The necessity of new management methods caused by the following reasons:

- construction organizations’ activities approval and integration during the realization of projects

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- the emergence and operation of value added resellers (VARs) on the market of construction services
- diversity of construction projects' financing sources;
- new standards and requirements to objects under construction;
- availability of new technologies and raw materials used in the construction process;
- coordination of suppliers;
- interacting with local authorities during the construction process.

Most of the above-mentioned reasons are the result of the construction industry development as an economic entity and the complication of its structure.

Modern information and computer technologies allow not only to monitor the organization activities, its departments and employees, but also to coordinate its activities with other organizations.

However, the use of ICT opportunities and the construction industry's capacity is restrained by the lack of project portfolio management skill among most of construction companies' heads.

The reasons for this situation in the construction industry are:

- Managers educated and started working in planned economy;
- Owners of the building organizations or the development companies want to see the construction project manager specialist with an engineering degree;
- educational system's focus on the preparation of high-skilled graduates with narrow specialization.

Project management methods are efficiently employed to solve extensive and multi-parametric tasks, including the organization of interaction between teams of designers and builders, involved in the same project, and the organization of operation of a building/a structure co-owned by several proprietors.

2 Development of portfolio management procedures: general problem statement

Projects have always accompanied the lives of humans, facilitating purposeful environmental changes and adequate responses to external challenges and changes in the setting. Almost every fact, evidence and subject of history represents a project: it's true for the construction of pyramids, temples roads, channels; military campaigns and conquests; Argonauts' sailing and Columbus's expedition; public and political reforms, etc. Today projects are implemented in fundamental and applied sciences, in industries and the social sector, in sports, culture and politics. Construction projects represent the most important constituent part of human activities. Project implementation is similar to the waving of a magic wand, when "the target result is generated from nothing". However life is sometimes different from fairy tales, and each so-called act of "waving" is usually backed by the hard work performed by talented project developers, by their extensive knowledge, expertise, skills, and multiple other factors. Project management theory and practice has been developing alongside the humankind, and it has traveled a long way from the "cabalistic" knowledge to formalized methods, technologies, and procedures. [2]

Sometimes, the word "project" contemplates some kind of a model, or a sketch of the future city, district, or building. However, this is a "paper project". Here we can draw an analogy with term papers or theses, well known to each former student.

Projects, developed in the construction industry, encompass each undertaking, starting from the idea of a new structure and all the way through its commissioning, as well as its repairs, restructurings, remodeling, and other construction works performed in the course of the operation and use of buildings/structures. [3]

Any construction project, be it a residential house or a plant, contemplates a lot more than architectural planning and delivery of construction materials. [4] Each construction project contemplates the social effect of its implementation, for example, whether the house will be convenient. Moreover, any construction project solves a multiplicity of specific problems in a variety of functional areas: how efficient the process flow will be, whether the plant products will enjoy demand, whether construction-related impacts can deteriorate the quality of living in a residential house, and whether the new construction can cause forest mortality or lake drainage. Today specialists willing to implement investment projects in the construction industry should know how to work with investment project/realty management software, distributed databases and knowledge bases, containing regulatory and reference information on construction projects, multimedia technologies and virtual representations in architectural/civil engineering design, local and trans-regional information networks. [5]

Besides, any efficient implementation of construction projects requires specialized management systems, because it is impossible to remember the whole variety of project information or to have it on paper (including the master plan, the correspondence, -related information concerning contractors and the track record of interaction between them). This information poll is to be stored, processed, and studied. Alternative solutions need to be generated; optimal solutions need to be selected. Today investment projects, involving construction undertakings, are implemented by big companies, developing several projects at a time. Therefore, their management systems must be able to process both one and several interrelated and/or independent projects at a time, and this multi-task activity is usually called programme/project portfolio management. In this connection, the methodology for project/targeted programme management, applicable to investment projects, implemented in the construction industry, needs development and/or improvement. The most acute problems consist in the coordinated management of projects which have to share technologies or resources and to compete for them in case of deficiency. Portfolio management can successfully solve each of these problems. In this article, the co-authors will consider the main programme/project portfolio management processes and approaches. [5]

3 Groups of portfolio management processes

If analyzed from the standpoint of management deliverables, portfolio management processes can be broken down into three main groups:

“Formation and Adjustment” represents a group of processes triggered on the “if needed” basis. These processes are triggered as a package or one by one; they are used to identify, classify, assess, prioritize, select and balance the portfolio constituents, and to identify the method of their management;

The **“Monitoring and Control”** group of processes analyzes portfolio deliverables to reconcile the portfolio and its constituents against Strategic Goals and Objectives on the ongoing basis;

The **“Maintenance and Development”** group of processes analyzes any changes in the environment and the Strategy to adjust, timely readjust and adapt the portfolio management systems on the ongoing basis.

The above groups are available within any portfolio management system irrespective of the scope of activity or the form of ownership of a company. If processes are grouped on the basis of target deliverables, the invariant composition and content of portfolio management processes can be compiled.

The implementation of the “Formation and Adjustment” group processes depends on the other processes, implemented within the framework of business and project-related

activities. The implementation of the “Monitoring and Control” group processes influences the monitoring and control processes, implemented in the course of the project/programme implementation. These interdependencies and mutual influences serve as the basis for the integration of the portfolio management processes with corporate management. The implementation of “Maintenance and Development” processes sets the stage both for the regulation and stabilization of portfolio management processes, and for the improvement of the system of portfolio management, as a whole, and its integration with other corporate management systems.

4 The “Formation and Adjustment” group of processes

The processes, comprising this group, guarantee the following factors and deliverables:

- Portfolio compliance with corporate strategic goals;
- Applicability of rules and criteria to portfolio management;

They also set

- The structured approach to ensure “the maintenance” of the set of programmes and projects in the condition agreed with the corporate strategy.

The processes of this group are particularly active in the following management cases:

- Selection of programmes/projects for the portfolio;
- Portfolio adjustment (in case of substantial deviations from Basic Plans/Budgets or in case of renewal of the Strategy);
- Approval of basic Plans and Budgets for programmes/projects.

Traditionally, the adjustment of the Strategy, short-term scheduling and budgeting are performed once a year, although they can be done more frequently, for example, once a quarter, or on the “ad hoc” basis, for example, in case of changes in the business activity and/or its environment. When all programmes/projects are selected for the portfolio, duly agreed with Strategic goals, prioritized and approved for implementation, it is necessary to implement monitoring and control functions both in terms of each project/programme, and the portfolio as a whole. There is a need to guarantee that constituent projects/programmes and the portfolio as a whole will remain in compliance with the Strategy, that they are duly implemented, the anticipated results will be finally delivered, and that they will deliver the expected effect. This group has seven processes:

Table 1. “Formation and Adjustment” group of processes

Process name	Definition
Identification	Identification of cases of compliance/non-compliance of new programmes or projects with those formal features and/or criteria which qualify them as appropriate for the portfolio
Classification	Assignment of classifying features to the programmes or projects and their adjustment. Classification will help to break down the programmes and projects into homogenous groups for their further assessment, selection, prioritization, adjustment, as well as application of mature approaches to portfolio management
Assessment	The quantitative definition of the “value” and the potential contribution of each project and programme both into the delivery of target portfolio deliverables, and into the implementation of the Strategy as a whole
Selection	Assignment or adjustment of priorities in terms of all projects/ programmes in the portfolio
Balancing	Formation of such a set of projects/programmes in the portfolio, which will have maximal potential and synergy for the portfolio and for the attainment of Strategic Goals in case of minimal expenses and pre-set limitations
Approval	The formal approval and implementation of resolutions to balance the portfolio

The processes from this group are triggered to select the projects/programmes into the portfolio and to identify the methodology of their management as part of the portfolio.

5 The Monitoring and Control group of processes

The processes of the “Monitoring and Control” group guarantee the following factors:

- Feasibility of the Strategy through the implementation of programmes/projects;
- Effectiveness and performance in terms of programmes/projects in compliance with the pre-set criteria and performance indexes, both in terms of the whole portfolio, separate groups of projects/programmes, and individual projects/programmes;

They also set

- Specific regulating impacts produced on projects/programmes and the portfolio as a whole.

The processes of this group are particularly active in the following cases:

- Compilation of reporting (regular and on-demand) on the project management and Strategy implementation;
- Approval of the implementation of specific steps and the whole projects/programmes;
- Formation of day-to-day regulatory impacts in case of identification of deviations from the pattern of implementation of projects/programmes and the portfolio as a whole.

The control over deviations and reporting is usually performed on the regular basis; portfolio and Strategy reports are delivered to the top executives. Any deviations identified here are exposed to analysis, and regulating impacts are developed to remedy the deviations. If substantial deviations in the implementation or substantial changes in the conditions (external or internal) are identified, the instructions, requesting the re-balancing of the portfolio and respective adjustment of the composition and content of the projects/programmes within the portfolio, are generated.

This group of processes has four clusters:

Table 2. Monitoring and Control group of processes

	Brief definition
Performance approval	Aggregation of information on controllable parameters of the projects/programmes, the portfolio and the Environment, and confirmation of convergence between the project/programme reports and the actual stage of their implementation
Identification of deviations	Identification of deviations of the controllable parameters of projects/programmes, the portfolio and the Environment, from the target parameters, and confirmation of compliance with the rules and delivery of mandates
Day-to-day regulation	Production of timely and adequate impacts on programmes and projects, the portfolio and the Environment to prevent/remedy any potential or identified deviations; improvement of the efficiency of resources/funding contributed to the portfolio
Compilation of reports	Confirmation of implementation of the approved Strategy and controllability of the portfolio, as well as the efficiency of resources/funding contributed to the portfolio

The processes comprising this group perform a regular analysis of projects/programmes and the portfolio as a whole to confirm the compliance between the actual and benchmark values, and to make immediate adjustments to projects/programmes to eliminate any identified or potential deviations. Upon the completion of the analysis, reports are compiled in respect of the portfolio and the Strategy implementation.

6 Processes comprising the “Maintenance and Development” group

The processes of the “Maintenance and Development” group guarantee the following factors:

- Portfolio compliance with the pre-set corporate criteria and values (ROI, NPV, IRR, etc.);
- Systemic use of the pre-set rules backed by the relevant infrastructure in respect of the portfolio management activities (including information delivery systems);

They also set

- Principles, characteristic values and criteria for the assessment, selection, prioritization, and balancing of projects/programmes within the portfolio.

The processes of this group are particularly active in the following cases:

- Identification and assessment of changes in the Strategy and the portfolio Environment;
- Consideration and resolution of any issues/problems arising in the process of portfolio management;
- Replication of the best methods and practices;
- Task-oriented development of the portfolio management system.

As a rule, any changes in the environment are controlled on the regular basis, and notices are generated in respect of changes in the Strategy. The consideration and resolution of any issues/problems and replication of the best methods and practices are performed on an “if needed” basis. Development, improvement and adjustment of the portfolio management system are performed in the cases when the existing elements are unable to efficiently complete the tasks.

This group comprises three processes:

Table 3. Maintenance and Development group of processes

	Brief definition
Identification and analysis of changes	Aggregation and analysis of information on the changes that can produce influence on the portfolio, the course of portfolio management, its projects/programmes
Consideration of issues and problems	Aggregation and analysis of any issues/problems; their further prompt resolution; generation of management impacts aimed at their prevention
Improvement of the management system	Improvement and development of the elements of the portfolio system management, aimed both at its reconciliation with the Strategy, and at the improvement of the efficiency of resources/funding contributed to the portfolio

The processes comprising this group serve to perform a regular analysis of the corporate Strategy and its Environment, and the elements of the portfolio management system to generate, adjust, and develop the portfolio management and corporate management system.

Conclusion

The relevance of and demand for the portfolio management objectives stimulate the development of the theory and methodology of portfolio management systems at construction companies. The extent of sophistication of the portfolio management model, chosen as the basic framework, will impact the successful introduction of portfolio management, improvement of the work efficiency and competitiveness of construction companies. The most important quality criteria for this “basic” model include the mutual

consensus and sophistication of its elements, its invariability and adaptability to specific features of particular organizations and their portfolios free from systemic contradictions.

In this article, the co-authors offer a general description of the main processes for an invariant model of the portfolio management system. The invariability was pilot-tested in the course of several projects to check the composition and the content of processes, information interfaces, and instruments.

The proposed approach has proven to have a high methodological and practical potential, and it guarantees the availability of the capacity required for the further development and improvement of project/programme management processes within business enterprises, including construction companies.

Further research efforts will involve further detailed elaboration of the proposed process model and generation of models of methods and competencies serving portfolio management processes.

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