

*project management,  
project finance,  
transport telematics (ITS)*

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## PROJECT MANAGEMENT METHODS APPLIED TO TRANSPORT TELEMATICS (ITS)

This paper presents systematized knowledge related to *Project Management* and *Project Finance*. The PF technique is of the utmost importance from the point of view of the realization of investment projects in the area of traffic and infrastructure telematics. In connection with the forthcoming moment of putting into effect in Poland the Act on Public and Private Partnership, I consider the examination of problems from this field to be both useful and indispensable for the purpose of realizing telematic projects in cities and regions of the country of great economic and logistic importance, and also taking into account structural resources and the cohesion of the EU.

## ZASTOSOWANIE METOD ZARZĄDZANIA PROJEKTAMI W TELEMATYCE TRANSPORTU (ITS)

W artykule przedstawiono usystematyzowaną wiedzę dotyczącą Project Managment'u oraz Project Finance. Szczególnie istotna jest metoda PF w realizacji projektów inwestycyjnych w telematyce transportu i infrastrukturalnych. W związku z krótką perspektywą wejścia w życie Ustawy o Partnerstwie Publiczno-Prywatnym w Polsce poruszenie zagadnień z tej dziedziny uznałem za celowe i niezbędne do realizacji projektów telematycznych w miastach i regionach kraju o dużym znaczeniu gospodarczym i logistycznym z uwzględnieniem środków strukturalnych i spójności UE.

### 1. INTRODUCTION

With the economic development of the world and an increasing number of undertakings from the area of transport telematics, which have been more and more complex, there occurred the need for systematizing the knowledge related to *Project Management* and *Project Finance*, a specific method of financing infrastructure projects, which will be discussed in item 7.

The main objectives of project management techniques are:

- to minimize the project-related risk,
- to realize the project in such a way that the expected results are secured,
- to enable the investor to fully control the realization of the project.

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On the basis of empirical data coming from the projects in progress and already realized projects in various countries, works related to defining the methodology were started. The prepared methodologies undergo permanent modifications in line with economic and political changes, as well as new experience gained by project teams. It is especially important in case of urbane telematic systems, undergoing dynamic development, because within the last ten years numerous revolutionary teleinformatic technologies have been implemented.

Parallel to works on the methodology, there has been also research related to the best methods of popularizing gathered and aggregated knowledge. In this way another discipline of management was born, mainly *Knowledge Management*. One of the strategic carriers of knowledge became IT technology. It is especially useful at those stages of the investment, when various computer applications are used during project works.

## 2. DEFINITIONS

“Project Management” is a number of activities leading to the complete or partial realization of the product or service subject to sale, in accordance with the customer’s (customers’) needs and with the profit margin for the contractor.

The objective of Project Management is to attain the project goals, while using the functional organization resources so that the customer’s (customers’) satisfaction is achieved.

Project Manager is a person responsible for:

- analysis of needs,
- planning,
- allocation of resources to every activity,
- control of the project realization,
- organization of resources on the operating level,
- motivation of the team,
- selection of the team members.

“Project lead time” is the total time from the analysis of the customer’s needs to the acceptance of modules delivered by the customer.

“Project deliverables” are objects that should be delivered by the supplier on the basis of the customer’s specification. They could be complete products or services, as well as partial products or services.

## 3. WHY DO WE NEED PROJECT MANAGEMENT?

- It allows to clearly identify the person and team responsible for subsequent aspects of the undertaking.
- It is the best way to increase productivity and shorten the time of realization of the undertaking.
- It is perfect training for the general management, because it involves key aspects of management.
- It makes the “Management by Objectives” more realistic and measurable.
- It focuses the attention of the team on costs and quality control.
- It develops team work.
- It encourages the team to constantly learn and think about all the team members.

- It shortens the project lead time through competition, the increase of the customer's requirements and more effective/ focused management.
- Complex technical solutions result in a big number of single tasks and require better planning and co-ordination of subsequent activities.
- A higher quality results in a lower level of waste and time savings.
- A big number of changes requires quicker reactions and a suitable decision support system.
- Frequent changes of the customer's requirements are the reason for respective frequent changes of communication channels and re-directing to primary information resources.
- The shortening of the product lifecycle requires a quick realization of the project in order to maximize the time of exploitation.

#### 4. STAGES OF THE PROJECT

##### **Stage 1 - Preparation**

- Pre-project definitions prepared by the management team (specifying objectives, the time of realization).
- Corresponding conditions for the Project Manager and his team.

##### **Stage 2 – Design works**

- Analysis of actions and setting the cornerstones.
- Allocation of resources.
- Selection of the critical path.
- Optimization of the use of resources.

##### **Stage 3 – Control of the plan**

- Frequent control meetings, putting down problems, defining repair activities.
- Regular control of “corner stones”, meetings with function managers, authorization of changes.
- Formal review of the final engineering project and the exact estimate of finances, implementation plans.
- Information for the customer.

##### **Stage 4 - Implementation**

- Review of the team membership and scope of assigned responsibilities.
- Supplementary training for the team.
- Control of completion of “corner stones” in course of realization of the undertaking.
- Reminding of objectives in relation to introduced changes.
- Post-project “review”, aiming at gathering information serving the purpose of a better realization of future projects.

##### **Stage 5 – Review of the project delivery**

- Verification of the fulfillment of the customer requirements.
- Acceptance of repair activities and costs.
- Information on the review results for the higher-level management.

The above procedure is quite rigid and that is why it is difficult to realize a project according to those assumptions in such a way that it is successful and profitable. For that reason it is important that:

- The higher-level management allocate proper resources.
- Realization dates given to the Project Manager are clearly and explicitly fixed.

## 5. OBJECTIVES AND SCOPE OF RESPONSIBILITY

- **Objectives of Project Management** – to deliver a product/ service on time and in accordance with the budget assumptions so that the customer's requirements are fulfilled (customer satisfaction).
- **Scope of responsibility**
  - Project Manager – is responsible for attaining the above goals.
  - Chief Executive Officer, C.E.O. – grants a suitable quantity of resources, proportionally to the project requirements, delegates authority to the Project Manager, so that he can attain set objectives.
  - Functional Managers – allocate resources for which they are responsible, adequately to the Project Manager's needs in order to support him in course of realization of the project.
  - Team Members – support the activities of the Project Manager, realize tasks in accordance with his orders, so that he is satisfied.

## 6. PROJECT MANAGEMENT CONTROL

The effectiveness of changes and Project Management requires control on two levels:

- General strategy of the project control (strategic level),
- Detailed operational control (tactical level),

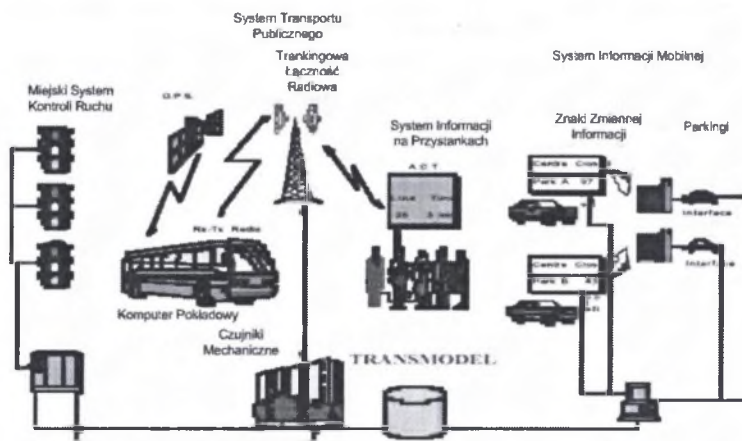
The success of a project because of effective control activities is measured by:

- meeting of planned realization dates,
- meeting of the budget assumptions,
- fulfillment of the assumed commercial objectives,
- attaining of assumed technical parameters,
- suitable administration of project changes,
- successful delivery of the complete undertaking to the customer.

Important practical elements supplementary in relation to controls are:

- selection of a strong leader organizing the team,
- monitoring and rewarding the teamwork,
- agreeing to the way of reviewing the progress of works (progress reviews) and control mechanism.
- suitable training, the use of skills and knowledge of the team members,
- encouraging innovation and rewarding inventiveness,
- developing communication channels, procedures and methodology,
- identifying measures of quality control in course of maturation of the undertaking,
- selection and implementation of processes aiming at the constant cost reduction and progress.

Appropriate understanding of relations taking place between the functional organization and Project Management (process approach) is the basic condition for achieving success in Project Management, e.g. in course of realization of UITs projects (see picture).



Description of the picture:

- *Miejski System Kontroli Ruchu* = City System for the Traffic Control
- *System Transportu Publicznego* = Public Transport System
- *Trankingowa Łączność Radiowa* = Tranking Radio Communication
- *System Informacji na Przystankach* = Information System at the Bus-Stops
- *System Informacji Mobilnej* = Mobile Information System
- *Znaki Zmiennej Informacji* = Signs of Changeable Information
- *Parkingi* = Car Parks
- *Komputer Pokładowy* = On-Board Computer
- *Czujniki Mechaniczne* = Mechanical Sensors

Another method important for the realization of telematic projects is Project Finance (PF).

## 7. WHAT IS PROJECT FINANCE ?

Project Finance is a specific method of financing, according to the method drawn from the initiator's structures, infrastructural projects and projects for the public services sector, where the source of the repayment of debt and returns from own capital used to finance the project are cash flows generated by the project.

The below scheme presents a typical structure of Project Finance. In the center there is a licensed company, called Special Purpose Vehicle - SPV, the shareholders of which are investors or other parties for some reasons interested in the project (e.g. the contractor or operator of the investment). SPV is established as an independent entity subject to the commercial law that can enter into contracts necessary to realize the project.





*Description of the picture:*

*Sponsorzy = Sponsors*

*Umowa Spółki = Deed of Association*

*Kapitały = Capital*

*Spółka Celowa = Special Purpose Vehicle (SPV)*

*Władze Koncesjonujące = Licensing Authorities*

*Koncesja = License*

*Banki / Pożyczkodawcy = Banks / Lenders*

*Pożyczki = Loans*

*Umowa o Finansowaniu = Financing Agreement*

*Operator = Operator*

*Umowa Zarządzania = Management Contract*

*Preferowani Odbiorcy = Preferred Receivers*

*Długoterminowe Kontrakty Sprzedaży = Long-Term Sales Contracts*

*Preferowani Dostawcy = Preferred Suppliers*

*Długoterminowe Kontrakty Zaopatrzeniowe = Long-Term Delivery Contracts*

*Generalny Wykonawca = General Contractor*

*Kontrakt Budowlany = Building Contract*

Governmental institutions, self-governing institutions or other public bodies (called licensing authorities) grant to SPV a license (a tool allowing to carry the project into effect) called also the "project contract". The license is the basis for other contracts presented in the picture. The license grants to SPV the exclusive right to realize the specified services with the use of infrastructure serving this purpose and created within the project infrastructure in a specified period of time. After the lapse of time specified in the license the infrastructure created by SPV in the license period and belonging to SPV in this period becomes the property of the licensing authority according to conditions specified in the license.

The biggest advantage related to Project Finance is the possibility of realizing the project without or with a limited recourse in relation to its sponsors. The main source of repayment of the debt drawn are cash flows generated by the project, and they are usually the

focus-point of potential lenders. If the project fails, the principal source of satisfying claims of the indebted part of financing become the assets of SPV, i.e. the infrastructure provided for in the project.

A special role in the Project Finance method is played by contracts engaging all the parties involved in the project. They define in detail roles of various parties, their tasks within the framework of the project and their commitments related to risk sharing. Elements of the legal architecture of transactions are also contracts specifying the course of proceeding, method of realization and supervision of the investment stage of the project, financing structure and procedures of introducing changes, debt structure and procedures for the repayment and servicing, operational procedures of the project, way of proceeding in the event of the lack of completion of the investment, exceeding its estimated costs, discrepancies between estimated and achieved cash flows, and sometimes also measures for unpredictable actions (e.g. natural catastrophes).

Irrespective of the character of investment planned within the framework of the project, SPV usually signs a contract with the General Contractor, who will be responsible for the realization of investment in the "turnkey" formula for an agreed remuneration. This contract specifies also the method and payment conditions related to the General Contractor's remuneration (e.g. the amount of installments and works preceding the payment out). Such a contract can also transfer to the General Contractor responsibility for potential delays in works (e.g. agreed penalties) and specify procedures implemented at the occurrence of the risk of exceeding agreed costs. The General Contractor can also be a shareholder of SPV, which means that he is one of the project sponsors and can keep his shares after the project has been initiated or sell those shares to other sponsors or third parties, most often according to the method provided for in the Deed of Association of SPV or in the Statutes.

After the completion of one of the investment stages and the start of exploitation of the created infrastructure other contracts, characteristic for projects realized according to the Project Finance method, are entered into - Operator (specifying the entity responsible for the operational functioning of the project, his rights and duties), Preferred Supplier and Preferred Receiver. The latter are sometimes a preliminary condition of starting the project, especially when its object is, e.g. an element of energetic infrastructure like a power plant, in which case agreeing to the issues of deliveries of required resources and sales conditions of the generated energy is of the utmost importance for the success of the project.

## 8. WHEN DO WE USE PROJECT FINANCE?

The Project Finance method is practically used all over the world, in numerous economic sectors and branches. It becomes more and more popular, especially in the situation, when governments try to engage the private sector in the financing of public infrastructure elements and exploiting them.

The Project Finance method is frequently used in the following sectors:

- Telecommunications and IT – with the rapid progress of the telecommunications technology in the last ten years, the Project Finance method is reported to be used more frequently, especially for the purpose of financing infrastructure necessary to launch new services.

- Road sector – the increase in the traffic intensity exceeding the possibilities of governments to develop and enlarge the road system is the global problem, which resulted in attempts to engage private funds to construct thoroughways that have to be paid for.
- Rail and road transport – the popularity of Project Finance as the method of assuring resources for the modernization of the existing railway connections, as well as for the development of new connections, including the development of rapid city narrow-gauge railways and the Subway systems has been constantly increasing. In the same way the necessary funds can be obtained in places, where the local authorities decide to create the licensing system for the town bus or tramway communication systems.
- Public services – up to this time regarded as an almost exclusive problem of the authorities. Especially in Europe, more and more often Public and Private Partnerships are created, which on the basis of the obtained licenses design, finance, construct and operate the infrastructure for the public services.

## 9. RECAPITULATION

The Project Finance method has begun to dominate in the field of financing and initiating infrastructural projects all over the world. Further popularization of this method, the increase in the number of thus available financing sources and the increasing role of the private sector in rendering public services is also forecasted by the World Bank.

The private sector entails efficiency, effectiveness and managerial skills mastered for a long time, supporting the improvement of the quality of services and availability of public services, such as transport, water supply, telecommunications, environmental protection. To sum up, the following applications of *PM* in the management of project can be distinguished:

1. Proper evaluation of the situation and making optimal choices
2. Quick organization of own thoughts and thoughts of project teams
3. Individual and group creativity
4. Defining, analyzing and solving problems occurring in telematic projects
5. Redefining objectives in relation to time, resources, changeable requirements
6. Support for the memory and learning process and of *PM* teams
7. Assurance of effective communication in the project team
8. Appropriate audit of the risk management.

The implementation of the above methods in the realization of projects from the area of transport telematics will result in the dynamic development of *ITS* systems in our country. Also for these reasons, governments should facilitate the engagement in financing infrastructure and delivering public services to enterprises of the public sector. To this aim, effective legislative processes related to the Public and Private Enterprises are needed; they should be efficient enough to enable a quick use of structural funds and the cohesion of the EU.



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