THE PROJECT MANAGEMENT PROCESS APPLIED FOR OPTIMIZATION OF A COUNTY PUBLIC PASSENGER TRANSPORT NETWORK.

Sorin Ilie, Gabriela Mitran, Ion Tabacu,
Nadia Ilie, Viorel Nicolae, Alexandru Boroiu
University of Piteşti, sorin.ilie@upit.ro

Abstract: Management, addressed concurrently as the theory and practice, is one of the most important elements of performance for projects. This paper presents a specific project management process for a project whose main objective is to optimize the county public transport network. The main elements of project computer model that includes: project activities, activity dependencies, resources and their assignments, calendars, project costs, work, resource and cost breakdown structures was developed using specialized software in Project Management.

1. DEFINITION

Project management represents the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project. Meeting or exceeding stakeholder needs and expectations invariably involves balancing competing demands among [2]:

- *scope, time, cost and quality;*
- *stakeholders with differing needs and expectations;*
- *identified requirements (needs) and unidentified requirements (expectations).*

2. THE PROJECT MANAGEMENT PROCESS

In the modern sense, the project management began in the early 1960s, driven by businesses that realised the benefits of organising work around projects, and the critical need to communicate and co-ordinate work across departments and professions [5].

Project management does not represent a small matter. It has a definite beginning and end and is not a continuous process. It uses various tools to measure progress and track project tasks. Projects need ad-hoc resources, as opposed to businesses that have dedicated full-time positions. Regardless of the methodology or terminology used, project management uses the same basic processes, as is shown in figure 1.
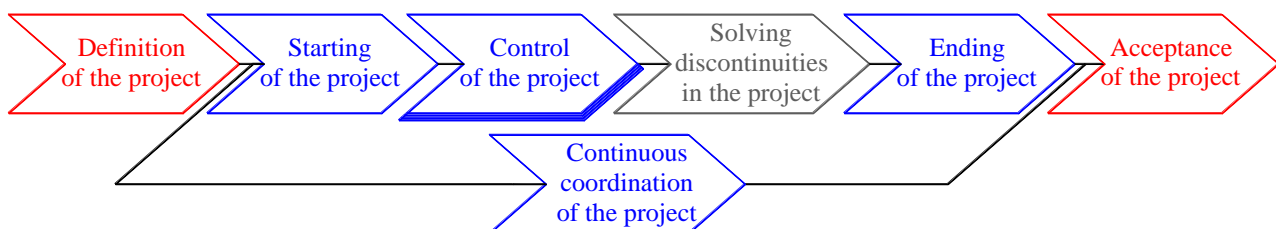

Figure 1. The phases of the project management process.

The project management process aims to achieve a professional project management. In order to reach the objectives, the project should be starting sub-processes of coordination, control, (eventually) overcome a break in the project and the end project.

The items of interest for the project management are: *objectives; outputs; deadlines; costs; profits; risks organization; culture; context of the project.*

The dimensions project context are: pre and post project phase, environment projects, other projects, company strategies and business houses in the project's initial investment.

The description of the project management process includes defining the objectives of the process, its borders and an overall structure of this process.

From the systemic perspective, the objective to initiate the project is to establish the project as a social system. The control objective is to encourage project development and the objective of completion project is to dissolve the project as a social system. The objective to overcome a break is to make a new identity of the project. The ongoing coordination objective is to ensure continuity of communication tasks in the project.

Fulfilling the coordination process of the project is done throughout the project, while achievement of other processes is limited in time.

During the course of individual processes consume energy in the form of resources used to achieve the desired level of quality project management. By definition, start and end of the project are done once. The control process is done several times during the project, periodically and/or achievement of project milestones.

The advantage of an integrated approach to project management processes is, on the one hand, to ensure continuity of approach used for project management, taking into account, and, on the other hand, the dependencies and the connections between sub-processes of project management.

Over several decades, the project management process was understood as an application of the technique of "network planning" to carry out deadlines, resource planning and costs in projects. Given the uncertainties associated with traditional single tasks management projects to be taken into account both methods of risk management and performance monitoring, project deadlines corresponding the costs of appropriate resources.

3. APPLYING THE PROJECT MANAGEMENT PROCESS
FOR OPTIMIZING A COUNTY PUBLIC PASSENGER TRANSPORT NETWORK

The passenger public transport is part of social services and it has the following specific characteristics:
- *represents a social utility service;*
- *is located in a permanent report with government institutions and local government authorities;*
- *provides collective benefits and general interest;*
- *operate on two basic principles:*
  - **continuity** – *this service can not be interrupted, even if public life is disrupted, it must continuously meet the public interest*
  - **public interest** – *should take priority over the individual interest.*

For this public service to work properly in a county and in the spirit of the two fundamental principles listed above, it is necessary to ensure the following: *the service organization (management); qualified personnel; european standards for all infrastructure / transportation; adequate financial resources; ensuring safe and comfortable trip; environmental protection; equal treatment and non-discriminatory basis to all users; providing quality services in terms of reasonable tariff for travel; efficient management of public assets and funds.*

In Romania, county public transportation service through regular service has suffered a series of radical changes after 1990, as a result of changes in the Romanian economy, due to its transition to a market economy. County Councils are obliged by law to assess the public transport network of passengers based on specialized studies, analyzing the current situation and making medium term predictions, at the same time with the optimization of county transportation network.

Below is presented the specificity of projects management process for a project whose main objective is the optimization of regional public transport service. The direct beneficiary of the project is generally County Council and the indirect beneficiaries are the residents of county which represent the subject of study. After initiation, the project was planned to an appropriate level of detail. The next step was planning of time, cost and resources estimated and to manage risk effectively during project execution.

The project is divided into 7 work packages, each containing a number of specific subtasks. Project activities are planned to be realized in a period of 8 months. Table 1 contains the planning activities [4] performed with specialized software in project management – *Microsoft Project.*

Table 1. The work breakdown structure.

ID	ⓘ	Task Name	Duration	Start	Finish	Predecessors
1		**Public Transport Service**	**193 days**	**Mon 01.11.10**	**Wed 27.07.11**	
2		**Project Management**	**193 days**	**Mon 01.11.10**	**Wed 27.07.11**	
3		Initiation	1 day	Mon 01.11.10	Mon 01.11.10	
4	▦	Coordination	193 days	Mon 01.11.10	Wed 27.07.11	
5	◯	**Control**	**176 days**	**Mon 01.11.10**	**Mon 04.07.11**	
6	▦	Control 1	1 day	Mon 01.11.10	Mon 01.11.10	
7	▦	Control 2	1 day	Mon 06.12.10	Mon 06.12.10	
8	▦	Control 3	1 day	Mon 03.01.11	Mon 03.01.11	
9	▦	Control 4	1 day	Mon 07.02.11	Mon 07.02.11	
10	▦	Control 5	1 day	Mon 07.03.11	Mon 07.03.11	
11	▦	Control 6	1 day	Mon 04.04.11	Mon 04.04.11	
12	▦	Control 7	1 day	Mon 02.05.11	Mon 02.05.11	
13	▦	Control 8	1 day	Mon 06.06.11	Mon 06.06.11	
14	▦	Control 9	1 day	Mon 04.07.11	Mon 04.07.11	
15		End of Project	1 day	Wed 27.07.11	Wed 27.07.11	39
16		**Geographic, economic and demographic characterization of the main transport poles in the county**	**82 days**	**Mon 01.11.10**	**Tue 22.02.11**	
17		Request socio-economic and demographic data from the National Institute of Statistics, County Department	10 days	Mon 01.11.10	Fri 12.11.10	
18		Collection of socio-economic and demographic data of the territory	60 days	Wed 03.11.10	Tue 25.01.11	17SS+2 days
19		Origin - Destination survey. Identifying the behavior of users transport network.	30 days	Wed 10.11.10	Tue 21.12.10	18SS+5 days
20		Generating electronic data bases	10 days	Wed 26.01.11	Tue 08.02.11	18;17;19
21		Data processing	10 days	Wed 09.02.11	Tue 22.02.11	20
22		**Analysis of legal framework for passenger public transport**	**20 days**	**Mon 01.11.10**	**Fri 26.11.10**	
23		Identify the principles concerning the organization and operation of county public transport for passengers	10 days	Mon 01.11.10	Fri 12.11.10	17SS
24		Setting rules - framework and specifications - framework for county public transport for passengers	10 days	Mon 15.11.10	Fri 26.11.10	23
25		**Analysis of passengers public transport network in the county**	**30 days**	**Wed 23.02.11**	**Tue 05.04.11**	
26		Caracterization of actual public transport system in the county	10 days	Wed 23.02.11	Tue 08.03.11	21
27		Calculation of quantitative and qualitative indicators of county public transportation network	15 days	Wed 09.03.11	Tue 29.03.11	26
28		Identify system deficiencies	5 days	Wed 30.03.11	Tue 05.04.11	27
29		**Estimation of passengers transport demand**	**55 days**	**Wed 26.01.11**	**Tue 12.04.11**	
30		Traffic analysis zone	15 days	Wed 26.01.11	Tue 15.02.11	18
31		Construction of the transport network	15 days	Wed 16.02.11	Tue 08.03.11	30
32		Construction the transport model	15 days	Wed 09.03.11	Tue 29.03.11	31
33		Analysis the current traffic flow of public transport network	10 days	Wed 30.03.11	Tue 12.04.11	32
34		**Develop strategy and policy for passenger public transport optimization on regular services in the county**	**15 days**	**Wed 13.04.11**	**Tue 03.05.11**	
35		Establishing strategic directions and actions to optimize public transport network for passengers	15 days	Wed 13.04.11	Tue 03.05.11	33;28
36		**Sizing public transport system for passengers**	**60 days**	**Wed 04.05.11**	**Tue 26.07.11**	
37		Configuring the optimized transport network	20 days	Wed 04.05.11	Tue 31.05.11	35
38		Setting the type and number of vehicles	10 days	Wed 01.06.11	Tue 14.06.11	37
39		New transport schedule for optimized network	30 days	Wed 15.06.11	Tue 26.07.11	38;24

The project team comprises 15 people: project manager, assistant manager, engineer specialized in public transport passengers, statistician, jurist, sociologist, computer system administrator, eight operators for data recording in the territory.

The resources involved in running the project are two categories: human resources (table 2) and material resources (table 3). Associated costs for these required resources are described in the table 2.

The total costs for the both type involved resources are 118615 euro.

Table 2. The project costs for human resources.

No.	Category of expenditure	Unit	Number of units	Cost/unit [EUR/unit]	Costs [EUR]
1.	Manager	month	10	1500	15000
2.	Assistant manager	month	10	650	6500
3.	Coordinator of operators for data recording	worked days	90	60	5400
4.	Operator for data recording x 8	worked days	90 x 8	50 x 8	36000
5.	Computes system administrator	worked days	20	130	2600
6.	Statistician	worked days	25	120	3000
7.	Jurist	worked days	20	110	2200
8.	Engineer specialized in transportation engineering field	worked days	160	120	19200
9.	Sociologist	worked days	15	110	1650

Total human costs: *91550*

Table 3. The project costs for material resources.

No.	Category of expenditure	Unit	Number of units	Cost/unit [EUR/unit]	Costs [EUR]
1.	Information materials	piece	100	6	600
2.	Recording sheets	piece	1000	0.5	500
3.	Telephone	piece	2	80	160
4.	Fax	piece	1	120	120
5.	Computer	piece	12	1000	12000
6.	Printer	piece	1	300	300
7.	Printer toner	piece	3	150	450
8.	Paper	piece	20	6	120
9.	Subscription for Official Monitor of Romania	monthly pass	1	15	15
10.	Software for creating and managing databases	piece	1	600	600
11.	Text Editing Software	piece	1	300	300
12.	Software specialized in the management of transport networks	piece	1	7000	7000
13.	Transport services	persons x travels	12 x 15	25	4500
14.	Telephone services	monthly pass	10	25	250
15.	Internet services	monthly pass	10	15	150

Total material costs: *27065*

In order to identify as early as the issues arising during the development of projects and the application of mitigation measures is done to monitor and control the project. This control activity has been planned as a reccuring activity in the project, so that an interval of one month has been a control session. Associated risks with project activities, the response strategy applied to minimize their impact and probability of occurrence, and the scores associated for impact and probability of occurrence are synthesized in the table 3.

Table 3. The risks management.

Activity ID	Risk	Response Strategy	Impact (I)	Probability (P)	IxP
17	Non-conclusion of the agreement	Negotiations with the representatives of National Institute of Statistics	5	1	5
18	Gathering of incomplete or erroneous data	Collecting and processing data with specialized equipments and trained personnel	2	1	2
19	Gathering of incomplete or erroneous data	Collecting and processing data with specialized equipments and trained personnel	4	1	4
19	Adverse Weather Conditions	Reprogramming activity	4	1	4
19	Lack of availability of respondents	Attracting the respondents by promoting the social benefits of the project	3	1	3
21	Processing Errors	Processing data with specialized equipments and skilled personnel	4	1	4
28	Inexperienced personnel	Continuous training of the personnel	5	1	5
30	Incapacity of the equipments	Purchasing of high-performance software with high work capacity	4	1	4
31	Incapacity of the equipments	Purchasing of high-performance software with high work capacity	4	1	4
33	Incapacity of the equipments	Purchasing of high-performance software with high work capacity	4	1	4
34	Inexperienced personnel	Continuous training of the personnel	5	1	5
35	Communication problems between the team members	Enhanced communication, joint meetings	5	2	10
36	Inexperienced personnel	Continuous training of the personnel	5	1	5

The impact and probability of risk receive a value on a scale from 1 to 5, where 1 is low values, and 5 very high values for both parameters [3].

4. CONCLUSIONS

In this paperwork were presented specific processes to be undertaken within project management, focusing on regional public passenger transport. Also, there were presented the risks associated with the project activities and it was found that the parameter Impact x Probability recorded maximum values for the risk of communication problems between the project team members which should establish the strategy for optimizing the public transport. Other major risks are those related to the non-conclusion of the agreement and to the inexperienced personnel.

References

1. Baars, Wouter. Project Management Handbook: DANS – Data Archiving and Networked Services, Holland, 2006. ISBN 90 6984 496 6.
2. Duncan, William. A guide to the Project Management Body of Knowledge - 3rd edition, Project Management Institute, USA, 1996. ISBN: 1-880410-12-5.
3. Garvey, Paul. Analytical methods for risk management: a systems engineering perspective, Chapman & Hall/CRC Taylor & Francis Group, UK, 2009. ISBN: 1-584886-37-4.
4. Ortúzar de Dios, Juan; Willumsen, Luis. Modelling transport, 3rd edition, John Wiley & Sons, UK, 2001. ISBN 10: 0-471-86110-3 (H/B).
5. Wideman, Max. Modeling Project Management, AEW Services, Canada, 2003.