INTEGRATED PROJECT PLAN AS BASIS FOR MULTI-PROJECT SYSTEMS MANAGEMENT

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Abstract

Organizations today are faced with the challenge of managing a bigger number of projects in an efficient way. Public sector is a good example of a multi-project system and each improvement in project management in this kind of environment is a very interesting field for study. Assuming there is a well-defined and organized project management system in place, the literature describes and practical examples show that efficiency depends directly on quality of data delivered from the lowest levels of management. Research into the theoretical background of this phenomenon points to the necessity of a systematic approach to planning: clearly defined demands and standardized forms for project plans development create preconditions for a precise and transparent vertical flow of information available to all project participants. The goal is to record and keep all required pieces of information on the project, in the first place those regarding time and finances, in one place in an integrated document called the project plan.

Key words: *integrated project plan, integrated time and financial plan, integral planning, project management system, public administration, project management*

JEL Classification: H43, O22, H49

1. INTRODUCTION

Although the concepts of time and financial project plans are well-known, in practice they are kept in separate places and recorded in different documents. An integral plan version which unites all pieces of information on the project is not well-represented in practice (Rastovski, 2011). Projects in public administration in the Republic of Croatia are initiated, planned and implemented on different management levels (ministries, counties, cities, public enterprises, agencies, etc.) and are different in size, type, financial sources and alike. Each project, including public projects, can be divided into subprojects, and can at the same time form part of a megaproject (Radujković, 2012). It can be concluded from the above mentioned that there is a need to interconnect projects. A group of projects can be interconnected through continuity, i.e. some projects start once others are finished (e.g. a designing project is followed by a construction project) or through single activities more projects have in common (e.g. procurement procedure for design which is common for more contracts on more projects). Since all of these projects are financed from public funds, the quality of their management directly contributes to the goal of efficient state budget management.

All of the above mentioned points to the need of establishing a system which would create prerequisites for efficient project management on the lowest level in a single project as well as on the level of all projects in the portfolio. In order to achieve it, on the one hand, we have to start from the lowest level or the project itself and set standards for defining and planning the project, so it contains all relevant information. Also, it is necessary to define at the very beginning how the realization of the planned values will be controlled during implementation and how it will be reported on. On the other hand, at higher management levels, it is necessary to define the enterprise project structure (Rastovski, 2011) which will be used to group all projects in the portfolio and thus ensure the bottom-up information flow (data summarization), which enables collection and transfer of relevant information to higher management levels to make managing of a group of interrelated projects (programmes) or the whole portfolio possible.

The basic idea is focused on integral project planning from the project's earliest phase to its closure. This means that all available pieces of information on deadlines, money, people on the project, potential risks, etc., are entered into

the system and planned at the level required for reporting to competent institutions. (Butković et al., 2011).

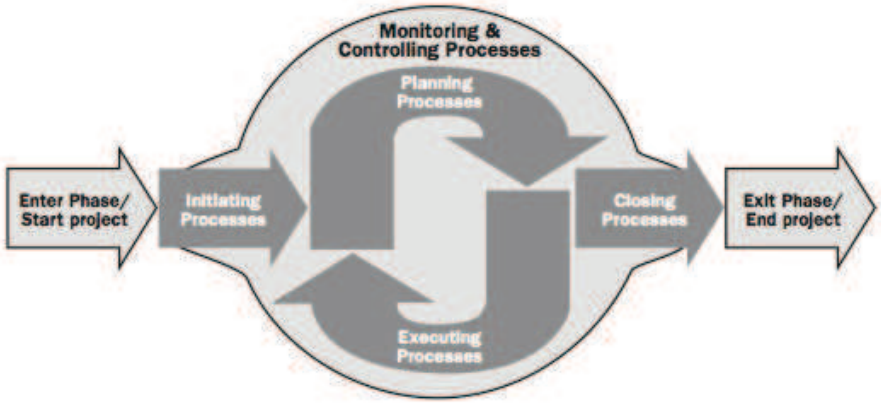
2. RELEVANT TERMS FOR PROJECT MANAGEMENT IN THE CONTEXT OF MULTI-PROJECT SYSTEMS

Literature describes and available pieces of research and examples from practice show that efficiency depends directly on quality of data coming from the lowest management levels in the project portfolio structure. In order to present possibilities of improvement of project management systems in the public sector in the Republic of Croatia, the theoretical background of some important terms relevant for project and portfolio management has been researched.

2.1. Project life cycle

Each project goes through a number of phases during its life cycle (PMBOK, 2008). After the initial phase comes the planning phase after which the project enters the execution phase. The planning process, which is under continuous control, stretches through the whole time of project duration up to the project activities closure phase. Examples from practice show that in project management in public administration planning is very often relatively rough, if we consider the applied methodology and tools for project planning and control (Rastovski, 2011). It can be concluded that the initialization phase moves to execution and execution control phase with planning which is not represented and detailed enough. A shortcoming of this approach in project management is lack of a good-quality, detailed plan at the very beginning of realization which would cover all aspects relevant for the project. It is thus not possible to compare the actual data from the realization phase with those from the planning phase. On the other hand, in realization phase the circumstances of the project are constantly changing and influencing the outcome of the project. This is why the life cycle loop is reversible (Picture 1) and is continuously going back from the execution to the planning phase. This means that planning is needed during the whole project because through updates during realization we obtain real data about the project. If there is a need to bring the project parameters back into the framework of the set deadlines and budget, it is necessary to replan the remaining activities.

Picture 1. Project life cycle

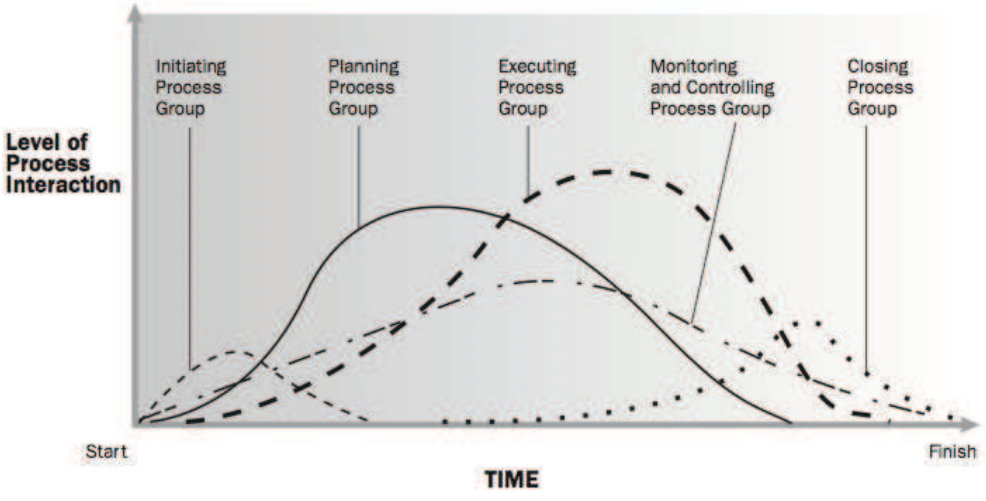


Source: PMBOK Guide 4th Edition p.71

Picture 2 shows how each phase is represented in the project life cycle. It is evident that the planning phase lasts till the very closure of the execution phase.

The closure phase is also very important because it records project experiences. It records all deviations, risks that have occurred and the way they were handled, all changes on the project and how they influenced the overall performances. All types of knowledge and experiences are systemized and documented and serve for implementation and improvement of the processes in some future projects.

Picture 2 - Process Groups Interact in a Phase or Project

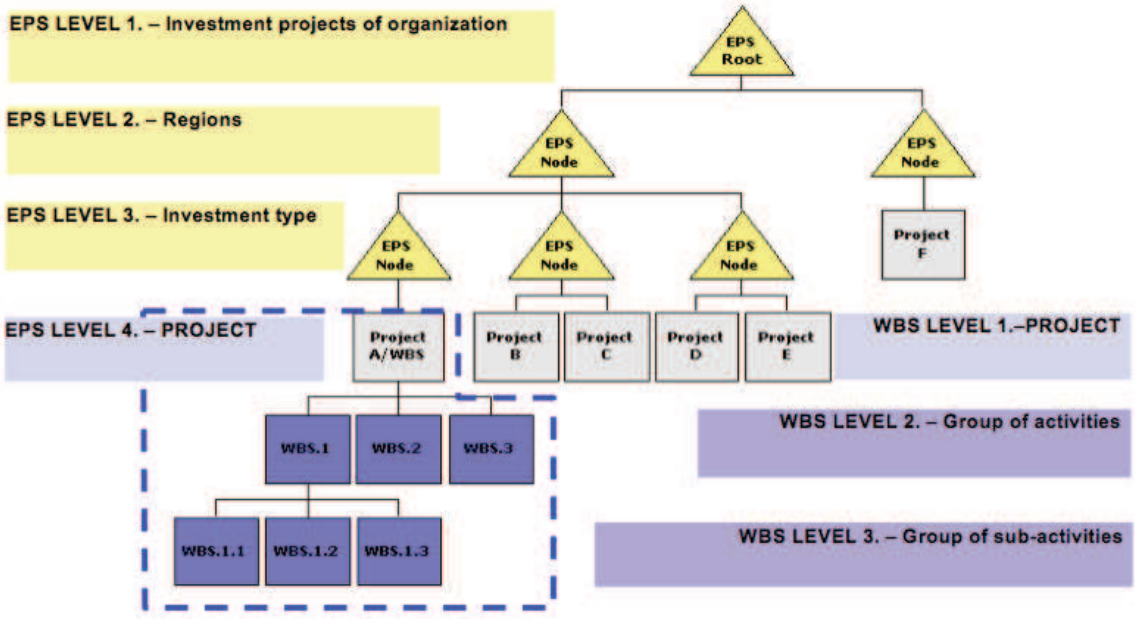


Source: PMBOK Guide 4th Edition p. 72

2.2. System definition – EPS, WBS, OBS

The planning process starts at the strategic level with a definition of the Enterprise Project Structure – EPS (Rastovski et al., 2006) which corresponds to the needs defined in advance, i.e. the way projects are grouped within an organization or department. Project is at the lowest level in the EPS structure. Each of the nodes of the EPS structure has an assigned responsible person from the organization who is at the same time responsible for all projects in the hierarchy structure below. (PMBOK Guide, 2008). Each organization can define the EPS structure according to its own needs (according to regions, sectors or departments, project types, etc.).

Picture 3 – Enterprise Project Structure (EPS) and Work Breakdown Structure (WBS)



Source: Rastovski et al., 2006

Picture number 3 shows an example in which EPS structure is defined according to regions and project types. The first level shows all organization's projects, the second level are regions with their departments where different project types are sorted, and the third level are groups of different project types. The fourth level is the project which is at the same time the lowest level of the EPS structure. On the other hand, the project is the highest level of the Work Breakdown Structure – WBS (Radujković, 2012). WBS structure divides the project into manageable units. Project Manager is responsible for the whole project

and team members are responsible for single parts of the project or single WBS nodes. Organizational Breakdown Structure (OBS) is a hierarchical structure, i.e. it represents the line of responsibility within an organization from executive top management to project managers and team members. Overlapping of the EPS or WBS structure with the OBS structure results in a matrix of responsibility in the portfolio or on the project (PMBOK Guide, 2008).

2.3. Project definition and planning

When project and its structure are defined, it is necessary to define activities, i.e. tasks that need to be implemented in order to achieve project goals. Time needed for realization of each activity is estimated separately and interdependence between the activities is established (Radujković, 2012). The level of plan detailedness depends on demands of reporting to higher management levels, since the quality of output information on reached goals on the project is in direct correlation with the input data entered into the plan (Barković, 2011). Costs and resources needed for project realization are estimated, project beginning and end as well as key dates for realization of single phases are defined. Project risks are defined and team members are assigned to activity groups or nodes of the WBS structure they are responsible for.

Allocation of resources to activities results in distribution of costs in time which forms the basis for control of time and financial aspects of the project during execution (Baseline). The moment the baseline plan is created, all relevant project data have become part of the plan and we can talk about the integrated project plan.

The preparation of the project environment evolves parallel to the project activities development. It consists of analysis of all project participants and drafting of the communication plan, i.e. the system according to which information on the project will be shared with all participants. Demands within the communication plan define ways of data exchange on the project and the way final results are presented in reports (Radujković, 2012).

Since during its life cycle a project evolves in a number of phases, the planning of the project itself is conducted on a number of levels. The basic or master plan is created in the initialization phase. It can be composed of a few dozen activities, contains basic information on time and budget and serves for planning

at the strategic level. With time the plan evolves and depending on the complexity of the project and higher management demands it can grow to a couple of thousands of activities. By using specialized planning tools it is possible to make templates which serve as standardized forms of the project plan in each phase, make the job easier and contribute to unambiguity in the vertical of managing projects (Butković et al, 2011).

Master plan or its activities represent a project definition, i.e. tasks that define the project from its nomination, preparation, procurement, contracting, realization to final takeover or project closure (op.cit.).

2.4. Project control and change management

Control is the most critical of all project phases. It is difficult to establish project control patterns if there is no basic execution plan – Baseline. If it exists, it has to be realistic because otherwise deviations from plans start already in the first weeks of the project (Rastovski, 2011). It is therefore necessary to manage the project plan.

In order to ensure good-quality information on performances of the project, it is necessary to have a good-quality plan and update the system regularly with all available pieces of information that occurred on the project. This means that real beginnings and ends of planned activities are recorded, which makes tracking of due dates realization possible. Also, by entering each single cost into the system financial statuses are updated (Butković et al., 2011). This approach detects all delays and budget overspending on single activities and the overall project, and enables timely replanning of the remaining activities by bringing the project back to defined deadlines and budget.

Apart from entering real dates and costs, comparison with the starting plan is made continuously and deviations are defined. When needed, replanning of the remaining activities is conducted in order to bring single activities back into the limits of the set deadlines and budget. Since during realization changes occur, the task of the project manager is to detect all new input information, changes and potential risks and to gather and enter them into the system in a way to make timely insight into the changes for all project participants possible (Barković, 2011).

3. POSSIBILITIES PROVIDED BY SPECIALIZED PROJECT PLANNING AND CONTROL TOOLS

When talking about managing projects on operational level using some of the available tools for planning and control, we can say that on the low level of planning, in case of managing a single project, we manage a group of activities at the level of tasks that are logically interlinked, i.e. we manage a time plan. If we assign resources needed for execution of these tasks to activities, we get a financial plan because each resource in the system is defined through price per unit and number of units per time, i.e. time and quantity needed for task completion. Since every resource defined this way is directly connected to a single activity in the plan, we get costs distributed in time, which connects the time and financial component of the plan into an integrated document. Planning at a higher level in case of managing a group of projects or a programme or portfolio requires the application of sophisticated tools that use one of the methodologies (Radujković, 2012). Here, much before the definition of activities on the project, we come to the definition of the structure of projects, i.e. project portfolios structure, single project structure, organizational structure and their interdependence. Why is this important? In order to provide a transparent model for undisturbed flow of all relevant information on all projects in the portfolio in real time. Data structured this way provide channels for undisturbed information transfer top-down in case of for example budgeting, and bottom-up in case of for example reporting on the status of project performances.

As already stated in the introduction, the basic prerequisite for managing a portfolio or a programme is a clearly defined structure according to which projects are grouped. Besides a certain level of knowledge the project planner and the management should possess, for managing this kind of systems it is necessary to invest into technological solutions in form of specialized project planning and control tools. We here need to pay attention to the project complexity level and for the needs of managing a portfolio we need parameters such as consolidation possibility and project coordination on the level of the whole organization (Radujković, 2012).

The basic document in this process is the integrated plan which contains all relevant pieces of information about the project. A standardized and methodological approach ensures unambiguous flow of all pieces of information from all projects. Through summarization of all data from the structure of all

projects, it is possible to obtain an overview of the basic information on the portfolio.

Picture 4 – integrated time and financial plan

Source: individual work of author

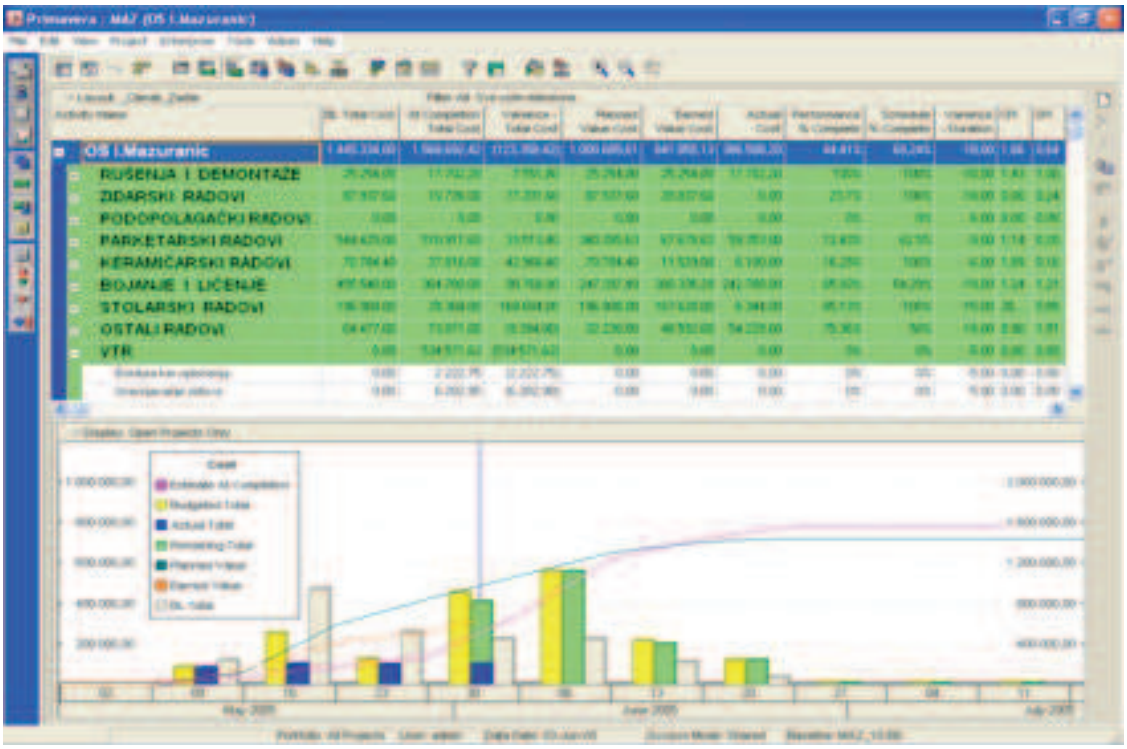
Picture 4 shows an example of an intergrated time and financial project plan made with Oracle Primavera P6 solution for project management. In order to show the link between time and financial plan only main activities that contain costs on the project are filtered. It is evident from the spreadsheet that the cost of each single activity is shown exactly in the point in time when this activity is happening, and by summarizing data obtained from all activities bottom-up on to the project level, cash flow of the whole project is obtained. The graphic part presents a histogram which shows budget spending in each time interval separately and an S-curve which shows cumulative spending. It is visible at first sight that in the first half of the project lower intensity of project budget spending is expected, i.e. more significant spending is expected when works and equipment installation start, since these contracts are most valuable, with emphasis that the spending peak will happen at the moment they overlap. S-curve

is a graphic method that further in the realization phase enables control of the project through comparison of the planned and actual S-curves.

Modern, sophisticated tools for project management contain modules for usage of the earned value management systems method which serve for precise measurements of the physical execution in comparison to the detailed plan, which in the end enables a much more precise forecasting of final costs and duration on the project (Fleming & Koppelman, 2000). This method measures the Planned and the Actual Value, as well as the Earned Value. If Earned Value is compared to Planned and Actual Value, it is possible to differ spending and time deviations on the project. We therefore differ between Schedule Performance Index (SPI) which shows if time plan is ahead (SPI>1,0) or behind (SPI<1,0) the planned values, and the Cost Performance Index (CPI) which shows if financial plan, i.e. spending is lower (CPI>1,0) or higher (CPI<1,0) than planned values.

Earned value is based on an integrated approach to planning and provides project managers with a certain "early warning" which enables them to undertake corrective activities, if spending on the project exceeds physical execution. These warning signs become available to the management relatively early in the project, depending on the detailedness of the plan and updating period, which is early enough to undertake corrective activities which can influence the unwanted outcome.

Picture 5 – project control with EVA method



Source: Rastovski et al, 2006

Picture 5 shows a model for project control using the Earned Value Analysis (EVA) method made with Oracle Primavera P6 project management solution. The example from the picture shows: time indicators: Variance – Duration and Schedule Performance Index (SPI) and spending indicators: Baseline Total Cost, At Completion Total Cost, Variance Total Cost, Planned Value Cost, Earned Value Cost, Actual Cost, Cost Performance Index (CPI).

According to momentary situation the project is 36% behind the plan (SPI=0,64) and by now 66% of funds less than planned have been spent (CPI=1,66). This means that the planned quantities from the bill of quantity (in this case we are talking about a construction project) were much higher than actually realized quantities. Total cost in the end will be 123.358,42 € higher than planned due to variations of works, i.e. changes that happened on the project (Rastovski et al, 2006).

When talking about forecasting, the realized spending is much lower than planned, but if all demands for changes are accepted, the total project budget will exceed the planned budget from the beginning of the project. We should emphasise that all changes are entered into the system at the moment they occur, regardless of the acceptance status because this is the only way to track all

changes on the project and the extent to which they influence the final deadline and the budget. Based on these pieces of information, project manager can set priorities and make decisions on what demands to accept or deny much easier.

Project or portfolio managers have on overview of project performances at every moment because control of time and financial indicators is made possible, since all pieces of information on all projects in the portfolio are located in the central data base. Access to database is enabled to all participants in the extent they have access to single project or portfolio segments.

4. CONCLUSION

Experiences from practice and pieces of research show that the majority of public projects are planned and executed without a serious methodological approach and that specialized tools are used for planning only to show activities in time. Financial plans still mainly exist in MS Excel tables and MS Word documents. The majority of data on changes in the project are recorded in notes, memos, schedule planners and e-mails. We can conclude that information on the project can be found in different places and cannot be available to all project participants at the same time which in certain situations can be of critical importance, when the system of reaction or decision making on the project is in question. The second, and maybe the biggest problem, is that because of non-existence of integral plans, the system cannot serve the purpose of project management but more of project administration. If time schedule is made before the beginning of the project and it does not change during the time of realization and if at the same time financial parameters are recorded in some other documents on the level of issued invoices, it can easily be concluded that the whole system is actually static and does not provide adequate information on project performances. However, if time schedule is connected to financial plan, in which costs and all other data are distributed in time, we get a dynamic environment where depending on the project flow, the plan can progress in time followed by all accompanying data. This kind of methodological approach to managing projects with this kind of dynamic plan, which is obtained through a systematic update of actual data where all changes and estimates of duration and costs by the end of the project are recorded and continuous replanning of the remaining activities is done, enables higher levels of management to have the actual data available in real time, which is much needed for good-quality de-

cision making. This is why we can rightfully talk about the most efficient model of managing projects and project control.

There is knowledge that is available and technologies that can respond to this kind of challenge. A good-quality and systematic education of people in the system and investments into technological solutions would for sure make a big change towards a more efficient management system. We here have to mention that this system implies educatedness on all levels of management and good knowledge of the methodology, since quality of information in the system directly depends on the demand which comes from higher management levels.

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