SOFTWARE APPLICATIONMS PROJECTAND ITSUSE INTHE PROJECTMANAGEMENT PROCESS

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Abstract: The goal of each project is to be completed in the shortest possible time with minimal costs. Many studies have found that on average only 40% of started projects finished on time and budgets usually exceed an average of two times the predicted values. Such phenomena have led to greater use of Microsoft Project, who represents one of the most popular software packages used to support project management. This software package is used for planning, monitoring and control of realization of different types of projects, and is one of the easiest and most used software packages for project management. This paper describes the practical use of this software package in the process of dynamic plans, planning different kinds of resources, planning and cost analysis, monitoring and control of the project and, creating different types of reports.

Key words*:* Project Management, MS Project, control, planning, reporting

SOFTVERSKA APLIKACIJA MS PROJECT I NJENA PRIMENA U PROCESU UPRAVLJANJA PROJEKTOM

Rezime: Cilj svakog projekta je da se završi za najkraće moguće vreme sa što manjim troškovima. Međutim, mnoga istraživanja pokazuju da se u proseku svega 40% započetih projekata završi u roku i da se budžeti premaše u proseku i do dva puta od predviđenih vrednosti. Ovakve pojave su dovele do sve veće upotrebe Microsoft Project-a koji predstavlja jedan od najpoznatijih softverskih paketa koji se koriste kao podrška upravljanju projektima. Ovaj programski paket je namenjen za planiranje, praćenje i kontrolu realizacije različitih vrsta projekata, i predstavlja jedan od najlakših i najviše korišćenih programskih paketa za upravljanje projektima. U ovom radu prikazana je i praktična primena ovog softverskog paketa u procesu izrade dinamičkih planova, planiranja različitih vrsta resursa, planiranja i analize troškova, praćenja i kontrole izvršenja projekta i kreiranja različitih vrsta izveštaja.

Klučne reči : Upravljanje projektom, MS Project, kontrola, planiranje, izveštavanje

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1 INTRODUCTION

A project is a task with a specific goal to be accomplished by means of using particular resources in a defined period of time. Project implementation must be carefully planned to minimize uncertainities and expenses.

Nowadays, every modern manager is expected to apply contemporary management methods that include organisation, planning, follow up and monitoring af all project activities, from the very concept design to its final implementation.

Concerning the fact that project planning and managment were often conceived and implemented by few project teams, a need to develop a a particular optimization methodology for the project management emerged at an early stage.Visual planning introduced by Henry Gantt, contributed greatly to the development of project management skills. In its methodology, Gantt has emphasized the need that the project should be divided into basic activities which will be presented in a shape of a graphics/diagram to be better visualised and coordinated (today these diagrams are called gantograms or Gantt Chart).One of the curiosities is that the gantograms were used for the construction of the famous Empire State Building in America, and by application of this methodology the construction deadline was two times shorter than originally foreseen.

In the late fifties of the last century for the purpose of a submarine nuclear missile design, Willard Frazer developed PERT method to manage the project expenses, also based on the graphic presentation of the resources and processes used. All abovementioned led to a bigger computer tehnology application in the field of project management and most certainly to the development of the most widely used project managment softwares so far MS PROJECT (Microsoft Office Project).

2 PROJECT BACKGROUND AND HISTORY

Microsoft Project was initially proposed by Microsoft's Manager of Product Development, Alan M. Boyd as an internal tool to help manage the huge number of software projects that were in development any time inside the company. Boyd wrote the specification and engaged a local Seattle company to develop the prototype. The first commercial version of Project was released in 1984 and Microsoft Company bought all the rights to this software in 1985 and continued its upgrading.

Today, it is sure that Microsoft Project (MS Project) represents one of the most popular project management software application. The application was designed to support managers develop their plans,to assign necessary resources to achieve specific goals, to monitor project by stages, to budget monitoring and management, to run workload analysis, organisation of tasks and human resources to implement the project in a planned period.

This software package helps the user in his planning process but like in other software packages it is necessary to ensure the adequate input of data into the database to make the program function successfully.

Besides its support to achieve the tasks within the foreseen timeframe and allocated budget, the MS Project also ensures:

- development of a better planning process
- control of the so called " what if?" scenarios resulting in an optimal project plan
- reveals problems in the plan itself, i.e. overload of the resources in respect of their availability
- automatic and reliable calculations from the first till the last day of the project assignment, project budget, available resources
- shows interdependence among various tasks
- develops Gantt Diagram, calender, WBS project structuring
- provides various reports in different formats to provide information to the clients, management and employees, thus ensuring the easily understandable plan presentation
- gives support in the project follow up and foresees new project end dates and new expenses (increased or decreased due to intoduction of new changes) under new circumstances
- adaptation of the original plan to the newly designed one and to face the possible consequences of such changes
- gives opportunity for a multi project management

Dramatic data on the great significance oth the software tools inthe planning process were reported by the company The Standard Gropu. Namely, surveys were conducted in the USA in 1998 showing thet only 44% of the projects started were ended within the

foreseen deadline, whereas one third of all projects have never been finished. The project deadlines and budget limits were exceeded by 189%. The final result reported in this survey is that 70% of all projects do not meet the initial expectations (Grbić, 2004).

3 MS PROJECT APPLICATION CASE STUDY

Management process includes considerable number of activities starting from the concept development till its implementation. To implement the project in the best possible way means frequent changes of the plan and adjustment of specific necessary resources (staff, material and equipment).

Project Managment is a two phases process

- planning phase and
- monitoring phase, i.e. follow up

During planning phase, a detailed project design is developed, the tasks are scheduled, resources assigned to project tasks, costs calculated and the report is prepared.

In a monitoring phase, the project progress is monitored, reports on remaining tasks are provided, various adjustments in the changes due to the unexpected circumstances are made and final reports done.

It is necessary to make certain preparations and activities prior to the MS Project plan development to enable easier plan elaboration:

a) project description and defining the project objectives;
b) WBS project development, i.e. defining the structure of the project;
c) defining the list of activities within specific timeframe, the list of necessary resources and resources budget allocation;
d) defining interdependence among the activities.

a) Project Description and Defining of the Project Objectives

Concerning the fact that the company bought the plant for hard biscuit production at the end of 2010, it was necessary to invest in additional facilities and reconstruction of the existing plant to turn it into a factory (final product warehouse, package warehouse and the management office).

Presently, there is one production line in the production plant of the factory with a limited range of assortment production. Bearing this in mind, there is an imperative to invest in the purchase of a new production line with bigger and more complex capacities to meet the production program requirements.

The specification and value of the planned investments in the confectionary production are given in the tables below.

Table 1: Value of the planned reconstruction and biscuit factory construction RSD

Description	**total**
Reconstruction of the exisitng biscuit production plant	15.400.700
Construction of the new warehouse for final products and package warehouse	60.450.900
Construction of the management office	39.564.160
Internal pump	6.924.000
Exterior design:	
Electricity installation	3.231.200
Water and sewage hydrant distribution	3.100.800
New transformer, dismantling of the exisitng one and diesel generator dislocation	1.379.650
Pressure plant, manhole and a water tank V=2x50m3	1.846.400
Test run	
Salaries, material and machine costs	1.501.654
Other costs	464.984
TOTAL	**133.864.448**

Source:Business Plan Taške LTD company, April 2011

Table 2:Value and dynamics of investments in new assets

Type of investment	***Investment value in EUR***	**Investments 20011/2012 EUR**
Facilities	1.212.900	1.212.900
Technology Equipment	2.610.601	2.610.601
IT	53.761	53.761
Transporting vehicles	412.750	412.750
TOTAL	**4.290.012**	**4.290.012**

Source:Business Plan Taške LTD company, April 2011

Since all of the own funds were exhausted for the purchase of a new production plant at the end of 2010, the additional funds for the plant reconstruction, construction of necessary facilities, purchase of a new production line and transportation vehicles will be ensured by the Development Fund and Foreign Ivestment Agency SIEPA which represent the most favourable source of funding at the moment.Therefore, it is necessary to draft an adequate business plan along with other project documentations to raise funds from the abovementioned sources.Basic project objectives are:

- development of the necessary documentation to raise funds from the favorable funding sources;
- reconstruction of the biscuit production plant in the shortest period possible;
- construction of additional facilitiesto meet the required standard;
- mastering new technologies: new equipment and technology will be introduced in the biscuit production during the reconstruction process and the staff will be trained simultaneously.

- new product market promotion;
- new staff employment.

b) WBS Project Structure Defining

The project should be divided into specific phases and activities.

The project team members together with the project manager have defined the phases and activities during the development of detailed project plana listed below:

1. Fund Raising

1.1 Business plan development

1.2 Application for fund raising

1.3 Land ownership Licence

1.4 Construction Permit

1.5 Use Permit

1.6 Fund raising

2. Civil Works

2.1 Reconstruction of the existing plant

2.1.1 Preparation and demolition works

2.1.2 Concreting and bricklaying

2.1.3 Plumbing and electrical works

2.1.4 Tiling works

2.1.5 Facade and tinsmith works

2.1.6 Other finishing works

2.2. Construction of the new premises

2.2.1 Preparation works

2.2.2 Concreting and bricklaying

2.2.3 Other finishing works

3. Electrical Works

3.1 Transformer

3.1.1 Equipment dismantling

3.1.2 New equipment installment

3.1.3 Final testing

3.2 Internal petrol pump

3.2.1 Equipment dismantling

3.2.2 New equipment installment

3.2.3 Equipment installment and final testing

4. Purchase of new equipment

4.1 Offers collection

4.2 Best offer award

4.3 Import and customs clearance

4.4 Payment for the equipment

5. Machine works

5.1 Dismantling of the old production line

5.2 Installment of new and old production lines

5.3 Pipeline installment

5.4 Final testing

6. Test run

Table 3. Defining milestones in the project

Reg.Num.	Milestones	Date
1.	Initial point in the fund raising phase	29.04.2011.
2.	Fund raising	06.07.2011.
3.	Beginning of the construction works phase	19.07.2011.
4.	Final works of the construction works phase	16.02.2012.
5.	Beginning of the electrical works phase	29.12.2011.
6.	Final works of the electrical works phase	06.02.2012.
7.	Beginning in the purchase of new production line phase	21.12.2011.
8.	End of the purchase of new production line phase	06.02.2012.
9.	Beginning of the machine works phase	01.02.2012.
10.	End of the machine works phase	21.03.2012.
11.	Beginning of the test run phase	29.02.2012.
12.	End of the test run phase	15.03.2012.

Source:Business Plan Taške LTD company, April 2011

c) Defining the list of activities within specific timeframe, the list of necessary resources and resources budget allocation

On the basis of the defined necessary activities to accomplish the project, their duration and relations, as well as on the basis of the resources assigned to each activity, specific data were filled in the Table 3. as the baseline for the application of MS Project.

Table 4. Activity title, duration and resources needed

Reg. Num.	Activity title	Next activity	Duration	Resources	Quantity
1.	Business plan development	2	15	Planning manager,marketing manager	1,2
2.	Application for funds raisin	3	1	Legal expert, assistant	1,2
3.	Land ownership Licence	4	5	Legal expert	1,2
4.	Construction Permit	5	5	Legal expert	1,2
5.	Use Permit	6	5	Legal expert	1,2
6.	Fund raising	7	15	Finance director, assistant	1,1
7.	Preparation and demolition works	8	2	Subcontractor 1	-
8.	Concreting and bricklaying	9	60	Subcontractor 1	-
9.	Plumbing and electrical works	10	30	Subcontractor 2	-
10.	Tiling works	11	15	Subcontractor 3	-
11.	Facade and tinsmith works	12	30	Subcontractor 4	-
12.	Other finishing works	13,16	20	Subcontractor 1	-
13.	Electrical equipment dismantling	14	4	Subcontractor 2	-
14.	New equipment installment	15	10	Subcontractor 2	-

15.	Electrical works final testing	20	3	Subcontractor 2	-
16.	Offer collection for the new production line	17	10	Technical director, assistant	1,2
17.	Best offer award	18	1	Technical director	1
18.	Import and custom clearance for the new production line	19	10	Legal expert, export-import expert	1,2
19.	Payment for the new production line	22	2	Finance director, assistant	1,1
20.	Dismantling of the old production line	21	5	Electric engineer, machine engineer	3,7
21.	Overhaul and installment of the old production line	22	18	Electric engineer, machine engineer	3,7
22.	New production line installment	23	7	Electric engineer, machine engineer	3,7
23.	Pipeline installment	24	5	Plumber, electric engineer, machine engineer	3,1,2
24.	Final testing	25	3	Plumber,Electric engineer, machine engineer	2,2
25.	Test run	-	15	Workers	50

Source:MS Project-project of biscuit factory construction, Company Taške LTD, Braničevo,2011

COSTS

In order to implement this project, material and human resources are necessary.

Material resources–necessary material and equipment for civil and electrical works will be purchased by the subcontractor and they will be considered as subcontractor's expenses.

Table 5. Necessary costs for the project implementation

Registration number	Resource title	Resource availability	Resource price unit
1	Marketing manager	1	781 RSD/h
2	Supervisor	1	340.000 RSD
3	Planning manager	2	605 RSD /h
4	Legal expert	1	781 RSD /h
5	Legal expert assistant	2	350 RSD /h
6	FinancE manager	1	805 RSD /h
7	Finance assistant	1	350 RSD /h
8	Subcontractor 1	1	99.900 RSD /h
9	Subcontractor 2	1	57.700 RSD /h
10	Subcontractor 3	1	44.670 RSD /h
11	Subcontractor 4	1	55.900 RSD /h
12	Technical manager	1	781 RSD /h
13	Technical manager assistant	2	450 RSD /h
14	Export-import associate	2	450 RSD /h
15	Electrical engineer	3	350 RSD /h
16	Machine engineer	7	350 RSD /h

17	Plumber	3	350 RSD /h
18	Workers	50	250 RSD /h
19	Electrical material	403	950 RSD
20	Water pipes	200 m3	15.000 RSD /m3
21	Flour	100 kg	50 RSD /kg
22	Sugar	950 kg	30 RSD /kg
23	Vegetable fat	150 kg	60 RSD /kg
24	Milk powder	136 kg	89 RSD /kg
25	Chocolate powder	123 kg	550 RSD /kg
26	Tunnel furnace	1	200 RSD /h
27	Line 1	1	150 RSD /h
28	Line 2	1	250 RSD /h
29	Packing line	1	100 RSD /h

Source: Company Taške LTD Business plan, April 2011.

d) Project Interdependence Definition

MS Project ensures defining four types of activities interdependence: finish-to-start (FS), start-to-start (SS), finish-to-finish (FF) i strat-to-finish. The sequence and link it has towards specific activity must be defined so as it can function properly and calculate automatically.

Table 6. Project activities interdependence

Reg Num	Acitivity title	Next activity
1	Business Plan Development	2
2	Fund raising application development	3
3	Provision of Ownership Statement	4
4	Provision of Construction permit	5
5	Provision of Permit license	6
6	Fund raising	7
7	Preparation and dismanling works	8
8	Concreting and masonery works	9
9	Plumbing and electrical works	10
10	Tiling works	11
11	Facade and tinsmith works	12
12	Other finishing works	13,16
13	Electrical equiment dismantling	14
14	Electrical equipment installing	15
15	Final testing of electrical works	20
16	Offer collection for new production line	17
17	Best offer award	18
18	Import and customs clearance	19
19	Payment for the new production line	22

20	Dismantling of the old production line	21
21	Repairs and assembly of the old production line	22
22	Assembly of a new production line	23
23	Pipeline installment	24
24	Final testing	25
25	Test run	-

Source: MS Project for Taške LTD Braničevo,Biscuit factory construction,2011.

1.1. Basic Plan Development Steps in MS Project Development

After completing necessary preparations, activities and links, it is time to develop the project plan for MS Project development.

First Step: Basic parameters of the project must be entered in the Tools Options of the menu. Basic data of the project are defined (project title, project manager, start date of the project implementation), calender timeline is set (work hours, nonworking days, number of working hours per week, winter and summer working hours), a record of the project must be placed on the disk, as well as units rates and decimals parameters used.

Second Step: Activities titles and activities duration are entered thorugh the menu option View Gantt Chart when the screen is split into tabelar and gantogramic display.The table has over 250 fields, and when selecting a certain field, another window is opened Task Information where all data for a particular activity are entered (title, duration, activity resources, links among activities..).

The Programme differs two basic types of activities: standard and macro activities on many levels. Activities can be grouped by levels so that the whole project can be presented in a single macro activity or group of activities in phases.

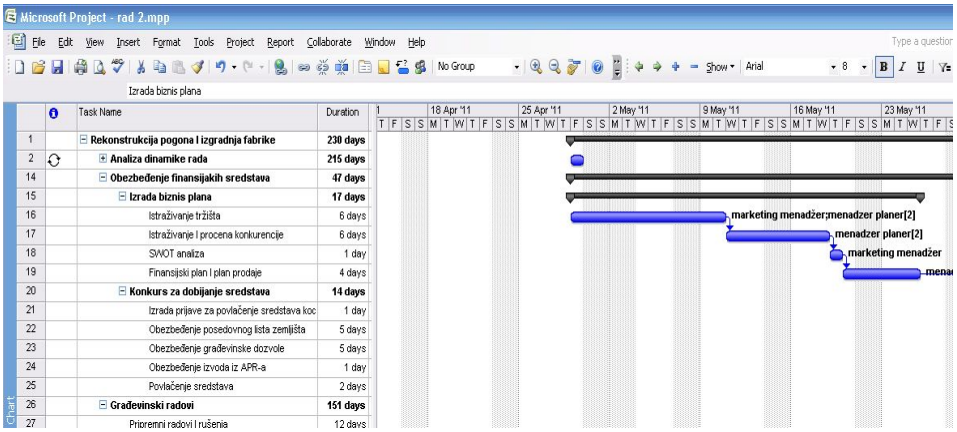

Figure 1. Software application of the MS Project – Tabelar and gantogram visual reports

Source: Software application of the MS Project

The Programme gives option to enter the recurrent activity recurring at a specific point of time (such as supervison activity which in our case recurs every month). The recurrent activity can be entered thorugh the menu option *Insert/Recuring Task Information* .

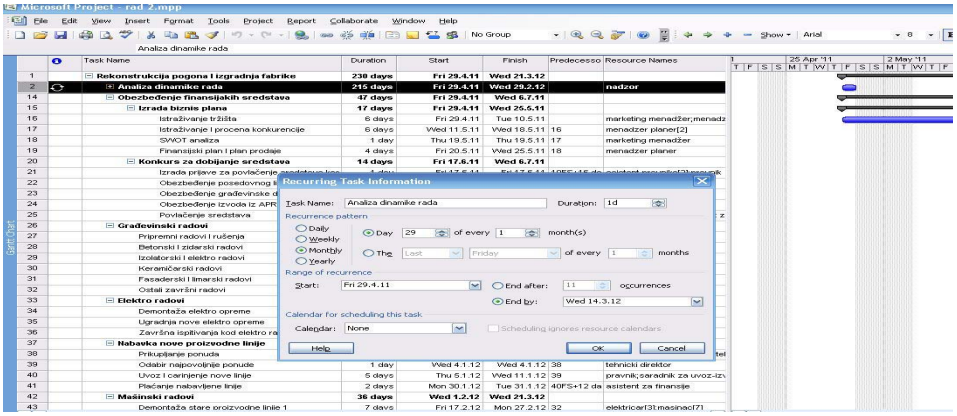

Figure 2. The procedure of entering the recurrent activity in the MS Project.

/Source: Software application of the MS Project

Third Step: Entering milestones in the project. The milestones represent start and finish points of specific phases defined bz WBS structure. It is important to stress that 0 duration point is entered for each milestone and they have different visual report in the Gantt Chart.

Fourth Step: Project structure design. Structuring is done by entering data on a multiple activity (e.g. in our case, business plan design) and by defining each particular activity (market research, competitiveness assessment, SWOT analysis..), using the function *Indent.*

Fifth Step: Activities linking. Previously designed table of interdependant activities is used for entering data into MS Project.

Sixth Step: Resources allocation. There are three types of resources in MS Project: material, work resources (machines and human resources) and subcontractors (subcontractor services costs). Resources data are entered in the menu option View/Resource Sheet and the table contains great number of fields to be filled in (available resource quantitz, costs, price units for overtime work...).

1.2. Project Implementation Follow up

Once the plan is defined, the baseline plan for the project implementation is saved in the menu option *Tools/Tracking/Save Baseline.*Data on of each activity is entered.On the bases of the present status of specific phases and activities, the programme forecasts the end of the remaining activities, present budget expenses, remaining budget resources and possible changes in the costs per each particular activity.Such forecasts ensure that the project managers respond in a timely manner in making certain corrections so as to preserve the planned project dynamics.

1.3. MS Project Reports

The Ms Project Menu Option Raportoffers a great number of various graphic and tabelar report format on the project progress:

- comprehensive project data
- money flow in the project
- level of the accomplished activity...

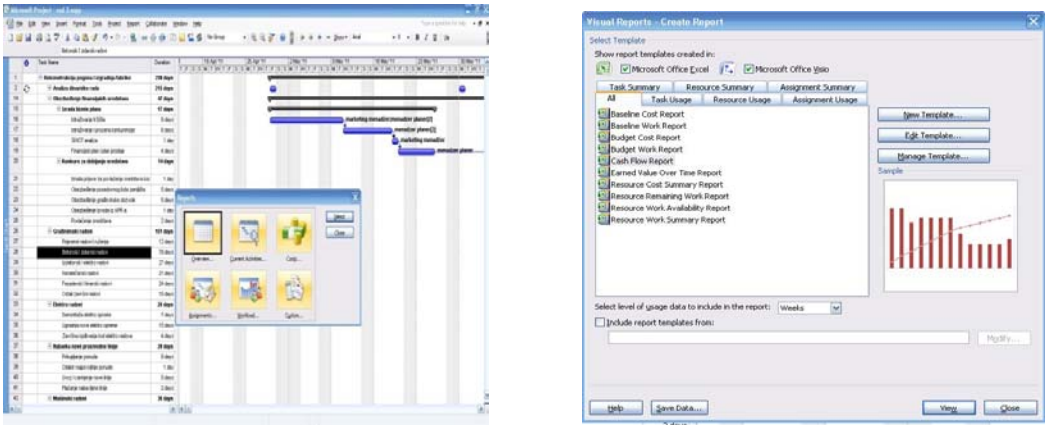

Figure 3. MS Project reports

Source: Software application of the MS Project

4 CONCLUSION

Generally, the project managment process consists of five basic phases: initiation phase, planning and designing phase, project implementation, monitoring and final phase. The major objective of this process is a faster, improved, successfull and project implementation within the original budget frame. According to this principle, one of the most used sowtware application today has been structured, MS Project. This programme significantly ensures the procedures of planning and monitoring various projects implementation, time management process, technical and human project resources use, costs, risks and at the same time enables us to get a set of different reports. An adequate management is of an utmost importance when starting the project implementation, mostly because the original parameters change throughout the process.

MS Project gives the complete picture of a project implementaion process, necessary resources needed in which quantities and estimated period of time, as well as the foreseen end of the project timeframe. Once the implementation of the project has been initiated, it is necessary to update the programme date frequently so as to monitor the project progress and possible unforeseen changes. Thus, we would be timely prepared to respond fast and in an adequate manner, in order to cut down on the project implementaion costs.

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