

THE BENEFITS OF PROJECT STRUCTURING IN SUB-PROJECTS AND WORK PACKAGES

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Abstract: The splitting or the segmentation of the project has shown, several times as been a necessary process for calculating the costs of the project, especially for the big European companies like BMW. The Paper presents the accounting of the costs in year 2006, for the project „data exchange and data conversion”. The right segmentation of the project, proportionally to the innovation levels each individual work packages, leads to cost savings. Depending on the obtained results of this process, the efficiency degree of the project segmentation can be analysed.

1. INTRODUCTION

In the realization of the modern industrial projects and not only there, occurs most of the time, the problem regarding the realization costs of the project. The right estimation of project execution time and of the innovation (difficulty) level, contribute to the quality increase and to the activity performance of the company.

1.1. Problem identification

The project result, project duration and the necessary resources needed for the realization of the project are the three fundamental components of the project management (Fig.1.). The achieve of the proposed result, the maintaining of the duration of the project and the involved costs in the proposed limits, during the realisation of the project, represents the key factors of the project and thus they are the main factors for the success of the project.

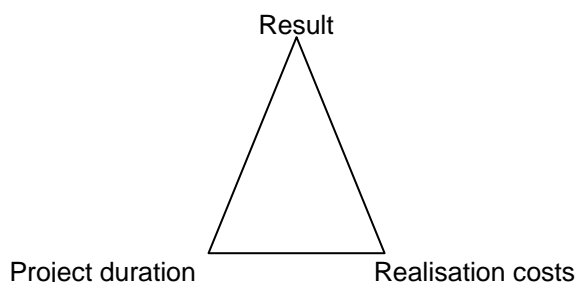


Fig.1. Triple constraint of the project

Beginning with the definition phase and planning phase of the project, followed by the budget approval and also during the project realization, there are fears in respecting of the triple constraint. All this will have an answer, if first of all, the project and his topic are very precise defined, the project elaboration mode is enough structured and the project realization budget is plausible (main condition for project approval and for project start). The scope of the splitting (structuring) of the project in sub-projects and work packages is to determine, as far as possible, the resources needed to finalize the project and also the

costs involved for its realization. This method implies a very accurate dimensioning of the work packages and a correct structuring in sub-projects of the project, depending on the difficulty level, project characteristics and the capacity of human resources and its qualification. Most of the time, because of not considering of these factors, the estimation of costs and finalization time are imprecise and the results are not conforming.

1.2. Paper objective

The goal of this paper is to use a realistic splitting algorithm of the project in sub-projects and work packages, conform to some specific standards (for ex. ITPM-Information Technologies Project Management) and conform to the innovation (difficulty) level of the components activities, method used at the big companies (for ex. BMW).

The roll of this method is essential in estimating the project costs and for determining the risk level for project realization.

On the other side the paper delineates the differences between the results of the costs, which are obtained through the mentioned method, and results of the costs ciphered by the bidding companies, term to own, internal factors such as: number of employees, specific equipment, availability of the employees as well as their experience, the correlation of finishing the project in the same time with other projects in process, which are carried out by the same team.

We mention the fact that both ciphering methods depend upon external factors, like for example: functional relationships with other external projects, the accessibility to particular equipment, the superposition of demands and the necessity to finalise the project simultaneously or nearly coeval with other projects. Therefore all the enumerated factors will be centred in the algorithm of the project splitting.

2. THE STRUCTURED PLAN OF A PROJECT

2.1. The split-up into subprojects and work packages

In order to make the most precise evaluation possible, there will be needed a structuring of the project into well definite subprojects and work packages, which will allow a more precise and a sounder analysis. The fragmented structure of the project, which stands in the technical literature also under the entry of Work Breakdown, defines and sets up the dimensions and the content of the project.

The project may be split up into subprojects according to the inherited characteristics, and into work packages, which are theme well and clearly defined activities, with the purpose of being consigned, programmed, supervised and organised. At the same time this split-up means a way of project partitioning into easy to handle segments, and a way of persuasion towards the employees, which will carry out the project (This is a characteristics of the difficulty level upon which the project costs depends).

3. EXAMPLE OF THE ACCOUNTING OF COSTS IN REAL SITUATIONS

3.1. General data

The next diagram describes the split-up of a project (FMSTUELI) by BMW into subprojects und work packages.

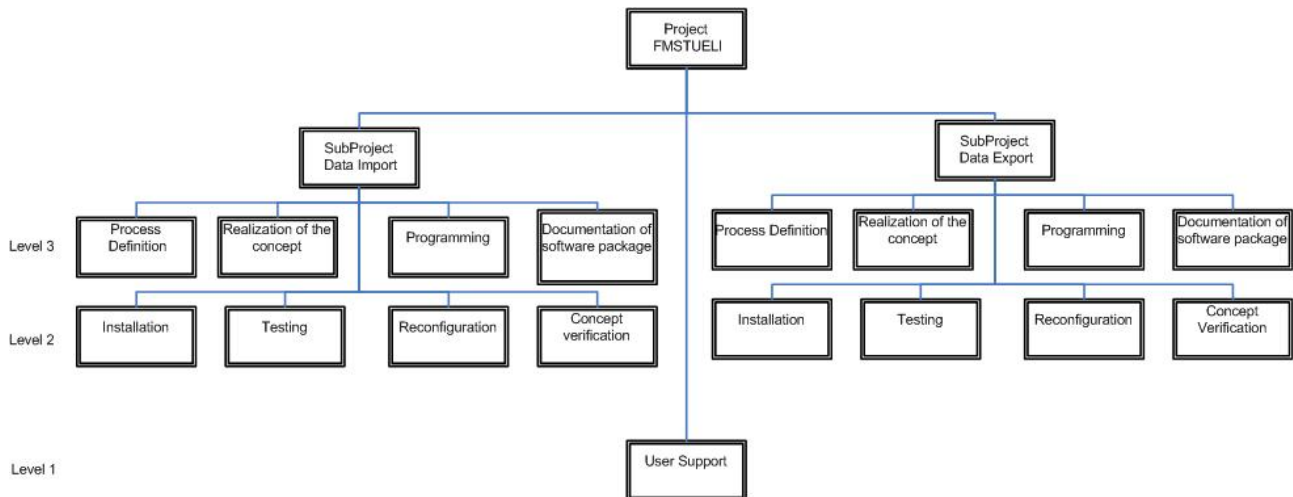


Fig.2. The split-up of the project into subprojects and work packages

The example in the diagram is specific for a subproject demanded by BMW (**B**ayerische **M**otoren **W**erke), a company with 106.575 employees in the whole world and which has registered in 2006 a turnover of 48,999 billion Euros, with a decided net income of 2,874 billion Euros.

Considering the complexity and the volume of its projects, this entrepreneur needs to appeal to external purveyors for the projects of development as well as for those in the area of production.

The external purveyors in charge of development projects are recruited among small project-engineering agencies or well developed entrepreneurs such as: IBM, Softlab, Cenit, ProStep, Continental, MAGNA etc.

The present paper will take as an example the proposal of engineering's office for projects, like the company X, a small enterpriser, which execute CAD data exchange and CAD data conversion for the BMW Company.

In 2006 the BMW Company had paid this entrepreneur an annual sum of money of 280 thousand Euros for the upkeep of the software package, which enables the data transfers between BMW and other engineering offices. This sum stands for the transfer of 6650 TB (Tera Bytes) per year, the hotline service, as well as the 2nd Level Support Service (intervention and reparation of possible errors). This sum is a pricing and is constituted according to the volume of transferred data and is not negotiable, like in the case of the transaction of new projects (ex. FMSTUELI).

3.2. Defining of the projects

In the category of new projects, there is a service package offered by this company, which implies the development of new software packages in the field of data exchange and conversion, the set-up into the BMW system, as well as an updating service (improve service) of the existing packages. Therefore in 2006 BMW required the following from the X Company, the ensemble of projects, among which FMSTUELI is to be found:

- the import of EFA data for the navigation systems
- the conversion of the CAD data ProE in CATIA V5
- the Update of ProIntralink 3.3 -> 3.4
- the development of a toolkit for data conveying from ProE in CATIA and HPGL
- the import of PSN data
- the import and the export of Synergy data

- the development of the REGVCA project
- the import of TIFF data through CAA API methods
- the development of the AUTOEXPORT project
- the Update rollout
- the development of the PICANT CATIA V5 project
- the import and the export of data from CATIA V5 into new formats: PRISMA 5H, V5N
- the import and the export of GRIVAD data
- the import and the export of FMSTUELI data

3.3. The costs accounting of the project offered by the X Company

The X Company has presented by demand of the BMW Company a list of costs for the projects shown above, justifying the price with the difficulty level of the projects, during the negotiations.

Therefore according to the difficulty level of these projects and of some internal evaluations made by the X Company, the following prices were presented to the BMW Company (Tab.1.) The level of innovation has been constituted according to the amount of knowledge needed to be involved in the project. The price is ciphered as an output between the value of the innovation level and the number of the figured labouring hours.

- 1st level is applied only for the Hotline Service, the price being of 42,8 Euros/hour
- 2nd level is applied for the update services and for small modifications of the already existing services, and for the keep-up team of the existing software packages, the price per hour being of 93 Euros.
- 3rd level is for the development of a high level innovation, the price being of 164 Euros/hour.

PROJECT NAME	Difficulty level	NR. of Hours	Price (Euro)
the import of EFA data for the navigation systems	3	144	23616
the conversion of the CAD data ProE in CATIA V5	3	104	17056
the Update of ProIntralink 3.3 -> 3.4	2	136	12648
the development of a toolkit for data conveying from ProE in CATIA and HPGL	3	240	39360
the import of PSN data	2	104	9672
the import and the export of Synergy data	3	236	38704
the development of the REGVCA project	3	176	28864
the import of TIFF data through CAA API methods	3	104	17056
the development of the AUTOEXPORT project	2	80	7440
the rollout Update	2	128	11904
the development of the PICANT CATIA V5 project	3	416	68224
the import and the export of data from CATIA V5 into new formats: PRISMA 5H, V5N	2	176	16368
the import and the export of GRIVAD data	2	48	4464
the import and the export of FMSTUELI data	3	200	32800
TOTAL		2292h/286,5days	328176

Tab.1. Price offer

3.4. Accounting example on the costs of a subproject (FMSTUELI) using the method fragmentation of activities

Based on the experience acquired during the previous projects and using at the same time the ITPM standards, the BMW Company has realised a split-up of the projects into subprojects and work packages.

Such an example is the Subproject No.14: "The Import and the export of FMSTUELI Data". The next segmentation of the project has been adopted by common understanding between BMW and the X Company:

Subproject A: The Import of FMSTUELI Data

The work packages - activities:

- the definition of the process
- the attainment of the concept
- the crosschecking and the approval of the concept
- the reconfiguration of the general carry-out process
- the implementation of the programs
- the testing
- the documentation of the software package
- the installation

Subproject B: The export of FMSTUELI Data:

The work packages - activities:

- the definition of the process
- the attainment of the concept
- the crosschecking and the approval of the concept
- the reconfiguration of the general carry-out process
- the implementation of the programs
- the testing
- the documentation of the software package
- the installation

Once with this segmentation there followed an evaluation of the subprojects and of the work packages according to the level of difficulty; the outcome is the table below, which shows a difference of 9100 Euros between the entire accounted costs and the bided costs.

The Import and the export of FMSTUELI Data			
The import of FMSTUELI data	Difficulty level	Nr. of hours	Price (EURO)
the definition of the process	3	4	656
the attainment of the concept	3	12	1968
the crosschecking and the approval of the concept	2	4	372
the reconfiguration of the general carry-out process	2	12	116
the implementation of the programs	3	24	3936
the testing	2	20	1860
the documentation of the software package	3	10	1640
the installation	2	14	1302

The export of FMSTUELI data			
the definition of the process	3	4	656
the attainment of the concept	3	12	1968
the crosschecking and the approval of the concept	2	4	372
the reconfiguration of the general carry-out process	2	12	116
the implementation of the programs	3	24	3936
the testing	2	20	1860
the documentation of the software package	3	10	1640
the installation	2	14	1302
Total		200	23700

Tab.2. The costs' accounting of the FMSTUELI subproject by using the fragmentation of the activities

In parallel and following the same principal, the other subprojects were split and evaluated, as seen in the results from the 3rd table; we can observe that the same number of hours has resulted, only that these are being evaluated at the fair price according to the innovation level of each activity and sub-activity (328176-300162=28014 Euros):

PROJECT NAME	NR. of Hours	Price(Euro)
the import of EFA data for the navigation systems	144	21873
the conversion of the CAD data ProE in CATIA V5	104	16776
the Update of ProIntralink 3.3 -> 3.4	136	12100
the development of a toolkit for data conveying from ProE in CATIA and HPGL	240	36800
the import of PSN data	104	8580
the import and the export of Synergy data	236	36800
the development of the REGVCA project	176	23875
the import of TIFF data through CAA API methods	104	16890
the development of the AUTOEXPORT project	80	7440
the rollout Update	128	10300
the development of the PICANT CATIA V5 project	416	64800
the import and the export of data from CATIA V5 into new formats: PRISMA 5H, V5N	176	16368
the import and the export of GRIVAD data	48	3860
the import and the export of FMSTUELI data	200	23700
TOTAL	2292h/286,5days	300162

Tab.3. The re-evaluation of the entire offer of the project using the method of activities fragmentation

4. THE INTERPRETATION OF THE RESULTS

By means of this method the BMW Company succeeded in negotiating the offer and to make savings according to the Diagram number 3:

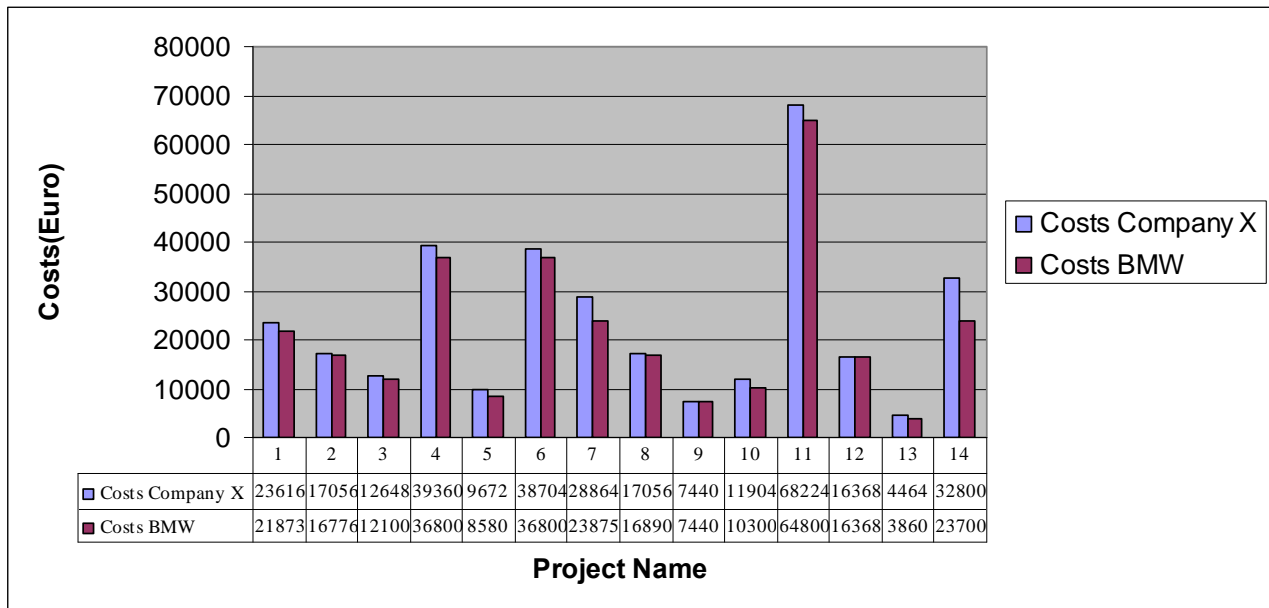


Fig.3. The benefits of costs savings by splitting a project into subprojects and activities

5. CONCLUSIONS

As one can observe, a simple split-up of the projects into subprojects and work packages may confer a better image upon the project and upon the to do activities, as well as over the level of innovation-difficulty of each phase. Also, by this segmentation one can have a better overview over the implementing, and can intervene more easily in case factors of risk will arise, factors, which could slow down the process of the project's accomplishment. In addition, algorithms of time evaluation can also be used, which may also lead to even higher costs reductions.

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