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Managing human resources in project IT management

Defining fundamental terms

I come across very often an opinion that a project is a component of the documentation, according to which something will be carried out or that a project is actually each new product, which we are launching, however nothing else. Or else by the term «project» each big task is designated, in such a way that neither the way of solution, nor the organization of resources and work for that solution along with the handing over the results does differ from a common working process. Those are only known partial meanings of the word «project».

The meaning of the term «project» is necessary to understand in a broader perspective in a sense of an idea, a proposal, a plan, and a complex solution of an intended assignment along with the working out of its necessities. The project is the purposive proposal for implementing an innovation within the given start and end dates. The task, which has a defined start and end, requires engaging one or more connected, dependent on each other, limited resources, which have to be used, in order to achieve the set goal.

The project is a unique process consisting of a series of the coordinated and managed activities with start and end dates, which is carried out for attaining the aim, which meets specific requirements, including the limitation given by time, costs and resources.

As said by V. Němec, it is possible to find a more accurate definition of the project as a unique set of activities. The project is an effort of achieving a change, during which a lot of activities is carried out, which lead to the creation of a product or development and implementation of the specific technology. The target state is achieved during the limited time, within the limited resources and costs and while attaining the required qualitative parameters. The product of the project is what is defined in the plan of the project output and submitted to the customer.

The plan can be executed as a project, if it is distinguished by the singularity of conditions, an adequate complexity, interdisciplinary cooperation, and if it is not satisfactory solvable within the standard line organization. The project always is distinguished by an uncertainty and relatively high level of risk connected with the fulfillment of the required goals.

Project functions of management

The correct three-dimensionality of the project arises always with the process of planning. And planning is nothing else than a gradual answer to the correctly put questions (what, how, with whom, when and for how much). First, we have to plan the contents exactly – what should be done. It is necessary to formulate unequivocally what will exist on finishing the project or possibly, which activities will be done. Each project should have its own goal. The closely defined objectives, focused rather on the function feature of the built SW lead to the loss of the strategic orientation of the project and cause failures.

If we are clear what we are supposed to do (the first dimension of the three imperative), then we have to say how to do it – i.e. to describe the procedure, how to reach the aims. At the same time, we are concentrating purely on the logic of the matter, i.e what to implement at the earliest, what next, what we can do simultaneously and what must be finished, in order to proceed further. At the beginning, it is not necessary to deal with the question of time – when to take a particular step. In planning the procedure, how to achieve the project goals, it is convenient to use the three stage hierarchy. We distinguish:

1) Project stages,
2) Project steps,
3) Project operations.

Stages follow sequentially. At the end of each stage, there is a gate, which lets the project pass through into another stage. Within the stage, steps are taken; some of them can take place concurrently. Each step forms a partial product, which contributes to the overall result. We plan steps, along with the stages, for the entire project.

The smallest parts of work are operations – elementary packages of work allocated to individuals or small, two or three member teams. Operations are not necessary to be planned more in advance than the following stage of the project. Incessant changes, which the project encounters, make us remake constantly the detailed plan of operations at the later stages of the project.

Once we know what and how we will do it, we have enough documents for determining with whom we will do it. The nature of goals and selected consecutive activities determine namely the set of professional knowledge, abilities, and skills, which we will need. First, we will plan the required project roles and then we will start staffing them with specific people. We will form a project team. It will provide us a framework, in which we can answer questions of the left two dimensions of the three-imperative – when something is done, how much it will be. Among those two plans one has to iterate: first, from experience, we will suggest the first estimate of dates, when something is done and we will complete it with the estimate of work consumption of team members. Then, we will correct the originally suggested dates based on the estimates of work consumption. Those two iterative steps, when necessary, can be repeated once again. In the following picture, the structure of the project stages is graphically depicted.

Fundamental principles of the methods and techniques used for managing human resources in projects

The efficient management of human resources in project management is based on respecting the principles of team work and management of teams. The task of the project team, the quality and the organization of team work influence directly the proper success of the solution of the project. Owning to the mentioned principle of the European projects, which are represented for instance by creating partnerships, the significance of the quality team work is increasing, too. It is also due to the fact that it is mostly about the rise of new working teams, whose members bring different working cultures, manners and methods of work into teams. This fact brings, on one hand, advantages of a high creativity and innovativeness of the project; however, on the other hand, it stresses extraordinary great demands on managing project work, in particular with large projects.

From that perspective, two essential factors delimitate a role for managing, such as follows:

– Team roles and their respect in managing,
– Team motivation.

The proposal of the organizational structure in a project team is a fundamental step of the life cycle of the project. Mostly, it is about the dynamic structure with the

distinct problem orientation. The basic aim of this structure is the fulfillment of the goals of the project. In projects, we are dealing with proposing and implementing a respective integrated system or its parts. An issue of the transitoriness of the structure of the solver's team does not have to reflect the transitoriness of the working team and its members, yet. Particularly, in the project oriented organizations, it is possible to use established working units for solving other projects. It applies namely to the implementation of projects, which are IT oriented, and where working roles in the analysis process, in the proposal and in processing are relatively well defined and reflect professional knowledge and workers' experience with respective information competencies.

If we want to describe the team (working) roles more closely in the process of solving projects, it is necessary to proceed from particular stages, periods of solutions, and the introduction of the project into the system. Those workers, or team roles, who they represent, participate at different stages of one's own solution in various project activities and control of one's own course of the project. The extent of involvement corresponds fully to the specification of their roles and at the same time, proceeds from pieces of knowledge of project management used in the area of the implementation of the project.

The approved organizational structure in the project intention is a must. Nevertheless, just the solution of projects makes a distinction as to great dynamism, the control of work procedure, incremental mechanisms, and quick search for corrections and new ways. This requirement is impossible to meet, provided that the exact determination of powers and responsibilities in working team roles would be a dogma, for the entire period of the implementation of the project. Gradually, new activities and project tasks are likely to come up, which are necessary to specify exactly and first of all, to set responsibilities for their solutions, including the control of achieving the set milestones of the stages of the project. Those activities require necessarily the respond in the organizational structure of the project team. It is often the case that the redistribution of competencies and responsibilities in the project team takes place, quite often; new project activities are set along with work packages, which require the introduction of new work and project roles, including the necessity of expanding the project team by new workers with the required requirements. A basic feature of a well set project management is openness.

For the right project management of projects it is necessary to fulfill the condition of the motivation of particular members of the project team. This motivation is fully showed in understanding their project roles, the effort of the quality fulfillment of tasks (defined in the submission of the project), n the effort of keeping the set time schedule in accepting the approved budget costs. It means that workers feel a personal responsibility for the results achieved. In the given context, it is important for the members of the solver's team:

- To understand and interpret the required goals of the project,
- To be able to quantify and verify the level of the fulfillment of partial project activities,
- To believe in the attainability and fulfillment of outputs of project activities (project packages),
- To be given the possibility to solve partial problems in a creative and innovative manner,
- To be responsible for the goals achieved,
- To be rewarded by the goals achieved.

From the view of the motivation of the team, the decisive factor in establishing the project team is to respect rules of the team development, its cycle, and the division into team roles. The motivation of the team members is dependant on the extent of their involvement at particular stages of the project, responsibilities for the

activities and it is based on the principle that everyone who participates actively accepts better obligations and dates.

Among the main tasks, which the entitled subject by the investor of the IS project (solver) has to cope with, is setting up the solvers' project team. As for the size and the composition of the project team, which is meant for implementing the IS project, experts' opinions differ. Some authors recommend (Turner) that the project team should be as small as possible. According to the authors of that approach, well working project teams are capable of achieving the results, which by far exceed the potentional sum of the results of work of particular team members, if they would work separately. This effect is described by them as synergetic effect. Synergetic effects can be explained also physically – the group of people is able to relocate a bigger object than the individuals.

However, in proposing and setting up the project team of the IS project, I recommend considering some facts, which determine also the number of project team members. Among those the following factors can be ranked:

The aspect of time

It comes from the identified fact that prior to the first stages of the solution of the IS project very often informal roles arise, which are a natural result of a discussion, ideas and proposals, suggestions of the possibilities of finding a solution, and searching for opportunities. Those generally formulated input propositions arise very often in the form of the brainstorming method, when the input requirements are formed in the general form, along with aims, strategies and variants of the solution of the project. Basically, at that time the elemental project team is established, whose many members get involve into the solver's part of the IS project and they are held responsible for fulfilling one's own goals of individual project stages.

The aspect of knowledge and skills

It proceeds from the theory of the priority of identifying necessary knowledge and skills, which are crucial for the project roles. In the IS projects, besides managerial skills in the first place, also information, analytical, programming, designing knowledge is essential along with the desired knowledge of the contents of the issues solved (e.g. knowledge of logistics, accounting etc.). On the basis of the need analysis and surveying the real required competencies, the next step involves then selecting those workers, who fulfill the requirements. That solver's activity has to take place very often in a relative short, limited project stage. From practical experience, I can emphasize the exceptional importance of this decision and practical problems in looking for workers, who are equipped with respective competencies. The basic knowledge domain is the issues of graduates and the perspective of various target users' groups on that object target group.

Within the project team, we can distinguish the formal and informal roles. The formal roles are defined functionally by responsibilities and competencies of individual members. The informal role comes from natural prerequisites of individual members, their personality profile, experience, and many other factors and they are not determined functionally. The degree of an accord of both types of roles increases the efficiency of work of the entire team and facilitates its managing. The overview and characteristics of the team roles in the IS projects is given in the following part.

The basic team of the IS project

It implements the project activities, which result from the life cycle of the project. It involves usually the following project roles and positions:

- The project manager of the IS project (responsible for the implementation and outputs of the IS project).
- Project managers of project activities (responsible for the implementation of the project packages).

- Knowledge engineers (experts) with the specialization in the IS domain (responsible for the analysis, a proposal, a design and programming the application including the pilot verification).
- Knowledge engineers (experts) with the specialization in the content domain of the respective quintessence of the problem solved. In the case of the RISA project, experts for education and labor market.

Support team of consultants, experts and users

The basic team fulfils very highly specialized tasks in the limited scope including the limited time aspect. Here, external consultants and experts for the marginal project activities belong, possibly the one time activities connected with the acquisition of data necessary for assessing the next procedure of the project. The representatives of users of outputs of project packages belong to this category as well, who carry out the testing and verifying in the pilot regime. In the project it was about the following types of project roles:

- Experts for the analysis of personalities.
- Experts for balance diagnostics.
- Experts for marketing survey and its evaluation.
- Experts for statistical data surveys concerning job offers on the internet.
- Workers for disseminating the conclusions of the project – organizers of the conference.
- Experts for a language arrangement of text documents in the electronic form.
- Graphic designers and proof readers.
- Translators and interpreters.

The role of the project manager in the project

The project manager can be characterized in the general form as a planner, an organizer, a controller, a coordinator, and a negotiator of project work. The project manager in our conception of project management is a person responsible for managing the project from the beginning to its end, including the responsibility for fulfilling partial subprojects (project activities). The project manager is then fully responsible for:

- Managing the project and its administration.
- Planning the project, supervision over it, and its management (implementation of implementation plans of the project).
- Personnel administration.
- Managing the coordination meetings of the project – members of the project team.
- Dividing work within the project team, arranging working conditions of the members of the project team (suitable information securing).
- Communication with the beneficiary including putting forward information about the course of the project implementation.
- Project documentation.
- The control of fulfilling the contract concluded with the investor of the project.
- The control of costs and consumption of the time fund.
- Identification of plan variances, managing change management.
- Risk management.
- Liaison management and establishing work contacts.
- Administrative contracts.
- The presentation of the project.

The project manager is then a person entrusted with management of the project and overall responsibility for its implementation. He/she manages the work of the project team in all information-technical problems, he/she takes care of the general

organization and work management of the project team, and finally, he/she is accountable for communication with the beneficiary of the project, along with processing the continuous and final report. The question of the exact specification of his/her professional training, knowledge, managerial and information training along with qualifications is very much discussed. I suppose that he/she should have a master's education, as an advantage can be seen his/r experience with managing knowledge projects.

The powers of the project manager can be defined as follows:

- The right to decide when approving of outputs of parts of the project and final report.
- Information, command rights along with the right to decide within the project.
- Allowing the further advance by attaining the milestones – subsequent starting of work in further partial tasks of the project.

The base of the profile of the manager of projects are his/her knowledge techniques and skills of managing projects on a general level, the superstructure is formed by his/her competencies on the level of knowledge of development means. The ideal is then one's won knowledge of the factual area of the project solved.

The project manager can be selected from two ultimate types. The first ultimate type has specific professional knowledge in the field, possible, in the field of the professional problem solved (analytic, programming, technical, and economic). The second type is a worker who possesses managerial and organizational prerequisites and skills, including communication and negotiation skills. It is only then a question of a decision made, what specific type of a worker is selected for the post of a project manager. A great mistake is to oversee the lack of some of managerial skills, such as for instance managing the project team, and communication skills. In particular in project management of projects, where outputs of particular stages are intangible, impalpable and provable, it is often about key skills for the further procedure of project activities.

The evaluation of the project manager results from a successful implementation of the project within the approved costs, time schedule, and indicators, which specify the quality of the solution. The fundamental task of the project manager is the specification of further project roles of projects.

The purpose of the specification of those project roles is:

- The division of tasks, powers, and responsibilities, and first of all, in the group of the permanent team of the project,
- Processing time schedules, getting individual workers of the permanent team into the implementation and control activities of the project,
- Appointing and approving of project roles (including their staffing) within the steering bodies of the project.

Steering committee

For securing the fulfillment of project tasks and for achieving the outputs set in project packages, project systems are used, which are defined as a steering committee. Their purpose is first of all to assist the project manager in implementing project tasks and delegating powers and responsibilities to the determined project roles. In the specification of projects, I suppose that it is appropriate to establish, to manage and to evaluate the activity of the following committees:

Steering committee of the project

This committee is occupied by a representative of the project investor, a project manager, senior executives of project activities, and possible representatives of suppliers of key technology items. It decides about the main facts of the project,

the fulfillment and the advance of project activities, the achievement the output indicators, including the compliance with the approved budget of the project.

Committee for managing changes of the project

This committee is qualified for assessing significant project changes. Aside from the project manager, it is necessary to provide for representatives of users, technology suppliers and to invite the respective project manager of the given project activity to the meeting concerning the work package. It is often the case that problems are solved during the meeting, which by their conclusion oversteps the competencies of this committee. In this case, it is suitable to process the output document as a proposal for the meeting of the steering committee of the project.

Roles of project managers of project activities

Project managers of the specific project activities are experts, who take full responsibility for fulfilling the specific project goals, activities and outputs set in the given project packages. In the managerial area, they manage and steer the specific partial solver's team, while at the same they look after cooperation between teams, sharing project values and information within the technical and technological part. They communicate closely with the project manager and in joint meetings, within the steering committee; they secure the achievement of the project milestones within the specific respective activities.

Principles for forming the team

- Always consult the involvement of individual members of the project team with their superior within the line structure.
- Line managers can secure the area of quality in the project, it is necessary then to consult their role and approve of it in such a case.
- Set up the matrix of the role of individual team members, team members will clearly see, what is expected from them to do and they will identify with their role
- Set exactly responsibilities of individual team members. For each «work package», one man is responsible.
- The initial meeting of the team, getting to know each other, and establishing the atmosphere of mutual trust and willingness to cooperate, is a key element for the later success of the project.
- Respect, apart from professional talent, also team roles (a project initiator, a person formulating the project, a team integrator, a mediator, a finisher) and psychological inclinations (creativity, preciseness, and so on).
- Do not underestimate the possible disturbing role of some of professional workers in relation to the team functioning.

The role of knowledge engineers (experts) with the specialization in the IS domain

The division of the roles of knowledge information experts from the content specialists is enabled by the specification of the project role (roles), whose activity is irreplaceable in the IS projects and very important. Among the main tasks of that role can be ranked the analysis and the model of the practical real state of the object examined, the development of the model of the given issues, gathering and constructing accessible knowledge in the given area of examining the object reality. Knowledge engineers in the IS domain are responsible for the collection, the analysis and the proposal of the structure of the user's access to the analyzed information, they create and keep the data stock and the respective knowledge databases including the proposal of the system of the administration and data update. Those experts provide for communicating with other knowledge experts – specialists for the solved content of the project.

The internal division project roles are very appropriate with respect to system analysts, designers and programmers. That presupposes the separation of the analytical part of the system, design, and one's own coding of the programme.

System analysts

They create IS models in the stage of the analysis, they have knowledge of the issue domain, moreover, they can model the IS by means of model languages. They create the IS model on the analytical level. They have the ability of analytical thinking, the capability to define the system, along with relations in the system and relations to the environment. The significant fact, which that role presents, is the fact that analysts can define the problem as a difference between the existing and intended situation. Besides managerial prerequisites and skills (management of resources, risk and change management), they are expected to possess communication skills, which are necessary for the quality processing of the analysis. We are dealing here with the art of the clear and efficient communication with other people – with the target IS users' groups. They have to cope with all communication techniques and methods of interviewing (an interview, a questionnaire, monitoring).

Designers

They are experts for the given technological environment, they are acquainted with the IS technology and they make all essential technological decisions in connection with the IS proposal. In specific cases, they are working, for instance, as an expert for the database, an expert for Microsoft NT and the like. For designers, the result of the analytical model becomes a task for the implementation in the given environment, i.e. for creating the design. In their activity, they select the fundamental development environment for the prototype of the system, and also the target application of the solution of the IS project. The designer should have knowledge of IS technical design including the capabilities to explain technical details to other members of the project team.

Software professions in IS projects

They are bound by the specific developmental and programming environment. They put (install) own programming environment into operation, they create (programme) their own information system, possibly, the system of the support of the development. Some software professions can be, according to the scope of the IS project, secured only by one person, in the case of developing greater IS projects, it is necessary to introduce and manage the entire department of programming professions, along with the use of external specialists – programmers. We can distinguish then two roles:

Head programmer

High requirements are made for that project role. He/she has to cope with the creation and the specification of programming tasks, management and the proposal of implementing programming work. The own success of the project of the information system and the formation of the programming solution are very often fully dependant on the quality staffing of that project role. In smaller projects, accumulation takes place, though, and the head programmer implements practically his/her own programming activities.

Idea programmer

In bigger IS projects, that role is occupied as well. What is demanded from that project role is creativity, invention, ideas concerning nonstandard programming solutions.

System programmer

For the administrative staffing of that project role, the detailed knowledge of the system environment for the given product is required.

Executive programmer

That programmer, in the first line, based on the detailed specification of the IS proposal, the quality processed scenarios and data analysis, creates his/her own application and programming solutions.

Expert for the programming language

That project role does not have to be occupied in the basic team, which solves the given IS project and it can be placed into the support group. We are dealing here with the expert for the specific implementation tool, which can provide other programmers for professional consulting on the problems, which have arisen while searching for the efficient solution.

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S U M M A R Y

The process of projecting the information system is rather an extensive process and one can perceive this issue from many perspectives. In some respects, the social aspect may prevail along with psychological or organizational. Another perspective could involve own steering processes, or an attempt in concentrating on the relation of the IS being developed and the information strategy of the beneficiary. Then, the IS projects can be uncoiled from those fundamental objectives of the organization along with specifying methodologies, methods and tools for developing the respective IS.

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