

MANAGEMENT SYSTEM FOR STREAMLINING THE INNOVATION PROCESS OF RESEARCH AND DEVELOPMENT WORKPLACE

Ing. Martina Husarova
Doc. Ing. Jan Spisak, PhD

Development and realization workplace of raw materials extracting and treatment,
Faculty of mining, ecology, process control and Geotechnology, Technical
university of Kosice, Slovak Republic

Abstract

Innovation is the application of new knowledge and its materialization. Thus it ensures the company's ability to cope with changes in the business environment and the ability to survive in the global competitive environment. As a result, innovation saves natural resources, provides safe and more efficient transport and production. Innovations change the style of work life, place emphasis on the importance of education, creativity, communication and collaboration. However, innovations are associated with a number of problems. They require high costs of the research and development and they face the risks during implementation. This paper describes specific experience with the application of principles and tools of logistics, project management and mainly the application of management system created for the streamlining not only the process of preparation and implementation of the specific innovation project, but also for the streamlining the operation of research and development workplace which implement innovative projects.

Keywords: Process, project, management system, innovation

Introduction:

Any process, the process of planning and the process of innovative project implementation does not take place in isolation. But they depend on other factors which have an influence on efficiency of the processes implementation in the organization. Furthermore, the factors create an organization context of this process. Regardless of the method of project solving (top-down or bottom-up) it is possible to identify the main factors that most influence the success of implemented projects. The main factors

for the research and development workplace implementing innovative projects within entire innovation chain are following:

- infrastructure - talks about how the organization is structured and organized,
- system - the system which is used by organization in order to support the processes of innovation projects and processes to ensure the operation of organization,
- culture – predominant culture in the organization, including communication, informal relationships towards inwardly and outwardly which significantly affect daily events in the organization.

From the view of the process of preparation and management of the innovative projects, it is essential that the workplace promote an environment that will support innovation activities. In management of innovation project cycle, it is therefore necessary to minimize the risks arising from breach of national and European legislation, guidelines of management and supervisory bodies, or individual failure of the member of project team. To make management system design more efficient, it is essential to identify "bottleneck" in the process of planning, preparation, organization and control of the project. If we want the process of preparation and implementation of the innovative project to improve, we have to have it under control. Especially, the process must be clearly defined. Therefore, each process must be planned, described then implemented, monitored and finally continuously assessed. The process which is not continuously improved, its effect decreases.

1. Management system:

In terms of the method of preparation and implementation, two types of projects are designed in the workplace:

- applied research projects,
- projects for practice.

Applied research projects are characterized by forming the top-down solution, which is also typical for the projects of framework programme. In this case the strategy is determined as first and concrete solutions come up with the project implementation. In terms of risk prevention, it is important if workplace can arise from comprehensive database of experience in implementing analogous projects. Second fastest-growing group of the projects implemented in research workplaces, are projects for practice. These projects have the bottom-up planning form, i.e. a particular problem is being searched. Using this kind of planning form, the risks and disadvantages may not be immediately obvious and could happen that some of them are identified during the project. For both types of projects, the workplace has within established management system developed own unique

methods and techniques making more effective the entire process of the projects preparation and implementation.

2. The structure of the management system:

For planning and management of all activities of the workplace, own management system was created. The system takes into account its specific position in the market and respects the legislative conditions in which it operates. The process model of the workplace was a model for formation of the system.

Management system in visual form represented by four-side pyramid (Fig. 1) has a simple structure. Top of the pyramid consists of a vision of the workplace. Its fulfillment is divided into four sides of the pyramid – into four fundamental areas of workplace specializations:

- research, development and innovation,
- transfer of the research, development, innovation (RDI) results into practice,
- transfer of the RDI results into education,
- VRP infrastructure.

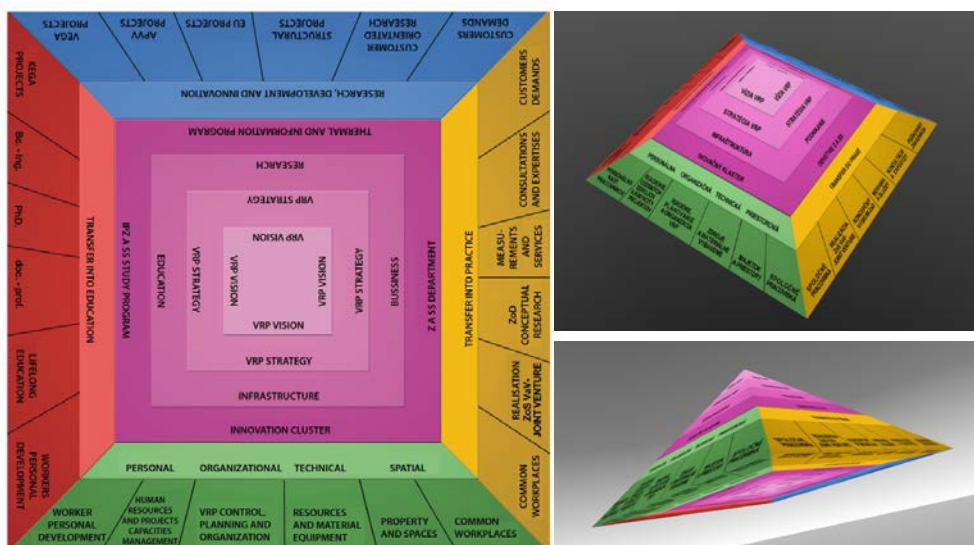


Fig. 1 – The structure of our system is created by hierarchical process model

In each area of the specialization are identified activities and processes and created algorithms for their planning, implementation and control with definite responsibility allocation.

From the perspective of the pyramid, each pillar has three levels:

- strategic - which includes vision and strategic planning (on the Fig. 1 in the 3D model is displayed in purple colour),

- tactical - it includes an area of tactical planning, annual plans and their evaluation (in 3D models is displayed in 4 colours – according to 4 professional areas: research, development and innovations – blue colour, transfer into practice – yellow colour, transfer into education – red colour and infrastructure – green colour),
- operational - this area is represented by the monthly and weekly work plans of the individual departments, which are subdivided into individual plans of specific workers.

Based on the definition of a process map that says "map of the processes is a visual representation of the process boundaries and the main process steps", the pyramid is a process map of the workplace.

2.1 Internal structure

Through a link with the surroundings and environment where the workplace operates, it is possible to describe its internal structure. The system which works here, is described by its structure and operating (management and planning). Description of the internal structure of is formed by process model of the workplace.

In the traditional definition of the organization, the working methods, working activities and operations are conserved in individual function categorizations of the organization structure. In addition, their mutual relationships are in advance predetermined by inclusion in the hierarchy of the structure. Thus, organization processes are hidden somewhere within the organization structure. The parts of one process can be divided among several function positions within the organization structure. The whole context of the organization's processes is thus unclear and we can it just guess intuitively instead of exactly to determine. On the basis of such division of the processes, responsibility for the management of the particular process should bear the worker with the highest position in the organization, for instance senior manager, what does not always reflect reality.

The reason why the workplace pays attention especially to processes is demand of dynamic in their operating. This dynamic is a key how to make the working methods possible to flexibly adapt to new opportunities offered by the research market (or to opportunities which are no offered by the market but workplace creates them by own active policy), and to cope with the administrative burden necessarily involving the implementation of large innovation projects.

If the processes that run in the workplace should be sufficiently flexible to reflect the actual needs of the workplace (and its customers), the organizational structure as system support these processes must be flexible as well. On the workplace is introduced matrix organization structure, which is probably closest to process-oriented structure as on the one side there can be created the functional units and, on the other side ad-

hoc individual process groups according to the needs of the specific projects can arise. For the process groups or processes on the workplace is hold true that the processes are not divided into key processes i.e. important and supportive (subsidiary). If we want the workplace to operate as a whole, all processes have the same weight in terms of maintaining its functionality and dynamics. Serious administrative errors can have fatal consequences, for instance failure of factual project assignment.

3. Approaches to the use of values that offers an innovative project:

In the context of the innovation process and understanding the importance of innovation project, it is important to mention the possibilities of using the value that is brought by the innovative project implementation not only from the perspective of the implementer of innovation but also from the workplace development point of view:

- short-term taking advantage of opportunity - misunderstanding of the innovation project value,
- long-term taking advantage of opportunities - understanding of the innovation project value.

For short-term taking advantage of opportunity, an implementation of the innovation project is considered as the ultimate goal of achieving the project intent and thus its importance is ended. The aim of the project is fulfilled, but it was not outlined and managed so that the outputs obtained from the project would generate further innovative occasions, further occasions for development of the workplace, for instance acquisition of new partnerships, creation of new innovation occasions, etc. Therefore a potential innovation project is unused.

Long-term opportunities use the innovation project only as a means (tool) in order to achieve higher - strategic objective of the organization. This approach enables to use the maximum potential of the project as used opportunity generates further opportunities for the organization (implementation of one project creates the conditions for the creation of further project).

To take advantage of all offered opportunities and use up their potential, is the only way to maintain sustainable development of the workplace.

3.1 Management system of the innovation projects

Management system of the innovation projects arises from workplace management system. In accordance with this system, the preparation and implementation of the innovation project is performed through described algorithms of the activities.

For each project solved on the workplace are identified activities and processes and are created algorithms for their planning, implementation and control with responsibility allocation.

3.2 The structure of the project and responsibilities allocation

From a technical point of view, each project is divided into certain stages. These stages are interconnected to form a system of processes and elements that are interacted. Therefore it is possible to identify a process approach whereas the outputs from one process present the inputs to another process. In general, the project can be divided into smaller sub-projects, which consists of several packages of working tasks. Decomposition of the project may be heterogeneous, but the sequence should be arranged hierarchically. Within established management system, there is evolved algorithm of solving which involves a sequence of steps from the project preparation to the impact period for each type of project solved on the workplace. Each type of project has own division. For projects of structural funds, decomposition of tasks and responsibilities is divided for the area of professional and administrative fulfillment (Fig. 2).

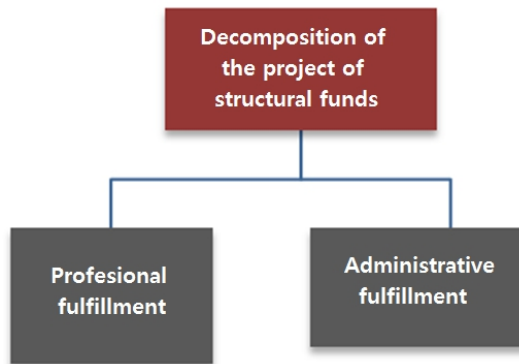


Fig. 2 – Decomposition of the tasks of structural funds

In professional fulfillment, a correct understanding of the project's outputs presents a basic precondition for the project success. All these outputs are thus clearly and precisely defined. Therefore, a professional fulfillment of the project, which is represented by activities (A), is broken down into several areas of the activity (Fig. 3). Within each area of activity there is defined set of tasks (T). It is essential to fill up the set in order to meet the aim of the area. Fulfillment of the aims of the areas leads to the fulfillment of the aims of the activity.

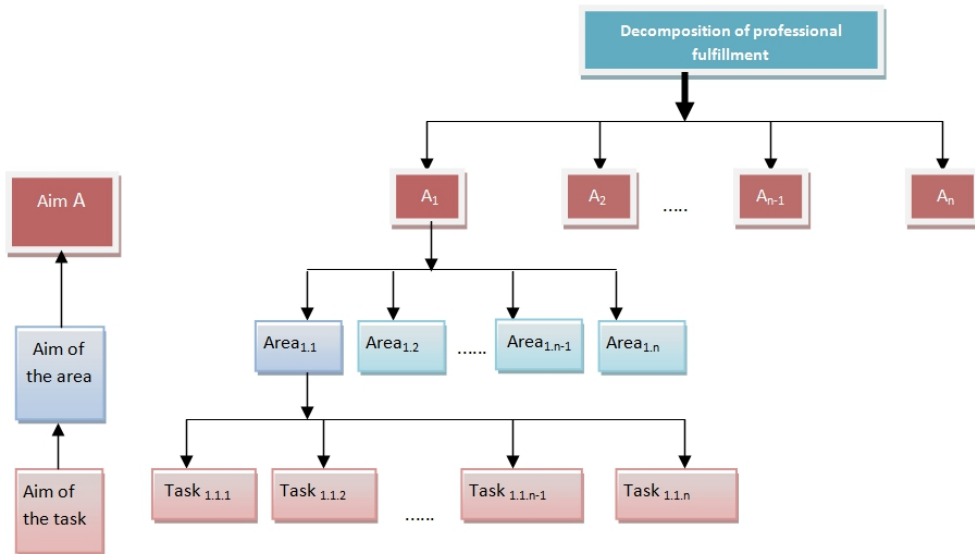


Fig. 3 – Structure of the professional fulfillment of the tasks for the structural funds

Each of these tasks must be defined temporally and factually. Based on the definition of the project, an innovative project can be understood as an activity of one time interval, which can never be exactly repeated. Despite the fact that a good innovation project needs a new technology, methods and in addition it indicates the elements of uncertainty and risk, it is possible to minimize the level of risk by experience that brings knowledge of the area where the project is implemented.

Conclusion:

Properly designed management system must be a significant co-creator of the commercial success of the workplace and not its obstacle. Developed management system of the research and development workplace has a simple structure – allocates working tasks, eliminates bureaucracy, is transparent and easily controlled, also is open, i.e. the system allows workers who need innovation to perform immediate innovation. The system has a wide range of support current documents, files, examples and experiences and therefore creates place for further improving productivity and quality of the performed work.

Creation of the process model:

Introducing a process approach on the workplace, the result of which the process model of the workplace was created, the following activities have been emerged:

- identification of the workplace processes,

- accurate definition of the links between processes,
- assign the processes to the owners and thus to the clarifications of the responsibilities and competencies,
- formation of the comprehensive overview of the workplace's activities.

Overview of the work organization:

As a result of the process model introduction, the change within performed activities was noticed in the workplace. It leads to the following:

- disposal of duplication of the performed activities,
- unsecured activities covering,
- creation of substitutability,
- duplicate control providing,
- clear definition of job content,
- clarification of administrative work on the workplace.

Maximize the effectiveness of activities:

By attributing responsibilities and defined sequence of the steps resulting from interactive job content of all workers there have been emerged:

- shortening a period of the performed activities,
- shortening the communication and information channels,
- maximum use of workplace capacity.

If the workplace want to ensure long-term competitiveness, it is not satisfactory to reduce costs and optimize the processes. It is essential that the competitiveness will be developed by combination of innovations and methods in order to rationalize the organization of work and to increase productivity.

In the last decades, even innovation has allowed workplaces innovation to improve performance. Despite the fact that many of workplaces, in recent years, systematically worked on making their business processes more efficient, only few of them have an effectively well-functioning system of the continuous innovating.

Although it is a long-lasting process, it will surely pay. Innovation of management principles and processes thus can create long-term advantage and bring advantageous shifts in competitive positions.

Acknowledgment:

This contribution/publication is the result of the project implementation Advanced technology for the mining company of 21st century by the Research & Development Operational Programme funded by the ERDF“. (ITMS: 26220220131)

References:

Kovac, M. (202) Innovation and technical creativity, Faculty of Mechanical Engineering, Technical university of Kosice, Publisher Michal Vaska, ISBN 8071653691.

Kostruriak, J., Debnar, R. (2006) Principles „lean" and innovations, Modern management, ISSN 0026-8720.

Gozora, V. (2008) Project management, Vysoka skola ekonomie a manazmentu verejnej spravy, 216 p. - ISBN 978-80-89143-70-2.

Vlcek, R. (2006) Value management of innovations, Modern management, ISSN 0026-8720.

Kotler, P., De Bes F. T. (2005) Innovative marketing, Grada Publishing, a.s., Praha, ISBN 80-247-0921-X.