

ICT INNOVATION PROJECT MANAGEMENT

New Knowledge Areas in PMBOK

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Abstract: The main goal of the position paper is the proposal of the new knowledge areas for Project Management Institute (PMI) method, which are different in comparison to that presented in PMBOK Guide version 4th. The paper covers justification of the need to implement the five new knowledge areas i.e. sustainability, project environment, financial analysis, innovations, marketing and events, because of the ICT (Information Communication Technology) opportunities and strong strategic demands of the economy.

1 INTRODUCTION

The current economic downturn is an opportunity to raise EU trend growth and make it more knowledge driven. Innovation should be a key to sustaining long term growth. The Programme Innovative Economy is one of six national programmes under National Strategic Reference Framework, which are co-financed from EU resources (<http://europa.eu.int>). This programme is directed to all entrepreneurs, who want to implement innovative projects connected with research and development of modern technologies and implementation of ICTs.

Entrepreneurs wanting to be innovative or to become beneficiaries of the Programme Innovative Economy projects should at first recognize what innovation is. According to Justesen (2004) innovation is when knowledge from previously separated domains is exchanged and combined in new ways. Innovative practice is not merely about getting new ideas and the creation of an invention, but equally about the successful exploitation and diffusion of the innovation. This definition emphasizes an interdisciplinary approach to innovation development as well as the necessity of practical applicability of new solutions.

Tidd and Bessant (2009) argue that innovation is driven by the ability to see connections and opportunities and to take advantage of them. The creativity in innovations adds value to the individual and the community and is based upon perceiving and capturing an opportunity. They consider four types of innovations:

- Product innovation – changes in the goods (products or services) that a business organization offers;
- Process innovation – changes in the ways in which they are created and delivered;
- Position innovation – changes in the context in which the products and services are introduced;
- Paradigm innovation – changes in the underlying mental models which frame what the business organization does.

Zhao defined innovation as the specific tool of entrepreneurship by which managers exploit change as an opportunity for a different business or service. Innovation has to address market needs, and requires entrepreneurship as a dynamic process and a unique event. (Zhao, 2006). Sundbo and Fuglsang (2006) say that innovation can be perceived as a special case of development, which is relevant to some firms and organizations. Innovation is defined by them as the successful introduction and development of new products and processes that can be clearly isolated and identified and which have a certain degree of radicalism and novelty. Innovations are less dependent on in-house specialized research and development activities. The business environment is more involved. Customers play a central role in the innovation evaluation process. Market reputation and political considerations are also a part of innovation. Therefore innovation management is to become the art of balancing different factors and development against stability. According to Gaynor (2002), innovation as a management discipline involves focusing on the business organization's

mission, searching for unique opportunities, determining whether they fit the organization's strategic direction, defining the measures for success, and continually reassessing opportunities. Innovation does not need to be a brilliant invention, ingenious device, but it demands the utilization of a unique opportunity and implementing the designs of new products, new systems and new processes. (Gaynor, 2002). Innovation is defined by the Oslo Manual as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations". (Oslo Manual, 2005).

Innovations discussed by Schumpeter cover the opening of a new market, the conquest of a new source of supply of raw materials or semi-manufactured goods, or the re-organization of an industry. (Oslo Manual, 2005). Schumpeter considers technological product innovation and technological process innovation. A technological product innovation is the implementation and commercialisation of a product with improved performance characteristics such as to deliver objectively new or improved services to the customer. A technological process innovation is the implementation and adoption of new or significantly improved production or delivery methods. It may involve changes in equipment, human resources, working methods or a combination of these.

Innovation management is the goal of any organization in order to be competitive on the market as well as it is an important subject of research work. Roberts and Frohman model has six stages and includes: recognition of the opportunity, idea formulation, problem solving, prototype solution, commercial development, technology utilization and diffusion. (Gaynor, 2002). Roberts and Frohman assume that innovation is a rational process with some prescribed methodology. Such a rational process requires a stable economic and competitive system. Uncertainty and innovation are synonymous at least in the early periods where general rules of experimentation, work and conduct do not apply. James Bryan Quinn considers the innovation process as controlled chaos. (Gaynor, 2002). For him, the innovation process can be initiated in two business environments: 1) independent innovators having strong internal motivation and no risk aversion working in the garage 2) corporate innovators and competent researchers conscious of the risk of undertaken venture realizing the innovation project. For Van der

Ven the innovation is a repetition of convergent and divergent thinking, so the innovation projects are not very consistent from project start to finish and the project outcomes are only partially stable and consequent realization of the project goals. (Gaynor, 2002).

2 PMI MANAGEMENT METHOD

Project management is increasingly becoming a profession. However, without project management methods projects only seldom deliver satisfaction to the involved stakeholders. Generally, methods can be divided into universal methods (i.e. PRINCE2, PMI method) and firm-oriented methods (i.e. IBM Rational). The PMI published on December 31, 2008 the 4th version of the PMBOK – Project Management Body of Knowledge. According to PMI, projects are a means to organize activities for the achievement of the strategic plan goals, whether the project team is employed by the organization or is a contracted service provider. (*A Guide*, 2004).

Projects are authorized as a result of one or more strategic considerations i.e. a market demand, an organizational need, a customer request, a technological advance or a legal requirement. ICT projects can actually start in different part of the organization. New technology or better use of existing technology encourages changing work practices. Intention to use different information or distribute information in a different form leads to innovative use of ICT. Improvement of products and services by incorporating digitized information or even new IT hardware ensures additional value for customers.

PMI considers project management as the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the implementation and integration of the project management processes. PMBOK Guide version 4th cover five groups of processes: Initiating, Planning, Execution, Monitoring & Control, and Closing. The knowledge areas continue to be the same nine as before, in earlier versions: Integration, Scope, Time, Cost, Quality, Human Resources, Communications, Risk, and Procurement or Acquisitions. However, because of the rapid development of ICT, as well as opportunities of innovation development and focus on sustainability and cost efficiency, the other knowledge dimensions could be included in the PMI method.

2.1 Sustainability as a New Knowledge Area

The etymology of “sustainable” carries interesting and important implications for the way the word is used as it includes several contradictions. The word “sustain” is derived from the Latin “sub-tenere”, meaning “to uphold”. This carries a passive connotation in it and gives the concept an image of stability, persistence and balance. “Sustainable” is used in a more active sense together with “development”. Development means change, progress and growth. Hence, “sustainable development” can refer to a process which is being upheld or defended at the same time as it implies movement and improvement. (Sunden and Wicander, 2005). For Ahmed and Sundaram (2007) sustainability is a commitment to a new way of business activities that addresses balanced prosperity of social, economic and environmental dimensions of business. Sustainability as the simultaneous effort of balancing economic, social and environmental goals for a corporation is another metaphor for describing corporate social responsibility, corporate citizenship or ethical business conduct. (Bondy *et al.*, 2007). PRINCE2 describes a project as “A temporary management environment created for the purpose of delivering one or more business products according to a specified Business Case”. (Hedeman *et al.*, 2005). This basic business requirement (Business Case) must be set at the start of the project. Regular checking of the basic business requirements must take place as the project progresses. The Business Case gives the framework within which project stakeholders specify the requirements and balance the ecological, social and economic dimensions. Sustainability is the capacity to ensure a desired level of outputs for an extended period. It requires not only that a particular project achieves its objectives during the project life but also that the benefits it generated continue beyond the time of the sponsoring. The Table 1 include sustainability as a knowledge area and processes suitable to this dimension.

Project management for sustainability needs to concentrate more on change than stability of environmental circumstances, meaning that existing rules, customs, practices and rights are seen more as the subject matter of the project to be influenced. Equally, project management for sustainability must recognize the limitations and the consequent need to take advantage of existing social institutions and structures that promote sustainability.

Table 1: Sustainability as a new knowledge area.

Project Management Process Groups for sustainability as a knowledge area	Sustainability of ecological, social, economic and legal environment
	Proposed processes
Initiating Process Group	Observation. Monitoring
Planning Process Group	Identification of the environment evaluation metrics. Planning the environment surveys. Collecting declarations and obligations
Executing Process Group	Analysing the environment before project's start and forecasting the environmental needs
Monitoring & Controlling Process Group	Controlling the reliability of analyses, forecasts and performances
Closing Process Group	Dissemination of the project results in the Business Case environment

2.2 Project Environment

Virtually all projects are planned and implemented in a social, economic and environmental context and have intended and unintended positive and negative impacts. But, the project team should also consider the project in the contexts created by other projects. In the interest of project beneficiaries as well as sponsors, a group of related projects can be managed in a coordinated way to obtain benefits and control products not available from managing projects individually. Therefore, business organizations can be responsible for management of multi-project, programme, project portfolio, roll-out projects' collection or large project. They consider an environment of multiple concurrent projects in which projects compete for the same set of scarce resources. Projects are unique in that their operational requirements and activity durations differ. However, they share common characteristics that enable their classification. So the realization of each project in the project set is unique. (Cohen *et al.*, 2004). The Table 2 covers the main processes for management of project environment.

Multi-project management is the management of a group of projects that are not interrelated, but the same staff and resources are used within the projects. The development of common reporting structures and of shared methods and techniques can lead to better harmony between the projects and corporate organization. (Hedeman *et al.*, 2005). A

programme is a temporary organizational structure covering the projects sharing the same financial resources and having the same goals. It is a temporary management structure in between the projects and programme sponsor (i.e. EU agencies) in order to ensure that projects' objectives involving change are achieved in a structured manner. Portfolio management covers the management of a group of ICT projects that together supply new capabilities that are necessary in order to achieve one or more mutual corporate objectives. Projects are prioritised and controlled by mutual agreement for the corporate objectives to be achieved and for the maximization of the portfolio value for the ICT users. Roll-out projects set covers nearly similar projects in the aspect of utilised resources, but different from the point of implementation place, as for example a series of ICT systems' deployments.

Table 2: Project environment as a new knowledge area.

Project Management Process Groups for project environment as a knowledge area	Project environment
	Proposed processes
Initiating Process Group	Identification, revealing and specification of all the projects connected together by the subject, people and resources. Analysis of realized and commenced projects.
Planning Process Group	Planning the utilization of the knowledge from earlier projects. Planning other projects, taking into account the status of the commenced projects.
Executing Process Group	Re-using the knowledge and artifacts gathered in earlier projects. Supervision and monitoring of other projects
Monitoring & Controlling Process Group	Controlling the honesty and integrity of projects' knowledge re-usage
Closing Process Group	Updating the projects' knowledge base. Verification and validation of artifacts gathered in project knowledge base

A large project is a project that comprises a number of part projects, each of which is controlled as an individual project, with its own executives, however, the outcome, what is delivered, is still a complex product. The difference between a portfolio of projects and a large project is that within a

portfolio of projects the various projects sometimes deliver a solitary outcome and sometimes clusters of a number of outcomes that can each provide the organization with added value, whilst with a large project one inseparable combined total outcome is delivered. Management of project groups creates the opportunities to search for unique knowledge, determining the best practices, defining the measures for success and continually reassessing the skill and abilities. It enables to look for the future with the knowledge of the past and with monitoring the present.

2.3 Durability and Financial Analysis

In PMBOK, project cost management is primarily concerned with the cost of resources needed to complete schedule activities, but it should also consider the effect of project decisions on the cost of using, maintaining and supporting the product, service, or result of the project. However, in the case of all development projects, there is an inevitable need to demonstrate that the project represents a good investment and will deliver value for money for those who are expected to finance it. Mostly, the considerations cover analysis of demand for the product and services, predicted cost and price structures and the potential economic viability of the proposal. Such investigations should seek to evaluate the existence of alternative solutions which may meet the desired objectives in a more cost-effective or economic fashion. In some instances, such studies may need to consider a range of options in which investment costs and outcomes vary considerably, thus allowing decision makers to exercise choices in terms of value for money and in terms of the level of investment in the context of competing demands for scarce resources. Usually, in the feasibility study or in business plan for the project, economic analysis covers calculation of economic performance indicators and interpretation of results. The three basic economic performance indicators i.e. ENPV, ERR, BCR must be calculated for each project option. The financial analysis covers the calculation of financial performance indicators and interpretation of results. The financial ratios, on the investment (FNPV/C, FRR/C) and on national capital (FNPV/K, FRR/K) must be calculated for each selected project option. (Florio, 2007). Project durability continues to be one of the most difficult aspect for most developers of sustainable ICT projects. There is no standard or widely accepted methodology for evaluating durability. In the Programme Innovative Economy, the durability

means that project beneficiaries should ensure the utilization of the project effects according to the specified strategic goals of project for an established period of time. The Table 3 covers the main processes for the finance and durability management.

Table 3: Durability, economic and finance analysis as a new knowledge area.

Project Management Process Groups for durability, economic and finance analysis as a knowledge area	Durability, economic and finance analysis
	Proposed processes
Initiating Process Group	Observation. Identification and specification of the financial support sources for the beneficiaries.
Planning Process Group	Resource planning and their cost specification. Project income, profits, and economic and financial indicators' predictions.
Executing Process Group	
Monitoring & Controlling Process Group	Controlling the revenues and expenditures during the project.
Closing Process Group	

2.4 Innovations in Projects

Nowadays, innovation development is a managerial process. As such, it includes the following activities:

- Searching – scanning the internal and external environment for threats and opportunities for change;
- Selecting – deciding which of the concepts and inventions are valuable for further research and development;
- Implementing – launching the research and development of inventions, acquiring the knowledge resources to enable the innovation;
- Executing the project under conditions of uncertainty which require extensive problem-solving;
- Deployment of the innovation and managing the process by initial adoption;
- Sustaining adoption and use in the long term through further prototyping and reinnovation;
- Learning and development of the innovation knowledge base. (Tidd and Bessant, 2009).

Table 4 covers the main processes for management of innovations.

Table 4: Innovations as a new knowledge area.

Project Management Process Groups for innovations as a knowledge area	Innovations
	Proposed processes
Initiating Process Group	Innovation conceptualization
Planning Process Group	Innovations' planning. R&D planning. Project effect implementation planning
Executing Process Group	R&D realization. Project results' implementation as prototypes or as pilot version
Monitoring & Controlling Process Group	Verification and validation of innovations.
Closing Process Group	Project results dissemination. Preparation for the project results' commercialization

2.5 Marketing and Event Management in Projects

Four principal factors govern how rapidly an innovation will spread: 1) the number of users, 2) the expected profitability of innovation 3) low investment at start of deployment and 4) adaptability and risk-proneness in the industry where the innovation is introduced. (Gibson, 1998). Diffusion of innovation demands communication through which the potential adopting unit gains knowledge about the innovation and the social system, which is a group of organizations working together on the commercialization of innovative effects. In PMI method communication is focused on information gathering and distribution for project management support, but the additional knowledge area should cover project effects' marketing (i.e. pricing, placing and promotion). The chosen target clients should be informed or educated about the project and its products. It includes advertising, Public Relations, messaging, media connections and business event management. (Bowdin et al., 2006). Business events include conferences, exhibitions, incentive travel and corporate events for presentation of innovative products to an invited audience with the goal of inducing a sale. Table 5 covers the main processes for marketing and events for innovation diffusion.

Table 5: Marketing and events as a new knowledge area.

Project Management Process Groups for marketing and events as a knowledge area	Marketing and events
	Proposed processes
Initiating Process Group	Conceptualization of the project results marketing activities and events
Planning Process Group	Planning the price, place, promotion, events and people. Estimation of events' impact.
Executing Process Group	Marketing activities. Events implementation
Monitoring & Controlling Process Group	Controlling the expenditures and evaluation of effects
Closing Process Group	Events' shutdown

3 CONCLUSIONS

Since the early 1990s, Europe has witnessed a rapid development of projects and programmes to exploit ICTs. Feasibility studies as well as business plans for ICT projects usually cover considerations concerning traditional PMI knowledge areas, but also new knowledge dimensions are demanded there i.e. innovation characteristics, sustainability and durability problems, economic and financial analysis, promotion and dissemination project effects. Therefore, there is a strong need to include these knowledge areas in a project management method e.g. the PMI method.

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