

Knowledge Oriented Project Management¹

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Abstract—Basic standards of project management are focused on project management processes. Knowledge Oriented Project Management (KOPM) is an approach to project management focusing in project management on utilization of the entire knowledge of project management collected by the project manager or organization. KOPM substantially extends Process Oriented Project Management and restores the right balance between processes and off-processual knowledge needed for project management.

1. INTRODUCTION

BASIC standards of project management such as PMBoK [2] or Prince 2 [1] are focused on project management processes.

Such an approach may suggest that this is the most important part of the knowledge needed to achieve success in the area of project management. But proper execution of processes may not guarantee success in this domain. For instance, it seems that in the area of cost management the most important success factor is knowledge about the prices of planned activities (price list). The process of planning itself is less important than the price list. There is an analogous situation in other areas of management: in the area of risk management, knowledge about risks threatening a project is more important than (often overcomplicated) management processes. It is more important to know what skills are needed and what resources are available than to know the (simple) process of human resources management processes. The words “more important” should be interpreted as implying: “an error may have more significant consequences in project execution”.

The examples that have been cited show that the way of conducting project management processes in all areas of project management, for example those described in PMBoK, is not what determines success in project management. A substantial amount of knowledge beyond that of project management processes is needed to achieve this goal. According to my personal observations, project managers would be more satisfied by being provided with knowledge needed for management than with the pure processes of project management.

Focusing in project management on utilization of the entire knowledge of project management collected by the project manager or organization is called Knowledge Oriented Project Management (KOPM). The approach to project management that focuses on project management processes, which may be found in the most of the publicly available PM standards, shall be called Process Oriented Project Management (POPm). As will be shown later on, POPm is a necessary element of every

instantiation of KOPM.

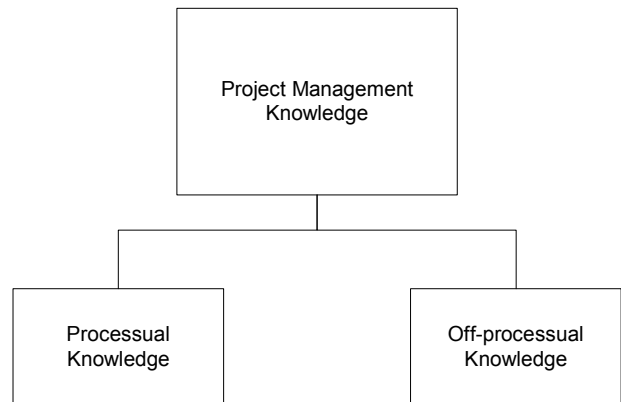


Fig. 1. General structure of project management knowledge

Project management knowledge has its own local flavor in most cases and areas. In the cost management chapters in any project management standard no price list is included – nor can one be. One reason is the local specificity (geographical; imposed by the area of project implementation; imposed by other factors) of price lists: the prices of a given type of work in Warsaw differ substantially from those in Los Angeles or India. Other price lists are needed by civil construction project managers and others by IT project managers. This in no way means that one may plan and execute a project without adequate knowledge of the prices that prevail in a given project environment.

Collecting the full register of knowledge needed for project management is not a simple task. Many companies strive for many years to possess such a register. Many consulting companies establish their value just on their proprietary knowledge relating to project management. This knowledge may be acquired in several ways. The three basic ones are:

- their own experience,
- publications,
- commercially accessible registers and data bases.

Our approach to PM knowledge is purely empirical and relies on experience gained by the author during his work as project manager. The contents of this paper may be placed within the knowledge framework defined by Zack [5] – we describe the explicit, declarative knowledge – but we did not want to focus too strongly on theoretical aspects of knowledge. Instead we focused on practical aspects which may contribute to everyday project management work.

2. PROJECT MANAGEMENT KNOWLEDGE IN BASIC PM STANDARDS

The approaches to full project management knowledge in three basic PM standards are different.

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There is no explicit reference to off-processual PM knowledge¹ in CMMI [4]. The concept of organizational process assets refers to items directly referring to “quality and process-performance objectives”.

There is nothing about off-processual PM knowledge in Prince 2 either, as it describes projects from the point of view of their customers. It is not the project customer’s business to collect knowledge about project management.

PMBok is closest to the concept of KOPM. According to this standard, an organization must be conscious of its Enterprise Environmental Factor and has to have defined Organizational Process Assets. Elements of these items are input to several PM processes. But no knowledge, except for processual knowledge, is provided to the reader – it may not be, as was stated above. According to the PMBoK Guide “The Project Management Body of Knowledge is the sum of knowledge within the profession of project management”. And, quoting the same publication, PMBoK describes a particular subset of this knowledge, mainly the PM processes and organizational issues. PMBoK provides no precise specification of the kind of knowledge that is absent from this publication. Probably the title “Project Management Processes Framework” would be more suited to this publication. The full bodies of knowledge in PM may only be developed locally – but this fact cannot be a rationale for claiming that the description of PM processes is the full scope of PM knowledge. If PMBoK were really focused on full PM knowledge, there would be a place for direct reference to off-processual PM knowledge items in the Organizational Project Management Maturity Model (OPM3 [3]), which is based on PMBoK. If there were references to the price list etc., we would be sure that PMBoK concerns itself with the full PM knowledge. But this kind of knowledge is absent from OPM3. So PMBoK’s approach to project management knowledge may not be treated as a holistic one.

KOPM does not supplant standard process oriented project management, but substantially extends it and restores the right balance between processes and off-processual knowledge needed for project management.

The full scope of knowledge needed for project management is described in the next chapters. This scope has been ordered by knowledge management areas defined by PMBoK. These areas have been extended to include a business management area (the lack of which is an important shortcoming of PMBoK) and knowledge about the project management environment of an organization.

3. BUSINESS MANAGEMENT

3.1 Strategic plan

First of all, every organization must know what it wants to do. Mission and strategy, treated as a long-term plan, must direct its everyday business. Appropriate business categories, their

¹ This type of knowledge is sometimes called “declarative knowledge” [5]. We call it “off-processual” to emphasize its relationships to often overvalued knowledge of processes.

parameters and their acceptable values must be described in the strategic plan. Market share, servicing of particular territories, income level or the set of services performed by an organization are examples of strategic business categories.

3.2 Project selection and evaluation criteria

An organization must know what projects it should perform – it has to define its set of project selection criteria. These criteria usually refer to strategic business categories and to the organization’s capabilities – resources, costs, risks. Project evaluation should refer to the criteria that led to the project’s selection, but the sets of criteria need not be identical with them. Resource availability may be an example of a criterion of project selection which may not be directly used for post-project evaluation.

4. INTEGRATION MANAGEMENT

4.1 Project management process

The project management process is one of the most important elements of every project management methodology. This process must be unified and consistent. Prince 2 constitutes a good, and perhaps the most well-known example of a consistent project management process. This methodology does not define separate processes for different management areas (PMBok approach) – it describes just one process from project start to finish.

In PMBoK, the main part of the project management process is described in the Project Integration Management area.

The project management process is probably the most important part of project management knowledge, but we must remember that this is only one of many such elements.

There may sometimes be very distinct components of project management processes (subprocesses), which can be assigned to another area than that of integration management. Quality control may serve as an example. But one must remember that the general consistency of a project management process is more important than assigning a process to a particular project management area. The quality control process makes up an integral part of the production process.

4.2 Lessons learned register

This register contains lessons learned by the organization’s staff in the course of executing projects. It may relate to all other elements of knowledge needed for project management. A lesson learned should describe the reasons causing a given situation, possible implications of this situation and the scope of the lesson’s applicability – and point out other elements of project management knowledge.

4.3 Configuration items

Knowledge needed for effective configuration management. A set of items classes which should be put under configuration management. A set of possible states must be described for every configuration item.

4.4 State changes of configuration items

Element of knowledge needed for effective configuration management. A set of state changes of configuration items. For each change a stimulus causing state change must be described. One specific type of stimulus may be a change of state of another configuration item.

5. SCOPE MANAGEMENT

5.1 Products

A list of products produced by an organization. The basic knowledge needed for project initiation and planning. Every product should be described by its general characteristics, the time and cost of producing it, and possible modifications. Processes for the production of products should be known, too.

5.2 Structure of products

Organizations should know the structures of their products. The decomposition of every product down to the level sufficient for planning work for its development should be known. Each component must be described by its basic characteristics: name, significance, method of production.

6. TIME MANAGEMENT

6.1 Activities categorization

In order to develop a set of qualitative or quantitative characterizations of activities, every organization should have some classification of project-related activities. Such classifications are usually used for analyzing activities workload or cost.

6.2 Activities lists for development of WBS elements

Activities needed for producing every WBS element should be known. Such lists are usually prepared for elementary WBS elements. They may be predefined for more aggregated WBS elements, mainly in order to describe activities they have in common with smaller WBS elements, e.g. management activities.

6.3 Activities workload

Activities workload (number of work hours or work days) is one of the basic items of knowledge needed for effective project planning. Workload may be defined for activity categories or for activities called for in the production of WBS elements. The cost of an activity is defined on the basis of its workload. Duration of activities is defined on the basis of its workload, too – though the relationship between these two parameters does not have to be linear.

7. COST MANAGEMENT

7.1 Price list

A price list is the most important knowledge item applied in the area of project cost management. It details prices of goods and

services being procured from outside of the organization performing a project, as well as goods and services being developed within an organization. The pay rates for particular qualifications (roles) and for organization's workers should be defined separately.

8. QUALITY MANAGEMENT

8.1 Product quality

The quality metrics for every product being developed in an organization must be known for successful project planning and execution. Their acceptable values must be defined, too. There must be procedures for computing the values of these metrics.

9. HUMAN RESOURCE MANAGEMENT

9.1 Project organizational structure templates

Every organization must have predefined effective organizational structures of projects. These structures can and should be different for projects of different type and scale. Every element of such a template must have defined functions and roles in order to perform these functions. Their responsibilities and authorizations should be specified there, too.

9.2 Qualifications and skills

The register of qualifications and skills needed to produce products developed in an organization. This register is often of a hierarchical nature. Qualifications should correspond to defined levels of proficiency.

9.3 Resources

Human resources register. This hierarchy should reflect the structure of an organization. For every staff member there should be a set of her/his specified qualifications and skills. One of the qualifications is usually singled out as primary role of a particular staff member.

9.4 Demand for qualifications and skills

There should be a register of demand for qualification and skills in every organization. For every interval (day, week...) the demand for every qualification or skill should be specified and documented in this register. The demand may be expressed in time units or in FTE.

9.5 Staff utilization registers

Every staff member must have his or her own work assignment schedule. Such a schedule must contain project identification, assignment status (reservation / final assignment), dates of assignment.

9.6 Activities performed by role

For every role there has to be a list of activity categories that it may perform. This register may contain specifications of minimum proficiency levels, too.

10. COMMUNICATION MANAGEMENT

10.1 Report templates

Reports are the main components of the information exchange process. Every organization should have a predefined set of report templates needed for project management. Report templates may take the form of project management system reports, reports from other databases or they may be templates produced by computer applications that assist office automation. Every report template should include a reporting schedule and indicate the persons responsible for preparation of reports and the persons receiving them.

10.2 Document templates

People planning a project must have access to templates of documents needed to carry out projects. These documents describe decisions made during project execution (project plan – a determination about the expected method of project execution; acceptance protocols – decisions about product acceptance etc.).

11. RISK MANAGEMENT

11.1 Risk register

Register of risks which may be encountered during the execution of projects. Risks are usually classified hierarchically. The description of every risk should contain its general characteristics, project elements exposed to it, estimation of risk impact. Risk symptoms should make up another part of risk description – early portents of its occurrence. Risk mitigation procedures and contingency plans constitute other important elements of risk description.

12. PROCUREMENT MANAGEMENT

12.1 Register of products, suppliers and price list

Project managers who plan to procure products or services from outside the organization that is performing the project, must have knowledge about potential suppliers. A register of suppliers should be organized in a way allowing for easy searching for suppliers of needed goods. Project managers need to know the prices and quality of offered goods. The organization should collect some other data about suppliers, such as the solidity (e.g. punctuality) of their services.

13. PROJECT MANAGEMENT SUPPORT

13.1 Project management information system

Contemporary project management is almost impossible without specialized software support (Primavera, MS Project...). Project managers must be skilled in the use of such applications in order to manage a project effectively and efficiently. Every organization must have a system of familiarizing project management staff with such software. The project management information system is – for project

managers – the most important part of the organization's information system.

13.2 Organization's information system

The information system is a set of rules and tools for processing information needed in project management. The accounting system, HR system or the set of work procedures are the most important – aside from the PM information system – components of this system. Project managers cannot successfully manage projects without knowledge about this system.

14. PRODUCT DEVELOPMENT PROCESSES

Projects are carried out with the main aim of producing certain products or services; one must remember that project management itself is not the goal of a project. So the indispensable, main part of knowledge needed for project management is the domain knowledge – about products, development processes, regulations etc. in the domain in which the project is performed. Every organization that performs projects must collect, structuralize and pass on such knowledge to project teams. The structure of such knowledge greatly depends on the knowledge domain, but it must be deeply integrated with knowledge that relates purely to project management. CMMI [4] provides a good example of such integration.

15. CONCLUSIONS – KOPM APPLICATIONS

Better project management. Knowledge Oriented Project Management describes the area of project management in a more complete way than Process Oriented Project Management does. So the KOPM model may be applied wherever POPM has been applied up to now – but with better results. The basic application of the KOPM approach is its direct utilization for the entire process of project management with special stress on the phase of project initiation and planning. It is impossible to manage projects effectively and efficiently without complete knowledge that concerns more than just processes of project management.

Basis for PM training improvement. The model presented above provides guidelines for project management staff training. Training that fails to supply all needed knowledge will not prepare prospective project managers for effective project management. Education providers claiming that they conduct effective project management courses while they in fact provide only the processual knowledge (a situation very frequently encountered) are like airline agents that indicate ticket prices without all the taxes and fees that are included in the final price. Systemization of project management knowledge. This paper attempts to present the structure of the full range of knowledge on project management. Our paper is in a sense similar to PMBoK: we present in a systematic way all registers of project management knowledge, while PMBoK presents in a systematic way project management processes (a subset of the whole subject matter).

The way of ordering an organization's knowledge in the domain of project management. Organizations performing projects must

order their knowledge. The paper presents the complete set of registers used for the description of such knowledge.

Basis for assessing the project maturity of an organization. As there is a complete set of registers of project management knowledge, their presence provides evidence of an organization's project management maturity. Organizations that have more knowledge registers are more mature than those which have fewer of them or do not maintain them at all.

Improving communication between project stakeholders. The KOPM model constitutes a better basis for effective communication between organizations engaged in project management. The company for which the author is currently working had its risk management method developed by a consulting company. The initial "final" product we received under this contract consisted only of risk management procedures. It took a long time to explain to contractors that the procedures alone, without knowledge about possible risks in our projects, are practically useless. If we had taken KOPM as the basis for this contract, the risk of such a misunderstanding would have been substantially reduced.

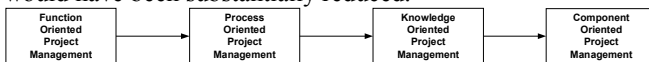


Fig. 2. Levels of maturity in project management

Basis for Component Oriented Project Management. This paper summarizes project management practices that the author has seen in many organizations and that are applied without any methodological rationale. Developing a foundation for a more complete approach to project management than the process-oriented one is the main goal of this publication. This model may lead to the development of an even more advanced approach to project management than KOPM – Component Oriented Project Management (COPM). Preparation of independent components for project management domains (processes, other knowledge registers, document templates...) is the basis for such an approach. These components correspond to knowledge modules that are described in KOPM. A project manager preparing a project must select the proper set of components and combine them into a unitary whole. This is another approach applied in the domain of project management by some organizations – though it lacks methodological support up to now.

REFERENCES

- [1] Office for Government Commerce, *Prince 2 – PProjects In Controlled Environment*, UK 2005
- [2] Project Management Institute, *A Guide to the Project Management Body of Knowledge 3rd Edition*, PMI, Newton Square, PA, USA, 2006
- [3] Project Management Institute, *Organizational Project Management Maturity Model Knowledge Foundations*, PMI, Newton Square, PA, USA, 2003
- [4] Software Engineering Institute, *Capability Maturity Model Integration*, Carnegie Mellon University, Pittsburg, USA, 2002.

[5] Zack, M. H. *Managing codified knowledge*, *Sloan Management review*, 40(4) Summer, 45-58, 1999

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