Standards ISO 21500 and PMBoK® Guide for Project Management

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Abstract: ISO 21500, Guidance on project management, can be used by any type of organization, including public, private or community organizations, and for any type of project, irrespective of complexity, size and duration. ISO 21500 provides high-level description of concepts and processes that are considered to form good practice in project management. New project managers as well as experienced managers will be able to use the project management guidance in this standard to improve project success and achieve business results. This article's mission - to inform you about processes and elements their methods and tools -was intended primarily to comfort the methodology-afflicted and afflict those pushing their own methodologies. Different projects require different methodologies -including templates and processes. Occasionally, a new idea comes along that makes us re-examine your philosophy on methodologies because this new idea requires the different methods. This article explains the similarities of project processes; those processes used on projects -irrespective of their industry type - are largely universal in nature. After all, a change process is a change process. It may be tweaked a little on a certain project, but it remains basically the same. We also saw numerous project management methodologies available for use, depending on the application, project size, technology, and schedule. Therefore, select the most appropriate one, identify your processes, and get on with it. The key is to manipulate and configure things to suit your environment.

Key Words: **Project, Process, Program, Communication, Purchasing, Quality, Risk, Cost, Date, Source, Scope, Stakeholders, Integration**

I. INTRODUCTION

ISO, the world leading standardization organization, must have its own project management standard. Currently its document dealing with this subject is marked with ISO 10006 symbols and is titled *Quality management systems - Guidelines for quality management in projects*. ISO 10006 has been originally published in 1997 and after so has been updated in 2003. But it has not gained popularity equal to ISO's norm of quality of the series 9000 nor as the Word leading project management standards like PMBoK® Guide or Prince2®. The main objective of the article is to provide information about the processes and elements in Project Management and to compare the most used standard for Project Management - PMBoK® Guide with the new international standard - ISO 21500. The comparison of the two standards was used comparative method, which was compared using the project stage, the sub-processes and areas of knowledge. Even some ISO member countries had more popular PM standards – BSI 6079 is a good example. And the world-wide PM standard defining industry was working intensively. Japan, Australia or Germany developed their own PM standards. International Project Management Association developed IPMA Competence Baseline. Several initiatives aiming at creating global PM standards have been established. Global Project Management Forum (created as an initiative of David Pells), Global Working Groups (initiative of Lynn Crawford), Operational Level Coordination Initiative (OLCI), or Global Alliance for Project Performance Standards make evidences that there is a need for one global project management standard. The ISO 21500 initiative creates another hope that we will have one such standard. This initiative has been initiated in 2006 by British Standard Institute, a member organization of ISO. ISO agreed and created work item ISO/PC 236 to prepare ISO 21500 standard on project management. There were 31 countries involved into this work and 5 observing it. The result is the release of ISO 21500 to 1 September 2012.

The article is divided into three parts. While the first part deals with the essence of the project definition and the second part explains the use of standards for different types of projects. The third part of this article is most important and shows the differences and comparisons between phases, areas and processes of these two standards, i.e. ISO 21500 and PMBoK® Guide. ISO 21500 provides high-level description of concepts and processes that are considered to form good practice in project management.

The last part describes standard ISO 21500 as universal body of knowledge for project management principles and processes because it is the first in a planned family of project management standards. It is designed to align with related International Standards, such as ISO 10006, Quality management systems - Guidelines for quality management in projects [2], ISO 10007, Quality management systems - Guidelines for configuration management [3], ISO 31000, Risk management - Principles and guidelines [5], and some sector-specific standards in industries, such as aerospace and IT.

II. PROJECT DEFINITION

The definition of project may be found in the 3.2 section. This is a unique set of processes consisting of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective. This definition makes a progress with comparison to PMBoK® Guide, which was probably the last definition saying that project are performed with the goal of producing deliverables. Products are absent from ISO 21500 definition. But the definitive retains the word "unique" in relationship to the set of project processes, which in fact causes the same problems as in PMBoK® Guide definition. When a project is initiated the set of project processes is not defined. According to ISO 21500 the set of project processes are defined as a result of performing process 4.3.3 Develop project plans, long after project initiation [12]. So you do not know whether this set of processes is unique (or have any other characteristics) when you initiate a project. So if you strictly follow such definition, you may initiate something what is not a project according to this definition. And, especially in the domain of routine, commercial projects (e.g. building a standard house for client) it is difficult to assign an adjective of unique to the set of project processes. Please also note that according to analysed definition, it does not require the processes to be unique. Only its set must be unique. Thus the very document in a sense is internally inconsistent: yet this document just describes the set of 40 standard processes for project execution. From one point of view ISO 21500 requires the unique set of processes while at the same time it defines its standard set. Anyway understanding the concept of project requires understanding of the unique word and may lead to many problems in interpreting this concept.

III. TYPES OF PROJECTS

In real life there are generally two types of projects: investment projects, which change the way of organizations' works and commercial projects which directly generate income for performing organization. The Overview section defines project environment in an organization. Though it is not clearly stated it seems that ISO 21500 is interests in investment projects only: project in ISO 21500 provide deliverables to operations and only these operations generate benefits. This is not the case for commercial projects where benefits are generated directly by producing required deliverables. Benefits realization is at customer side only (section 3.4.3). But for organizations performing commercial projects just collecting benefits is the main reason for performing projects. Projects are undertaken as a result of opportunities. Opportunities "may address, for example, a new market demand, a current organizational need, or a new legal requirement". An opportunity of client demand, which is the most popular opportunity for commercial projects, is absent from this list. All this statements are evidences that ISO 21500 does not describe commercial projects. In section 3.7 Projects and operations the standard says that "Projects (…) create original deliverables".

IV. PROJECT MANAGEMENT PROCESSES

When analysing ISO 21500 it's difficult to abstract from PMBoK® Guide which gave main ideas for its creation. The next sections contain comparison of PMBoK® Guide and ISO 21500.

Project Management Process Groups

ISO 21500 divides project processes into five process groups. You may find the comparison in Table 1.

Table 1 ISO 21500 and PMBoK® Guide Process Groups comparison

Project Management Process Groups	
ISO 21500	**PMBoK® Guide**
Initiating	Initiating
Planning	Planning
Implementing	Executing
Controlling	Monitoring and Controlling
Closing	Closing

The differences between these two standards are really minimal here. Changing the names is the only difference.

Subject Groups

PMBoK® Guide's knowledge areas have been renamed to subjects in ISO 21500. Their comparison may be found in Table 2.

Table 2 ISO 21500 Subjects and PMBoK® Guide Knowledge Areas

ISO 21500 - Subjects	PMBoK® Guide – Knowledge Areas
Integration	Integration
Stakeholder	X
Scope	Scope
Resource	Human Resources
Time	Time
Cost	Cost
Risk	Risk
Quality	Quality
Procurement	Procurement
Communication	Communication

It is clearly seen from both comparisons that ISO 21500 is strictly based on PMBoK® Guide. ISO 21500 adds the subject of Stakeholders to the set of PMBoK®'s knowledge areas [11]. The Human Resources knowledge area has been renamed to Resource subject in order to cover both types: human and other project resources. The structure of description of processes in ISO 21500 differs from that in PMBoK® Guide. The main difference is that ISO 21500 does not provide description of tools and techniques. The description of each process in ISO 21500 consists of general description and a table containing primary inputs and primary outputs. ISO 21500 descriptions are substantially shorter than those of PMBoK® Guide; roughly speaking description of two ISO 21500 processes fits at one page while in PMBoK® Guide it takes several pages to describe one process [12].

1. *Integration*

Adding Collect lessons learned process focused on project knowledge management to ISO 21500 is a move in the right direction. But as more and more practitioners and methodologist say that knowledge is the most important project resource and thus it deserves to be treated as separate subject in the discipline of project management. ISO 21500 requires development of three types of plans. The project plan describes project baselines: what should be achieved by the project in separate subjects like scope, time, cost and any other. The project management plan describes project management processes. The third type of plans is subsidiary plans – any part of project management processes may be placed in separate document. In PMBoK® Guide there is one project management plan which consolidates and integrates all planes needed by the project. Their comparison may be found in Table 3.

Table 3 ISO 21500 and PMBoK® Guide Integration Processes

ISO 21500	PMBoK® Guide
4.3.2 Develop Project Charter	4.1 Develop Project Charter

4.3.3 Develop Project Plans	4.2 Develop Project Management Plan
4.3.4 Direct Project Work	4.3 Direct and Manage Project Execution
4.3.5 Control Project Work	4.4 Monitor and Control Project Work
4.3.6 Control Changes	4.5 Perform Integrated Change Control
4.3.7 Close Project Phase or Project	4.6 Close Project or Phase
4.3.8 Collect Lessons Learned	

2. *Stakeholder*

ISO 21500 moved the two processes, which in PMBoK® Guide are included into the Communication Knowledge Area, to separate subject of Stakeholder. Their comparison may be found in Table 4.

Table 4 ISO 21500 and PMBoK® Guide Stakeholder Processes

ISO 21500	PMBoK® Guide
4.3.9 Identify Stakeholders	10.1 Identify Stakeholders (taken from Communication Knowledge Area)
4.3.10 Manage Stakeholders	10.4 Manage Stakeholder Expectations (taken from Communication Knowledge Area)

3. *Scope*

ISO 21500 Define Scope Process includes collecting requirement - at least project requirements are one of process' main outputs. There is no process like Verify Scope in ISO 21500. No ISO 21500 process produces output like Accepted deliverables, which is the most important output of Verify Scope PMBoK® Guide process. The minor change is moving the process of Define Activities from time management knowledge area to the subject of scope in ISO 21500. Their comparison may be found in Table 5.

Table 5 ISO 21500 and PMBoK® Guide Scope Processes

ISO 21500	PMBoK® Guide
4.3.11 Define Scope	5.1 Collect Requirements
	5.2 Define Scope
4.3.12 Create Work Breakdown Structure	5.3 Create WBS
4.3.13 Define Activities	6.1 Define Activities (taken from Time Management Knowledge Area)
	5.4 Verify Scope
4.3.14 Control Scope	5.5 Control Scope

4. *Resource*

The ISO 21500 Resource subject covers all types of resources: human, equipment, materials etc. This is more than in PMBoK® Guide HR Management Knowledge Area. The process of defining project organization in ISO 21500 is performed after establishing project team. The Establish project team process works on "flat" structure: only characteristic of single roles are needed for obtaining human resources. Relationships between them are defined later, in Define project organization team. There is different approach in PMBoK® Guide: you have first to define roles and project organization in Develop human resources plan and after that you hire skilled people. Their comparison may be found in Table 6.

Table 6 ISO 21500 and PMBoK® Guide Resource Processes

ISO 21500	PMBoK® Guide
	9.1 Develop Human Resource Plan
4.3.15 Establish Project Team	9.2 Acquire Project Team
4.3.16 Estimate Resources	6.3 Estimate Activity Resources (taken from Time Management Knowledge Area)
4.3.17 Define Project Organization	
4.3.18 Develop Project Team	9.3 Develop Project Team
4.3.19 Control Resources	
4.3.20 Manage Project Team	9.4 Manage Project Team

The process of resources estimation has been moved to the subject of resources. There is no separate process for controlling resources in PMBoK® Guide. The purpose of ISO 21500 Control resource process is assuring that required resources are available to the project. A similar process may be found in ISO 10006 which requires controlling resources in its 6.1.3 section.

5. *Time*

Two processes have been taken from Time Management Knowledge Area to other subjects. The other processes seem to be stable. Their comparison may be found in Table 7.

Table 7 ISO 21500 and PMBoK® Guide Time Processes

ISO 21500	PMBoK® Guide
Moved to Scope subject	6.1 Define Activities
4.3.21 Sequence Activities	6.2 Sequence Activities
Moved to Scope subject	6.3 Estimate Activity Resources
4.3.22 Estimate Activity Durations	6.4 Estimate Activity Durations
4.3.23 Develop Schedule	6.5 Develop Schedule
4.3.24 Control Schedule	6.6 Control Schedule

6. *Cost*

There is no substantial difference between PMBoK® Guide and ISO 21500 processes in the subject of cost. Their comparison may be found in Table 8.

Table 8 ISO 21500 and PMBoK® Guide Cost Processes

ISO 21500	PMBoK® Guide
4.3.25 Estimate Costs	7.1 Estimate Costs
4.3.26 Develop Budget	7.2 Determine Budget
4.3.27 Control Costs	7.3 Control Costs

7. *Risk*

There is no planning of risk management in ISO 21500. Two analytical PMBoK® Guide processes have been merged into one Assess Risks process of ISO 21500 but it is not clear if quantitative risk management is required by ISO 21500. Their comparison may be found in Table 9.

Table 9 ISO 21500 and PMBoK® Guide Risk Processes

ISO 21500	PMBoK® Guide
	11.1 Plan Risk Management
4.3.28 Identify Risks	11.2 Identify Risks
4.3.29 Assess Risks	11.3 Perform Qualitative Risk Analysis
	11.4 Perform Quantitative Risk Analysis
4.3.30 Treat Risks	11.5 Plan Risk Responses
4.3.31 Control Risks	11.6 Monitor and Control Risks

The ISO 21500 Treat Risk process may be treated as equivalent to Plan Risk Responses of PMBoK® Guide. The ISO 21500 process replicates the old shortcoming of PMBoK® Guide: though it claims that there may be positive and negative risks, the measures to treat risks are adequate only for threats: mitigation, deflection and contingency plans. This issue has been fixed in PMBoK® Guide 3rd Edition in 2004.

8. *Quality*

There is no substantial difference between PMBoK® Guide and ISO 21500 processes in the subject of quality. Their comparison may be found in Table 10.

Table 10 ISO 21500 and PMBoK® Guide Quality Processes

ISO 21500	PMBoK® Guide
4.3.32 Plan Quality	8.1 Plan Quality
4.3.33 Perform Quality Assurance	8.2 Perform Quality Assurance
4.3.34 Perform Quality Control	8.3 Perform Quality Control

9. *Procurement*

The purpose of ISO 21500 Select supplier process is generally the same as PMBoK® Guide's Conduct Procurements: to sign contracts. There is no separate process of closing contracts in ISO 21500 - closing contracts is a part of Administer Contracts process there. Their comparison may be found in Table 11.

Table 11 ISO 21500 and PMBoK® Guide Procurement Processes

ISO 21500	PMBoK® Guide
4.3.35 Plan Procurement	12.1 Plan Procurements
4.3.36 Select Suppliers	12.2 Conduct Procurements
4.3.37 Administer Contracts	12.3 Administer Procurements
	12.4 Close Procurements

10. *Communication*

Two PMBoK® Guide communication processes have been moved to newly created subject: Stakeholder. As there is no process in ISO 21500 directly matching PMBoK® Guide's Report performance process, we assume that the output of Report Performance is a special kind of distributed information and thus ISO 21500 Distribute information covers both PMBoK® Guide processes: Distribute Information and Report Performance. Their comparison may be found in Table 12.

Table 12 ISO 21500 and PMBoK® Guide Communication Processes

ISO 21500	PMBoK® Guide
Moved to Stakeholder subject	10.1 Identify Stakeholders
4.3.38 Plan Communications	10.2 Plan Communications
4.3.39 Distribute Information	10.3 Distribute Information
	10.5 Report Performance
Moved to Stakeholder subject	10.4 Manage Stakeholder Expectations
4.3.40 Manage Communication	

The ISO 21500 Manage Communication process concerns external stakeholders as well as project team members and has the main goal of resolving issues in the domain of communication.

V. CONCLUSION

Many papers exist which deal with various issues of project knowledge management. Some authors describe ways of procuring particular knowledge elements or some are interested in the whole knowledge possessed by project teams. This paper compares and shows the first time linking all of these perspectives for viewing project knowledge management. It is introducing the concepts of project micro-knowledge life cycle and project macro-knowledge life-cycle and how all of the processes from the area of project knowledge management are mutually linked. The two releases of the PMBOK® Guide and the ISO 21500 standards are very close. They present a set of processes that have been organized the same way, by project management stage and project management topic. The ISO standard is 47 pages only and is limited to the introduction of the processes, their inputs and their outputs. PMBOK® Guides describes, through more than 450 pages, the project management processes, their inputs, their outputs and also the associated tools and techniques. ISO uses most of the PMBOK® Guide processes and introduced minor adaptations: the risk knowledge area has been revisited as well as the human resource management. The major change is related to stakeholder management; the subject group (knowledge area) has been introduced by ISO and it appears as well in the new PMBOK® Guide release. The two processes introduced by ISO in this subject group were two processes of the communication knowledge area of the PMBOK® Guide. ISO processes are more likely oriented towards a cascade approach of the scope definition rather than an iterative approach. Therefore, the ISO standard is perhaps less attractive for project-oriented organizations. Throughout this review, we see the most important addition of the ISO standard being the

addition of a formal knowledge are to deal with stakeholders. A step towards the management of knowledge has been made in the ISO standard without becoming a knowledge area by itself.

The PMBOK® Guide incorporates also this major change. On the other hand, the new version of the PMBOK® Guide didn't reassign processes in different knowledge areas like ISO did. The major addition of the PMBOK® Guide compared to its predecessor is the fact that, from now one, a knowledge area always starts with the concerned subsidiary management plan. Many project managers expected to see the emergence of iterative approaches in decomposing the scope and executing the project: Both standards are very "cascade approach" oriented.

Maybe, the most important point is the fact that current trainings don't need a tremendous revisit to be consistent with the new PMBOK® Guide. Simplification and consistency concerns drove this new edition, together with the new knowledge area. The important consistency between the PMBOK® Guide and the ISO standards will definitively help the profession. PMI certifications will continue to promote structured project managers and these project managers (or associates) will definitively help a lot of organizations to align their project management processes toward ISO recommendation. This mutual contribution is likely to continue since a new technical committee has been set-up to deal with program and portfolio management. And the organization of this new committee is the same than the committee producing the ISO 21500 standard. This might also lead PMI to certify portfolio managers in the future.

PMI confirms its leading position to certify program managers, project managers and associates who will feel "at home" in ISO oriented organizations. In the future, if ISO 21500 becomes the basis of a certification, there will be an advantage for companies to have PMI certified project and program managers on board.

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