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Analysis and comparison of ISO 21500 - Guidance on project management and PMBOK 6th Guide

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Abstract—**In today's fast-changing environment, changes are necessary if a company wants to survive on the market. The ability of organisations to make and implement changes can be the key factor of success. Projects and project management have a big role in this process. Many organisations have introduced different standards for project management. So, today, there are a few project management standards that can help organisations in directing a project into a regular and systematic framework. The main goal of this paper is to analyse and make a comparison between two of the most popular versions of project management standards: ISO 21500 and PMBOK 6th Guide. A general overview of differences and similarities, definitions of important terms of project management, project management processes and knowledge areas were essential for analysis. The 6th edition of the PMBOK® Guide and ISO 21500 standards are very similar. A set of processes are pretty organised similarly, but the approach of those two standards is different. The ISO 21500 standard is about process introduction and inputs and outputs of the project. At the other side, PMBOK® Guide gives more detailed picture about project management processes, their inputs, and outputs as tools and techniques in a more detailed way. Also, it is noticed that processes are matching in many cases, but there is a difference in naming style noted.**

Keywords—standard, project management, PMBOK, project, process, guide

I. Introduction

Project management has become a very important tool in many business areas. Together with the development of project management, many standards, guides, different methodologies are also developed.

The problem that the organisation now can face is connected with choosing the right one. Appropriate selection, also as the application of project management standard, can make everything easier and provide different benefits. What are the key differences? Is there any guide which is the best for their company and their people? These are the questions that will be answered by this paper.

Many investments that are a key factor of the company's success are realised via projects. A successful project requires good inputs, especially good and educated workers. Involved people need to work together, to cooperate and, using available resources efficiently, bring results. There are too many tools and practices that can be used. Difference between different project management standards exists, and many scientists and experts are constantly trying to bring something new in the field of project management. Labriet [1] highlighted the biggest differences and communalities between ISO and ANSI standards. They have one common purpose, and that is to help organisations to manage their projects.

According to the problem, subject, objectives and various requirements, research methods are also defined. All theory, or theoretical analysis, is based on the theories of mainly international professional literature (professional journals, articles, books, etc.). In the preparation of this seminar paper, some of the following methods were used: method of description, classification, methods of analysis, comparison method, etc.

This scientific research will be a contribution to the existing literature. The conclusions of this paper can serve as a basis for further research and development of new, maybe completely guides.

II. ISO 21500 AND PMBOK 6TH GUIDE OVERVIEW

In today fast-changing environment with a high level of complexity in business, the results showed that the projects managed by the structured application of good practice-based process constantly shows a better performance in many fields [2]:

- "Deliver as promised."
- Faster delivery because of commonly known processes
- Possibility of "Surprises" is less during project execution
- Customer satisfaction improved

A. ISO 21500 Standard

International Organisation for Standardization has published this standard at the end of 2012. Many organisations who deal with projects can use this standard. This is guidance which gives explanation on concepts and processes of project management. This standard is a common referent frame, the roof standard for all standards and project management processes [2]. This standard consists of 10 subject groups and 39 logically groups [3] grouped into four chapters [4].

ISO 21500 gives high-level concepts and processes description. Focus of ISO 21500 standard is on concepts used in project management and their relation. One aspect of this standard also covers the processes of project management. Recommendation from the standard is that the processes should be followed for the whole project and individual phases. An organisation that uses this standard don't show just better performances in term with lower costs and shorter delivery deadlines, but also a high level of satisfaction of client needs. [4] This standard is created to help organisations to achieve professional excellence. The best way to achieve objectives of the project is to confirm results to certain requirements including, for example, cost, time, and other resources [5]. For organisation who wants to maintain good communication through the project, this ISO 21500 standard could be very useful.

There are two perspectives processes for viewing the processes: process groups from the management perspective or as subject groups from the perspective of a specific theme [4]. It is not prescribed how the processes or structures should be applied or executed. There is an existence of many shortcomings within the standards [5].

Shepherd Miles, who developed the new standard, said - "ISO 21500 enables people in any organisation to understand how the discipline fits into a business environment. It is also intended to be used as a basic guide, aimed at the informed reader without an in-depth knowledge of project management."

B. PMBOK Guide 6th edition

PMI was founded in 1969 by the American National Standards Institute (ANSI) using a process-based approach. In 1987 the first version of PMBOK Guide (Project Management Body of Knowledge) was published, in an attempt to standardise information and practices in project management general. [6]

This Guide introduces one part of the project management that is recognized as good practice which means that application of knowledge, skills, techniques and tools can be a very big influencer over projects. The project team and stakeholders are trying to find the best combination of processes, tools, techniques, inputs and outputs that can help to manage the project.

There are five basic process groups, ten typically knowledge areas and 49 processes that are recognised by PMBOK 6th Guide. Through a project, many processes overlap and interact, and every process has defined using:

- Inputs (plans, documentations, designs, etc.)
- Tools and Techniques
- Outputs (product, documents, etc.)

III. METHODOLOGY

ISO 21500 Standard and PMBOK have concepts and content that is similar. These standards will be analysed in a way which will give a clear picture of similarities and differences. Three sections that are selected for analysis are:

- General comparison
- Project Management processes
- Project Management Knowledge

IV. RESEARCH FINDINGS

A. General comparison

If we looked at the history, we would see that ISO standard came second, after all, approvals by committees. It was released on August 2012. ANSI Standard with the PMBOK Guide 4th edition came first. Because of that, in ISO standard it could be seen that many processes are used. One big change was only connected with stakeholder management, which was introduced by ISO. In the second edition of PMBOK Guide, that section was also included. It is recognised by many international organisations which are represented in the project management profession. PMBOK Guide from 2013 has confirmed this fact, and it shares the same structure with different name for some processes, but the similarity has a big percentage. [4]

The ISO 21500 standard has 47 pages. It has a focus on the introduction of the processes and inputs and outputs used. On the other side, PMBOK Guide describes, through 978 pages also project management processes, inputs, outputs, and tools and techniques that can be used.

TABLE 1 – STAGE, TOPICS AND PROCESSES COMPARISON

	ISO 21500	PMBOK Guide 6th
Stages	5	5
Topics	Ten subject groups	Ten knowledge areas
Processes	39 processes	49 processes

ISO 21500 eliminates the processes tools and techniques because it leaves space for experts to choose and combine them to get the best combination for the project. In some fields, recommendation and suggestions of tools and techniques can confuse and create a barrier for problem-solving, but sometimes can be very helpful. Unlike PMBOK Guide 6th, ISO 21500 doesn't describe inputs and outputs of the processes, and there are not any stages of a project.

B. Definition of "Project" and "Project Management"

Existing literature shows many different definitions of project and project management. In project management standards that are the subject of this paper also can be found their definition of those terms.
Definition of the project can be found in section 3.2 in Guide.

ISO 21500 - The definition of the **project** is: "A project is a unique set of processes consisting of

coordinated and controlled activities with start and finish dates, undertaken to achieve an objective. Achievement of the project objective requires deliverables conforming to specific requirements, including multiple constraints such as time, cost and resources." [2]

PMBOK Guide 6th - The definition says that the **project** is "a temporary endeavour undertaken to create a unique product, service, or result" [6]

There is a difference between those two definitions. Definition of ISO 21500 doesn't have a word "product" in definition, so that can be maybe unclear. Also, the definition of PMBOK doesn't mention resources required for project implementation.

Project management – ISO 21500 definition: "Project management is the application of methods, tools, techniques and competencies to a project. Project management includes the integration of the various phases of the project life cycle. Project management is accomplished through processes" [2].

Project management – PMBOK Guide 6th definition: "Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of the project management processes identified for the project. Project management enables organisations to execute projects effectively and efficiently. [6]

Those two definitions are pretty similar because they both include tools and techniques that need to be used to meet the requirement of the project.

Also, both definition mention processes as a very important part of project management. Many processes can be similar (same stakeholders, resources used, deliverables provided by the project, etc.) but each project is somehow unique.

There is a project of all types and level of complexity, and the organisation's responsibility is to set the objective for the project.

C. Project Management Processes

Processes are the most important area in Project Management science. Because of that, this part is devoted to them. PMBOK and ISO 21500 have some visions about the processes, and in this part of the analysis, the focus is on finding similarities and differences in their imagination of processes. One of the differences between these guides is that processes from ISO 21500 standard have a different approach to the scope definition.

Now, especially PMBOK Guide 6th edition is more attractive than ISO 21500 because of the agile approach to processes.

To get the best results from the project, project team, including project manager, must pay attention to concepts (topics) named "Knowledge areas" in PMBOK Guide, and "Subject groups" in ISO 21500 Standard.

TABLE 2 – PROCESS COMPARISON

ISO 21500	Abbreviation	PMBOK Guide 6th	Abbreviation
Initiating	IN	Initiating	I
Planning	PL	Planning	P
Implementing	IM	Executing	E
Controlling	CO	Monitoring and Controlling	M
Closing	CL	Closing	C

D. Project Management Knowledge area

Staff arranged to work on the project must follow the project plan constantly. In ISO 21500, Project Management Knowledge is called **Subject groups**, and in PMBOK Guide 6th, it is called **Knowledge areas**. But the meaning remains the same. There are ten items on this list [6]:

- Integration
- Scope
- Time/Schedule
- Cost
- Quality
- Resources
- Communication
- Risk
- Procurement
- Stakeholders

Each of listed has its sub-processes. Sub-processes and the differences between ISO 21500 and PMBOK Guide 6th are shown in tables from 3 to 12.

TABLE 3 – COMPARISON – INTEGRATION

Integration	
Subject	***Sub-process***
ISO 21500	4.3.2 Develop Project Charter 4.3.3 Develop Project Plans 4.3.4 Direct Project Work 4.3.5 Control Project Work 4.3.6 Control Changes 4.3.7 Close Project Phase or Project 4.3.8 Collect Lessons Learned
Knowledge	***Sub-process***
PMBOK Guide 6th	I - 4.1 Develop Project Charter P - 4.2 Develop Project Management Plan E - 4.3 Direct and Manage Project Work E - 4.4 Manage Project Knowledge M - 4.5 Monitor and Control Project Work M - 4.6 Perform Integrated Change Control C - 4.7 Close Project or Phase

In this table, sub-processes are shown. They are very similar instead of one step. That is *Collect Lessons Learned* that exists in ISO 21500 Standard,

which is essential for evaluation of the project conducted and also for collecting shareable experience.

TABLE 4 – COMPARISON – SCOPE

Scope	
Subject	**Sub-process**
ISO 21500	4.3.11 Define Scope 4.3.12 Create WBS 4.3.13 Define Activities 4.3.14 Control Scope
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 5.1 Plan Scope Management P - 5.2 Collect Requirements P - 5.3 Define Scope P - 5.4 Create WBS M - 5.5 Validate Scope M - 5.6 Control Scope

In both Guides, scope exists, but one conclusion given by Tavan and Hosseini was that PMBOK has a detailed scope than ISO 21500. They said that PMBOK gives an introduction of organisational impacts such as environmental impacts, style, culture and organisational structure. [7]

TABLE 5 – COMPARISON – TIME/SCHEDULE

Time/schedule	
Subject	**Sub-process**
ISO 21500	4.3.21 Sequence Activities 4.3.22 Estimate Activity Durations 4.3.23 Develop Schedule 4.3.24 Control Schedule
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 6.1 Plan Schedule Management P - 6.2 Define Activities P - 6.3 Sequence Activities P - 6.4 Estimate Activity Durations P - 6.5 Develop Schedule M - 6.6 Control Schedule

These sub-processes listed in the table have the same flow, but it is noted that PMBOK Guide 6th is more detailed because it has some sub-processes that are included before, and are very important (for example – Plan Schedule Management).

TABLE 6 – COMPARISON – COST

Cost	
Subject	**Sub-process**
ISO 21500	4.3.25 Estimate Costs 4.3.26 Develop Budget 4.3.27 Control Costs
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 7.1 Plan Cost Management P - 7.2 Estimate Costs P - 7.3 Determine Budget M - 7.4 Control Costs

Like in the previous table, one very essential sub-process is included in PMBOK Guide 6th, and not in an ISO 21500. Planning is a very good start for a *lean* and very organised and fast flow.

TABLE 7 – COMPARISON – QUALITY

Quality	
Subject	**Sub-process**
ISO 21500	4.3.32 Plan Quality 4.3.33 Perform Quality Assurance 4.3.34 Perform Quality Control
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 8.1 Plan Quality Management E- 8.2 Manage Quality M - 8.3 Control Quality

Quality knowledge area/subject is at first very similar. But if a deeper look is taken, it can be seen that ISO 21500 is using the term "Quality Assurance" which is one part of Quality Management.

TABLE 8 – COMPARISON - RESOURCES

Resource	
Subject	**Sub-process**
ISO 21500	4.3.15 establish project team 4.3.16 estimate resources 4.3.17 define project organisation 4.3.18 develop project team 4.3.19 control resources 4.3.20 manage project team
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 9.1 Plan Resource Management P - 9.2 Estimate Activity Resources E - 9.3 Acquired Resources E - 9.4 Develop Team E - 9.5 Manage Team M - 9.6 Control Resources

For this topic (Resources), it is noticed that the separate process for planning of resources does not exist. After the team is established, the process of defining a project organisation is provided later.

TABLE 9 – COMPARISON – COMMUNICATION

Communication	
Subject	**Sub-process**
ISO 21500	4.3.38 Plan Communications 4.3.39 Distribute Information 4.3.40 Manage Communication
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 10.1 Plan Communications Management E - 10.2 Manage Communications M - 10.3 Monitor Communications

It is noticed that processes are matching, but there is a difference in naming style noted. The sub-process "Distribute information" has the same purpose as "Manage Communication" in PMBOK Guide 6th. The other difference is in the last step.

The goal of the sup-process "Manage Communications" in ISO 21500 is control and improvement communication, and that is also the function of the last sub-process in PMBOK Guide 6th.

TABLE 10 – COMPARISON – RISK

Risk	
Subject	**Sub-process**
ISO 21500	4.3.28 Identify Risks 4.3.29 Assess Risks 4.3.30 Treat Risks 4.3.31 Control Risks
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 11.1 Plan Risk Management P - 11.2 Identify Risks P - 11.3 Perform Qualitative Risk Analysis P - 11.4 Perform Quantitative Risk Analysis P - 11.5 Plan Risk Responses E - 11.6 Implement Risk Response M - 11.7 Monitor Risks

At first look, it would be said that the difference is pretty obvious. First difference noted is also connected with the planning process. The ISO 21500 standard does not include that sub-process. Assess risk is one sub-process in ISO 21500 that has same function like sub-processes 11.3 and like sub-processes 11.3 and 11.4 in PMBOK Guide 6th. Next sub-process "Treat risk" is maybe very similar or the same as the sub-process 11.5 Plan Risk Responses and maybe somehow includes 11.6 in its scope.

TABLE 11 – COMPARISON – PROCUREMENT

Procurement	
Subject	**Sub-process**
ISO 21500	4.3.35 Plan Procurements 4.3.36 Select Suppliers 4.3.37 Administer Contracts
Knowledge	**Sub-process**
PMBOK Guide 6th	P - 12.1 Plan Procurement Management E - 12.2 Conduct Procurements M - 12.3 Control Procurements

Sub-processes for procurement remain very similar. Although otherwise named, sub-processes 4.3.36 from ISO 21500 and 12.2. Conduct Procurements have the same function.

TABLE 12 – COMPARISON – STAKEHOLDERS

Stakeholders	
Subject	**Sub-process**
ISO 21500	4.3.9 Identify Stakeholders 4.3.10 Manage Stakeholders
Knowledge	**Sub-process**
PMBOK Guide 6th	I - 13.1 Identify Stakeholders P - 13.2 Plan Stakeholder Engagement E - 13.3 Manage Stakeholder Engagement M - 13.4 Monitor Stakeholder Engagement

It is clear that PMBOK Guide 6th is wider, i.e. it includes two more sub-processes than ISO 21500: 13.2. Plan Stakeholder Engagement and 13.4. Monitor Stakeholder Engagement.

V. CONCLUSION

The analysis and comparison between ISO 21500 and PMBOK Guide 6th have been performed. In this paper, processes and sub-process of project management together with subject groups (knowledge areas) are analysed and compared, also as differences between defining some terms. The analysis showed the strengths and weaknesses of both Guides.

Every organisation is unique, somehow. Because of that, every organisation has different needs and requirements. Taking that into consideration will help managers to choose a suitable standard for their project. PMBOK standard has focused on project management, unlike ISO 21500 Standard which is focused on an individual project. Maybe the appropriate combination will bring the best results. In his paper, Grau [11] writes about national and international standards and about one model called „Project Excellence Modell der IPMA". Also, in that paper Grau wrote some suggestions for usage of standards in a reasonable mix.

Many pieces of research, experiences and studies showed that strategic level of Project Management has increased [7]. Maybe one day ISO 21500 standard will be standard for certification. In that case, many companies could get an advantage if they have certified projects and project managers.

Because of the consistency between those standards, the author thinks that that will have an influence on improvement and that will help the profession. Change is a must today, so organisations who develop the standards, also as an organisation who use it, need to follow innovative ways of doing something and to try to integrate that into the "good-practice guide". PMBOK Guide 6th connection with agile was one big step because people connect that with words "easily", "quickly" as it is supposed to be.

Nonetheless, results from this study must be interpreted with caution because there may be some possible limitations. The time available to study the structure and content of those two standards in a more detailed way was constrained by the deadline. Also, this study doesn't provide a view of experiences from the companies who are using them in their processes, but this paper could be the base for some future research in that direction. Results of detailed analysis of the advantages and disadvantages of existing standards in this area can create the potential for the development of a new model that could take advantage of both and eliminate the disadvantages of each standard.

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