REINTERPRETATION OF (SUB-)PROJECT PROCUREMENT

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ABSTRACT. Project procurement is, and will long remain, an important segment of public procurement. It involves spending public money by contracting a supplier for the delivery of a project. This may well be an outsourced 'sub-project' of a more complex 'project'. To create a clear distinction between the procuring entity's activities (insourcing) and the supplier's activities (outsourcing), project procurement needs some reinterpretation. I suggest conversion and extension of currently used terms and principles. Proposed terms are: *master project, project shell, associate project* and *in-house project*. Management roles are analysed from slightly different angles. Phase-dependent co-operation between the project procurement and other project management knowledge areas is re-defined. The harmonisation of the parties' management obligations and counterpart organisational structures is better articulated.

INTRODUCTION

Although the provision of public services by a third party (e.g. within the framework of a public private partnership) has proven, in many cases, to be an efficient substitute for the classical state-financed infrastructure projects, conventional methods of project procurement will always be justified in many fields of application.

The main problem is that project procurement management is a 'stepchild' of project and procurement management. While its 'parent' disciplines are well defined and have their own evolutionary paths, project procurement management is rarely properly addressed. It is either handled as a facilitating knowledge area of project management or as a slice of procurement management. In the first case the spotlight is on internal project management activities because only auxiliary products

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and services are imported from external resources. This is not typical in the public procurement world, where outsourcing prevails. In the second case procurement techniques dominate, with little attention to project management aspects.

Enhanced project procurement management adds value by the case-sensitive combination of project management and procurement back to management methods. It looks at which proven alternative schemes can be followed, when and by whom. In order to achieve a more effective utilisation of existing management knowledge, I would suggest going some of the basic principles in both 'parent' disciplines. This paper first addresses project procurement terminology. Then, on the basis of the suggested terms, some of the well-known relationships are revisited and clarified.

The focus is on projects in which a substantial portion is outsourced (a facility to be established in the field of mechanical, electrical, telecom, IT or civil engineering) with the following typical characteristics:

- grade of complexity: high;

- implementation time: between 6 months and 2 years;

- project costs: from the equivalent of a hundred thousand US dollars upwards.

PROJECTS IN THE CONTEXT OF PROCUREMENT

Procurement-Related Definition of Projects

The term 'project' has numerous definitions in wide circulation. One of them has been formulated by the Project Management Institute saying that *"... project is a temporary endeavour undertaken to create a unique product or service"*[1]. This reading of 'project' suggests that all parts of the facility to be established are included in the project. It means that the outsourced (procured) portion of the facility is a sub-project, while the insourced part (to be implemented by the procuring entity's own staff) is covered by another sub-project.

In the case of project procurement, however, the procuring entity and the supplier[2] sign a contract for the *project*, which contains only an outsourced segment of the facility. The insourced part usually appears in the contract only indirectly, e.g. in the form of preconditions to be met by the procuring entity, like the provision of a well defined physical

environment or specified interfaces. Consequently, there is a need to define projects specifically from procurement point of view.

A possible definition could be the following: *project means the provision of all activities and tangible/intangible items that are necessary for the delivery of the contracted facility*. This definition is meaningful only in a contractual context where the subject of the *project* is well determined as are the costs and implementation timeframe.

Embedding and Relationship of Projects Procured

Figure 1 illustrates the embedding of procured *project*s into the procuring entity's environment. *Master project A* does not have any procured *project* content; therefore we will not consider this example. *Master project B* represents a typical project procurement structure, although the relative weight of the *project* and the *in-house project* may vary widely. For example, in the public procurement arena in many cases the *in-house project* is negligible. *Master project C* illustrates repetitive[3] contracts, when similar *project*s are implemented consecutively. *Master project D* indicates framework[4] contracts, when similar but customised *project*s are executed individually, regardless of their relative timing.

Figure 2 explains the suggested project procurement related terms and their counterparts currently applied by the project management community. In the suggested terminology a procured *project* is always part of a *master project* of the procuring entity. The *master project* contains the *project shell* and the *project package*.

The *project shell* covers all activities conducted by the procuring entity to sign the related contract(s) with the supplier(s)[5] and to close the *project*(s) within the procuring entity's organisation. The *project shell* brackets the *project package*.

The *project package* consists of the *in-house project* (if any) and either a single *project* or a cluster of *associate project*s. The aim of project packaging[6] is to split a large composite project into its constituents typically for the following purposes:

- to receive better offers from specialised suppliers who are interested in the delivery of certain parts of the facility (if the procuring entity can ensure, either himself or by employing a system integrator or construction manager, proper integration of the 'temporarily separated' *associate project*s);

FIGURE 1
Master Projects
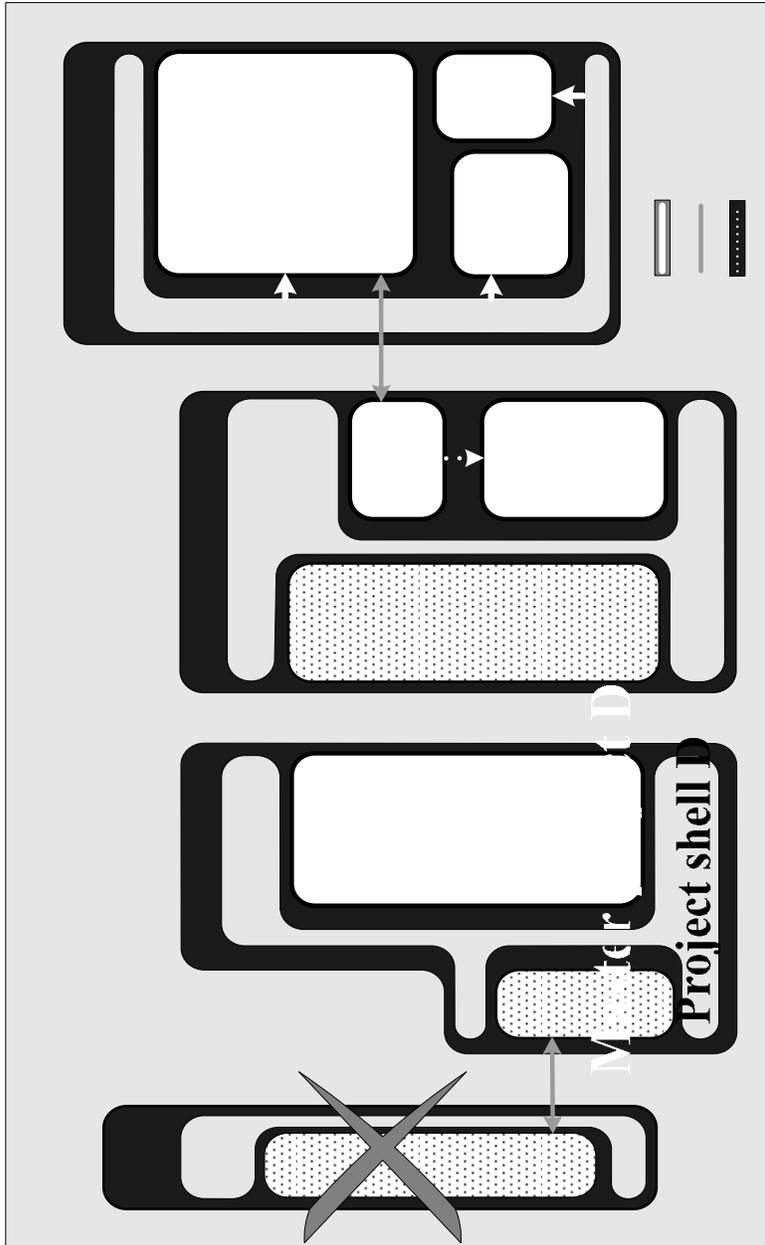
Terms suggested for the project procurement arena		Counterpart terms used in the project management arena	
	Explanation		
Programme	Umbrella term for two or more related *master projects*.	Umbrella term for two or more related projects.	Programme
Master project	**Umbrella term for the *project shell* and the *project package*.**	**Umbrella term for the whole of the outsourced and insourced parts of the facility**	**Project**
Project shell	Umbrella term for the pre-project and post-project activities.		
Project package	Umbrella term for the *project, associate project*(s), and *in-house project*.		
Project	**The outsourced part of the facility to be realised by the supplier.**		
Associate project	Another outsourced project within the same project package.		
In-house project	The insourced part of the facility, to be realised by the procuring entity.		
External project	A project outside of the *master project*.		
Sub-project	That part of the *project* that is subcontracted by - the supplier of the *project*; or - the project manager of the *in-house project*; to a sub-supplier (sub-contractor).		**Sub-project**

FIGURE 2
Project Procurement Related Terms Suggested

   - to award identical *associate project*s to different suppliers (either in case of shortage of supply or for socio-political reasons); or

   - to distinguish recurring *project*s to be implemented under repetitive or framework contracts.

Identification of that part of the *master project*, which is deemed to be more beneficial to implement within the framework of an *in-house project*, is also part of project packaging. In public procurement cases, however, the purpose of the *in-house project*, if any, is usually only to prepare the work environment and interfaces to enable the supplier selected to implement the *project*.

Nevertheless, even with the lack of an *in-house project* there is still considerable work to be performed by the procuring entity within the *project shell* before commencing the implementation of the *project* contracted. The applied procurement system[7] (traditional[8] or non-traditional[9]) determines how soon the supplier will be involved, but this choice impacts only the actual coverage and extent (not the existence) of the procuring entity's own *project*-related activities.

PROCUREMENT IN THE CONTEXT OF PROJECT MANAGEMENT

Life Cycle of the Master Project

Figure 3 illustrates the typical life cycle of a *master project*. It must be emphasised, however, that the actual nature and number of stages and phases of a particular *master project* is determined by the type of *project* and by the procuring entity's practices.

The outsourcing of a project means that it should be carried out by the supplier, in compliance with the procurement contract. The procuring entity may prescribe the substantive stages and phases of this work, e.g. by determining the associated acceptance procedures and milestone deadlines. In Figure 3 the supplier's *implementation* phase is followed by a *transfer* phase (which is quite common in many engineering fields except the construction industry). It can be used for checking the correct operation of the established facility under live conditions and for its controlled fine tuning. The *transfer* phase usually starts with provisional acceptance and it is completed with final acceptance 6 to 12 months later. It can be particularly useful in such public procurement cases when the procuring entity needs strong support from the supplier, to ensure that the contractual performance of the facility meets the specification.

On the procuring entity's side the following procurement-specific phases and stages are indicated in Figure 3, in addition to the 'standard' phases and stages of 'classical' project management:

- procurement and solicitation planning related stages of the *planning & design* phase;

- the *sourcing* phase, the actual commencement of which depends on the (traditional or non-traditional) procurement system being applied;

- the *monitoring & control* phase, which is the equivalent of the supplier's *implementation* phase plus the *provisional acceptance* stage of the *transfer* phase;

- the *deployment* phase, which is the equivalent of the rest of the supplier's *transfer* phase up to the end of the *final acceptance* stage.

Figure 3 also indicates which measures the contractual parties take separately within the framework of their own *project shell*s, and which of the parties' activities belong directly to the contracted *project*.

On the basis of Figure 3 the following statements can be made:

- the parties' pre- and post-*project* activities are largely different;

- during the *project* life cycle the parties have complementary roles; and

- the *project* requires parallel project management, harmonised both in terms of activity and organisation.

Figures 4 and 5 give a breakdown of the project procurement related phases and stages of the procuring entity's *master project*. The first two columns of these tables illustrate the relationship between the project management process groups, dominant procurement processes, and the associated phases.

Project Management Knowledge Areas

The following project management knowledge areas are considered, as defined by the PMI[10]:

- project integration management;

- project scope management ;

- project cost management;

FIGURE 3
Parallel Project Management Phases
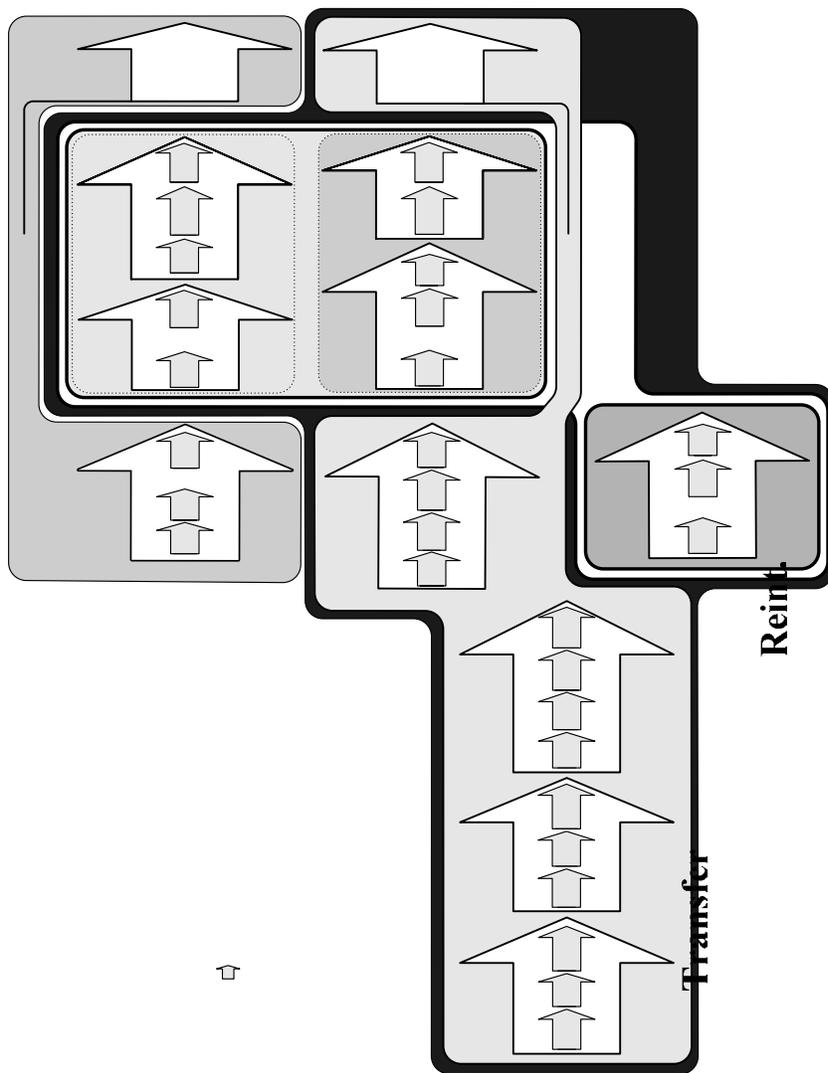
Supplier's
project shell

Component

Impl.   Transfer   Reint.

Project

Sourcing   M & C   Deploy.

FIGURE 4
Pre-Project Phases

Process groups	Dominant procurement process	Phase	Stage	Sub-stage
INITIATING	Initiation	IDEA	Identification	
			Objectives	
			Approval	
		CONCEPT	Perimeters	
			Development	Alternatives
				Make or buy analysis
			Approval	
PLANNING	Procurement planning	PLANNING & DESIGN	Outline design	Project packaging
				Procurement design
	Solicitation planning		Detailed design	Drafting
			Approval	
EXECUTING	Solicitation	SOURCING	Solicitation	Issuance
				Clarification
				Submission
			Evaluation	Assessment
				Integration
	Source selection		Selection	Report
				Approval
				Award
			Contracting	Scheduling
				Finalizing
				Approval
				Signing

FIGURE 5
Project and Post-Project Phases

Process groups	Dominant procurement process	Phase	Stage	Sub-stage
EXECUTING / **CONTROLLING**	Contract administration	**MONITORING & CONTROL**	Preparation	Site survey
				Implementation planning & design
			Execution stage 1	Delivery
				Installation
				Preliminary testing
			Execution stage 2	Delivery
				Installation
				Preliminary testing
			. .	
			Execution stage *n*	Delivery
				Installation
				Preliminary testing
			Training	
			Provisional acceptance	
		DEPLOYMENT	Live operation	Putting into operation
				Adjustment, tuning
				Fault elimination
			Final acceptance	
CLOSING	Contract Closeout		**REINTEGRATION**	

- project time management;

- project quality management;

- project procurement management;

- project communications management;

- project risk management; and

- project human resources management.

In general, the first five management segments (integration, scope, cost, time, and quality management) are considered to be the core knowledge areas of project management. The last three fields (communications, risk, and human resources management) are known as the facilitating knowledge areas. There is no clear division between the two clusters, and even this uncertain boundary moves with the actual phase of the *master project* life cycle.

The only question mark is over the project procurement management. Although it is usually considered to be a facilitating knowledge area, when talking about project procurement this should obviously be deemed a core knowledge area. In general, project integration management still has the controlling role, at least before and after the *sourcing* phase.

Phases and Knowledge Areas from the Procuring Entity's Angle

Figures 6 and 7 illustrate the sequence and relationships of project management processes by knowledge area and by phase (as a project procurement-related adaptation of PMI's mapping of project management processes to the process groups and knowledge areas[11]). These figures illustrate which kind of parallel activities require co-ordination by project procurement management.

Figure 6 covers the pre-*project* phases of the *project shell*. Figure 7 illustrates the *monitoring & control* and *deployment* phases of the procuring entity's activities, which proceed in parallel to the supplier's *implementation* and *transfer* phases.

FIGURE 6
Knowledge Areas in the Pre-Project Phases

Phase	Stage	Project Integration Mngmt.	Scope Mngmt.	Cost Mngmt.	Time Mngmt.	Quality Mngmt.	Project Procurement Management	Communication Mngmt.	Risk Mngmt.	Human Resources Mngmt.
IDEA	Identification / Objectives / Approval									
	Perimeters	Provision of resources and infrastructure	Functions, interfaces, technology	Budget	Time-frame	Minimum quality	Identification of suppliers, timing, procedures	Inter-departmental	Major risks	Available resources
CONCEPT	Development		Optional solutions — *Preliminary responsibility allocation / Marketing value analysis (MVA), 'make or buy' analysis*	Associated costs	Associated timing	Optional quality requirements	Preliminary project packaging, selection of the procurement and evaluation system, scheduling	Within the development team	Option-specific risks	Project organisation
	Approval	Project brief	Assumed project scope	Estimated project cost	Estimated time schedule	Assumed project quality		With the approval board	Project risks	Resource allocation
PLANNING & DESIGN	Outline design	Project plan	Project design — *Responsibility Allocation Matrix (RAM)*	Project budgeting	Project timing	Quality assurance plan	Finalising of the project packaging, procurement and evaluation system, sourcing schedule, identification of the associated external projects	Communication plan with the offerors	Risk mngmt. plan	Staffing plan
	Detailed design	Project realisation related documents	Specification / Work Breakdown Structure (WBS) — *Design value analysis (DVA)*	Price schedule	Implementation time schedule					Staff acquisition
	Approval						Drafting of the solicitation and contract documents			
SOURCING	Solicitation	Publication of the procurement notice (or invitation of selected offerors), issuance and clarification of the solicitation documents, submission of offers						Communication with the supplier	Risk assessment	
	Evaluation	Overall	Technical	Price		Commercial evaluation				
	Selection	Justification and approval of the award proposal								
	Contracting	Harmonisation of contract details with the accepted offer.								

Core Knowledge Areas: Project Integration Mngmt., Scope Mngmt., Cost Mngmt., Time Mngmt., Quality Mngmt. (Value Management)

Facilitating Knowledge Areas: Communication Mngmt., Risk Mngmt., Human Resources Mngmt.

PROJECT (PROCUREMENT) MANAGEMENT

Project Procurement Management

The first message we get from Figure 6 is that procurement experts should be involved even from the *concept* phase. If the procuring entity has its own production capacity (which is not typical in the case of public procurement) this would be the time to conduct a 'make or buy analysis'[12]. Procurement-related constraints should also be identified at the very beginning. Such constraints could be restrictions by public procurement law, if applicable, or restrictions by financing institutes, if any are involved.

Preliminary project packaging, if relevant, should be made in parallel with the elaboration of alternative project concepts. Preliminary contractual milestones should also be set at the *concept* phase in accordance with the *project* deadlines and the provisional responsibility-allocation. Optional procurement scenarios and offer evaluation schemes can be determined only after clarifying all these issues.

In the *planning & design* phase the boundaries of the *project package* should be unambiguously defined with due identification of the associated (impacting and impacted) *external project*s. This is also the time to spell out the Responsibility Allocation Matrix (RAM) and the Work Breakdown Structure (WBS)[13]. The chosen procurement system determines the procurement procedure and the type of contract.

The other obvious message from Figure 6 is that, not surprisingly, the *sourcing* phase is dominated by the project procurement management knowledge area, which temporarily takes over the controlling role from project integration management.

As Figure 7 illustrates, in the *monitoring & control* phase (and in the *deployment* phase, if any) the task of project procurement management is to provide contract administration, while other core project management knowledge areas are responsible for monitoring the progress made by the supplier in the scheduled execution stages. The main message from Figure 7 is that smooth realisation of the *project* requires appropriate change control management with properly established procedures stipulated in the contract.

FIGURE 7
Knowledge Areas in the Project and Post-Project Phases

Phase	Stage		Core Knowledge Areas					Project Procurement Management	Facilitating Knowledge Areas		
		Project Integration Mngmt.	**Scope Mngmt.**	**Cost Mngmt.**	**Time Mngmt.**	**Quality Mngmt.**		**Commu-nication Mngmt.**	**Risk Mngmt.**	**Human Resources Mngmt.**
MONITORING & CONTROL	Exec. stage 1	Resource and execution monitoring	Scope *(Value Management)*	Cost	Imple-mentation	Product quality measure-ment and control	Contract administration	Distribution of information, docu-mentation of progress, deviations from the project plan	Risk assess-ment and control	Human resource monitoring and control
	Exec. stage 2		Monitoring of the supplier-driven earned value management (EVM)							
	...		evolution monitoring	control	schedule monitoring					
	Exec. stage *n*	Integrated change control	Scope change control / Value change control	Cost change control	Impl. schedule change control	Product quality change control			Risk change control	Staffing change control
DEPLOYMENT	Training	Acceptance testing mngmt	Performance monitoring	Checking of the cost of additional changes, if any	Monitoring of the timeliness of fault elimination and other procedures					
	Provisional acceptance									
	Live operation	Operation control support				Monitoring of product quality		Docu-mentation	Risk assess-ment of insuffi-ciencies	
	Final acceptance	Acceptance testing mngmt								
REINTEGRATION	REINTEGRATION	Winding up of the project procurement organisation and reintegration of all resources on the procuring entity's side.								Gradual reintegra-tion of the project staff

Project Management Knowledge Areas

The essential point of Figures 6 and 7 is that, without advance consideration of the project management aspects, there is only a slim chance that there will be appropriate source selection and proper realisation of the *project*.

Project Management Organisations

*Project*s are usually managed by a joint body of the parties, consisting of counterpart project management organisations on both sides. These parallel organisations should co-operate along clearly established rules which govern their communication, authority and responsibility, reflecting the parties' different roles.

In the traditional procurement system the implementation of the *project* is the sole responsibility of the supplier. The procuring entity's role is 'only' to monitor progress, approve or reject the relevant portion of work at predefined phases, and to pay the instalments accordingly. If there is no *in-house project* (which frequently occurs in the case of public procurement) the procuring entity's project management organisation may shrink to a few individuals or even a single person. When non-traditional procurement systems are used, the parties' roles are definitely closer.

The scope of the activity of the two counterpart organisations should be clearly stipulated in the relevant parts of the contract. Nevertheless, in addition to such obligations expressed in the contract, there are obviously many tasks implied which have to be identified and detailed by both parties from their own side. This requires detailed attention, particularly in such public procurement cases when the procuring entity does not have sufficient in-house project management experience and buys this capability from a third party.

The supplier's project manager cannot facilitate anything without the agreement of the procuring entity's project manager. Similarly, it is only the supplier's project manager who will be authorised to instruct his own implementation staff. The procuring entity's project manager can never have comparable power on the supplier's side. In other words, neither party can survive without close co-operation.

As far as the relative size of the procuring entity's and supplier's project management organisations is concerned, in a well balanced situation they are closely related to the contractual allocation of tasks.

The most important tool used in controlling the co-operation of the two counterpart organisations is the proper regulation of the problem escalation routes and the authority allocated to the different decision making forums.

CONCLUSION

To get a more precise and practical description of project procurement, the paper suggests the revision of the currently used terminology. This results in the reinterpretation of the term 'project' and the introduction of new terms in order to differentiate between the procuring entity's and the supplier's pre- and post-project activities and to identify the parties' parallel project management obligations and organisations.

By using the amended terminology, typical phases and stages of project procurement are overviewed. PMI's mapping of project management processes to the process groups and knowledge areas is converted in a project procurement specific version to show the actual role and weight of project integration management and project procurement management, respectively, over the life cycle of the *master project*.

Using this as a basis for a minor restructuring of the available collective knowledge base, practical issues of project procurement are revisited. The outcome is a more efficient approach to project procurement management aspects both in procurement contracts and in the application of project management principles.

NOTES

1. See s. I chap. 1 para. 1.2 (p. 4) in [1].

2. Depending on the nature of the given project, the term *supplier* used in this paper may also mean *contractor*.

3. *Repetitive contracts* are *continuation*, *continuity* or *serial contracts*, when similar facilities are established by the selected contractor. See Pt. IV, chap. 14 (pp. 205-206) in [2].

4. A *framework contract* is an umbrella to stipulate all the general terms, conditions, and requirements of subsequently established individual projects. Ibid (pp. 207-211).

5. In this paper, for the sake of simplicity, the supplier is supposed to be a single entity who acts as a main contractor. In the real life more suppliers may form an alliance for the joint implementation of the project. For such teaming agreements see chap. 4 (pp. 40-57) in [3].

6. See Pt. II chap. 5 (pp. 58-62) in [2].

7. In this paper *procurement system* means a combination of a particular type of contract and the selected procurement procedure. It is also called *procurement path*. See Pt. IV (pp. 171-199) in [2].

8. In the *traditional procurement system* deliverables (goods, services and/or works) are 'fully' specified before the commencement of the procurement procedure. See Pt. IV chap. 13 (pp. 189-191) in [2].

9. *Non-traditional procurement systems* are the *model-based*, *design-oriented* and *management-oriented* procurement systems. The *model-based* procurement system is a transition between the *traditional* and *design-oriented* procurement systems. *Design-oriented* procurement systems are *turnkey*, *design-build*, and *package deal*. *Management-oriented* procurement systems are *construction management* and *management contracting*. See Pt. IV chap. 13 (pp. 191-199) in [2].

10. See s. I chap. 1 para. 1.3.2 (pp. 7-8) in [1].

11. See s. chap. 3 para. 3.5 (p. 38) in [1].

12. See chap. 3 (pp. 27-34) in [3].

13. See Pt. III chap. 8 (pp. 95-104) in [2].

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