

System Work Frameworks and Methodologies

1. System Work Framework

In the next table are presented layers of system work with corresponding results and questions

Table 1. System work framework

System work layer	Result	Questions
IS strategic management	Goals for change and expected benefits concerning the whole organization	Why we must change?
IS tactical management	Changes realization framework concerning the whole organization	Which is present situation in organization and what would be the future situation and how to achieve that?
IS operative management	Specific changeable part of the IS with specific change methodology with specific management methodology	What part of the whole system must be achieved with what kind of work processes with what kind of management style?

2. Changes Realization Framework

With next topics we can answer questions concerning change in organization.

- IT Governance in Organization – Why to change? - IT Governance Framework
- Change Content - What to change? - Enterprise Architecture Framework
- Change Processes – How to change? - IS Development Methodology
- Management of change processes – How to manage change? - Project Management Methodology

3. IT Governance

It is the responsibility of the board of directors and executive management and is an integral part of enterprise governance. It consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives. IT governance is concerned about two things - IT's delivery of value to the business and mitigation of IT risks. The first is driven by strategic alignment of IT with the business. The second is driven by embedding accountability into the enterprise

Both need to be supported by adequate resources and measured to ensure that the results are obtained. Five main focus areas for IT governance, all driven by stakeholder

value. Two of them are outcomes: value delivery and risk management. Three of them are drivers: strategic alignment, resource management (which overlays them all) and performance measurement.

Examples of IT Governance Frameworks:

- Control Objectives for Information and related Technology (COBIT)
- Information Technology Infrastructure Library (ITIL)
- Information Technology — Code of Practice for Information Security Management (ISO 17799)

4. Enterprise Architecture Framework (EAF)

EAF establishes the organization's roadmap to achieve its mission through optimal performance of its core business processes within an efficient IT environment.

Enterprise architectures are "blueprints" for systematically and completely defining an organization's current (baseline) or desired (target) environment. They are essential for evolving information systems and developing new systems that optimize their mission value.

This is accomplished in:

1. logical or business terms (e.g., mission, business functions, information flows, and systems environments)
2. technical terms (e.g., software, hardware, communications)

EAF includes also a Sequencing Plan for transitioning from the baseline environment to the target environment

Examples of EAF:

- Enterprise Architecture Body of Knowledge (EABOK)
- Federal Enterprise Architecture (FEAF)
- The Open Group Architecture Framework (TOGAF)
- Generalised Enterprise Reference Architecture and Methodology (GERAM)
- Inspired Enterprise Architecture Frameworks
- Zachman Framework

5. System Development versus Project Management Methodology

System development methodology deals with system and its creation determining principles for system development. Project management methodology deals with work to be done determining management processes for work outputs and outcomes. Project manager is responsible to ensure that project meets its objectives appropriate system development methodology will help it. Project management doesn't depend on specific system development methodology but may be restricted from it.

6. Information System Development Methodology

Set of recommended steps, approaches, rules, processes, documents, control procedures, methods, techniques, and tools for the developers, which covers whole life cycle of an information system. Defines **who, when, what, and why should do during the development** of the IS. Methodology covers all substantial elements of the IS:

- People
- Organization procedures
- Data
- SW / HW
- Organization influences
- Economic aspects of IS development and operation
- Documents and control procedures for particular IS development stages

Examples of System Development Methodologies:

- Waterfall
- Spiral
- RAD
- RUP
- XP
- Scrum
- OpenUP
- Kanban

7. Criteria for Choosing System Development Methodology

- Nature and scope of system under development
- Project criticality
- Budget
- Team Size
- Used Technology
- Used Tools and Techniques
- Work culture in organization

8. Nature of the Software Developments

Steve McConnell in his book "Rapid Development" differentiates basic lifecycle approaches to 3 groups:

- Demos and “proof-of-concept” prototyping - needs some conceptual modeling to guide the coding, but not detailed requirements, design, or testing
- New technology application delivery - requires an incremental approach, iterating between the software development phases of architecture, detailed design, coding, and testing
- Stable application maintenance - needs a sequential waterfall approach repeating a well-understood process for a well-understood product or application

9. Adaptive (“agile”) versus Predictive (“plan-driven”) Approach

- Adaptive/ agile
 - Low criticality
 - Senior developers

- Requirements change often
- Small number of developers
- Culture that thrives on chaos
- Predictive/ plan-driven
 - High criticality
 - Junior developers
 - Requirements do not change often
 - Large number of developers
 - Culture that demands order

10. Methodologies, organized as people x criticality x optimization

Project criticality and corresponding team size with project management formality is presented on the next figure [9]:

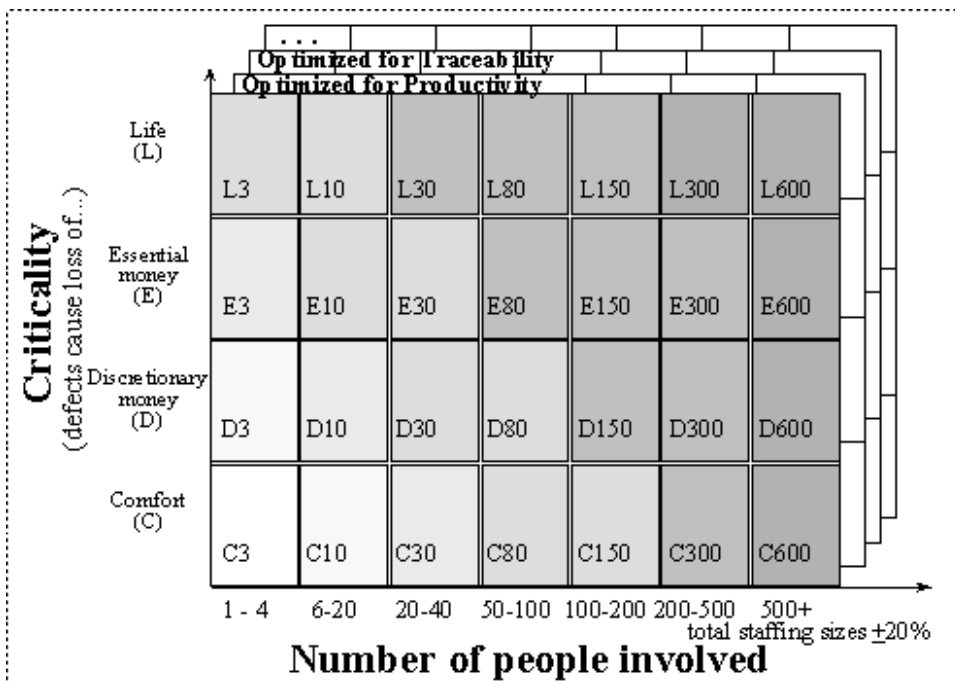


Figure 1. Project Criticality related with Team Size

11. Boehm and Turner Radar Chart

- Personnel - measures team skills
- Dynamism - likelihood of changes
- Culture - temperament of the organization – thriving on chaos vs. order
- Team Size
- Criticality - system failure results in loss of ...

Pictorially expressing [10]:

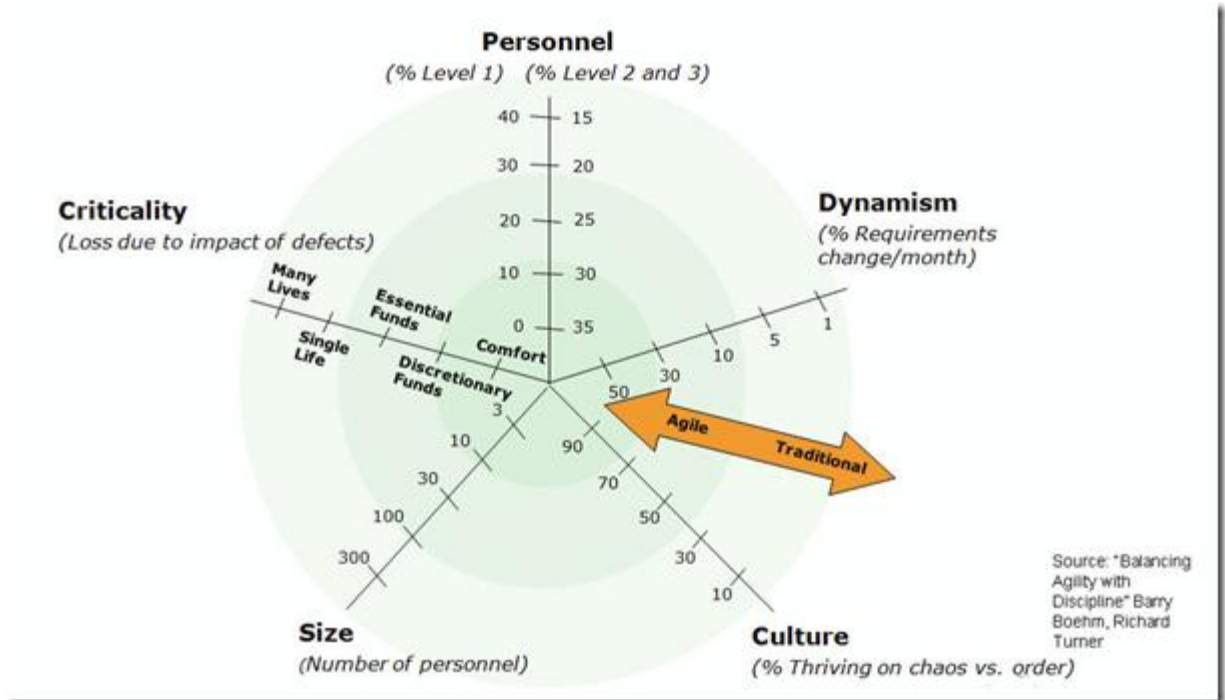


Figure 2. Boehm and Turner Radar Chart

12. Project Management Framework (PMF)

PMF gives bases for project management methodology determination and directions to project management activities. Framework is general, methodology is specific giving concrete values to framework elements.

Using analogy from Zachman Architecture Framework, PMF is logical structure for categorizing and organizing project management important aspects enabling various parties associated with project to communicate and understand each other. PMF enables get answers to following questions:

- what?
- how?
- where?
- who?
- when?
- why?

While in context of IS project management is directed to IS change management, PMF helps define goals, inputs, outputs and processes for system development.

13. Elements of Framework

Are effective to all team-based undertakings and are presented on the next figure [9]:

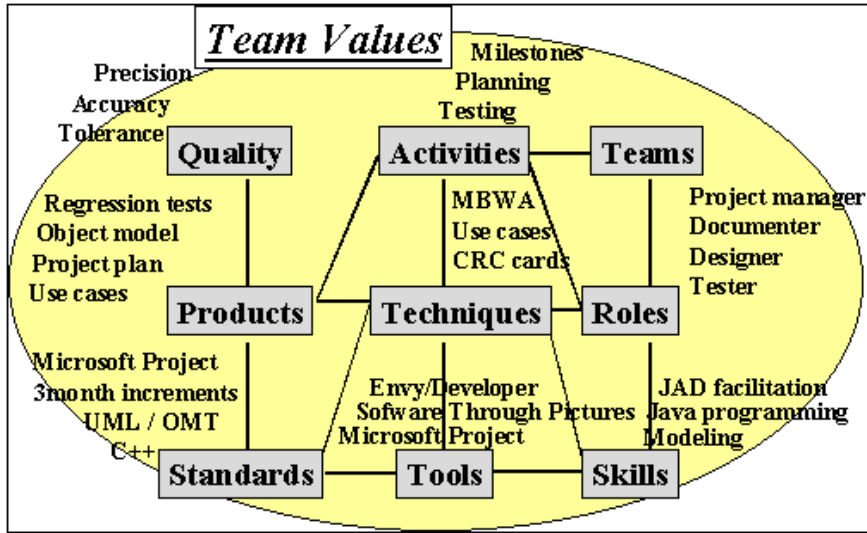


Figure 3. Methodology Topics and Samples

To comparison on the next figure are presented elements of business process methodology [11]

Business Process and its Environment's Meta-model

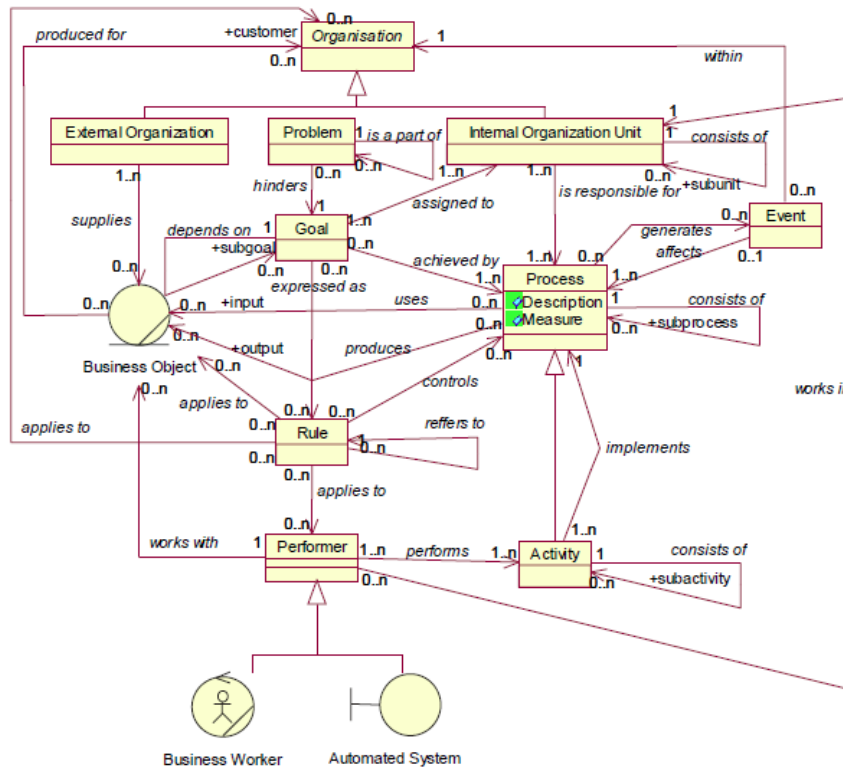


Figure 4. Business Process and its Environment's Meta-model

Examples of Project Management Frameworks and Methodologies:

- PMI (USA) Project Management Body of Knowledge (PMBOK)
- Association for Project Management (UK) BOK
- Projects IN a Controlled Environment (UK) (Prince2)
- Unified Project Management Methodology (UPMM™)

14. Project Life Cycle

Defines project start and end and various milestones between them

Project is divided into small time periods (phases, iterations, sprints etc) and by the end of each time period project status is checked out and decided to continue or not. By each time period an outcome (*deliverable*) is created - “tangible” and verifiable work “product”. It is input to the next time period or another project or to the custom usage

15. Project Life Cycle in Prince2

It is presented on the next figure [18]:

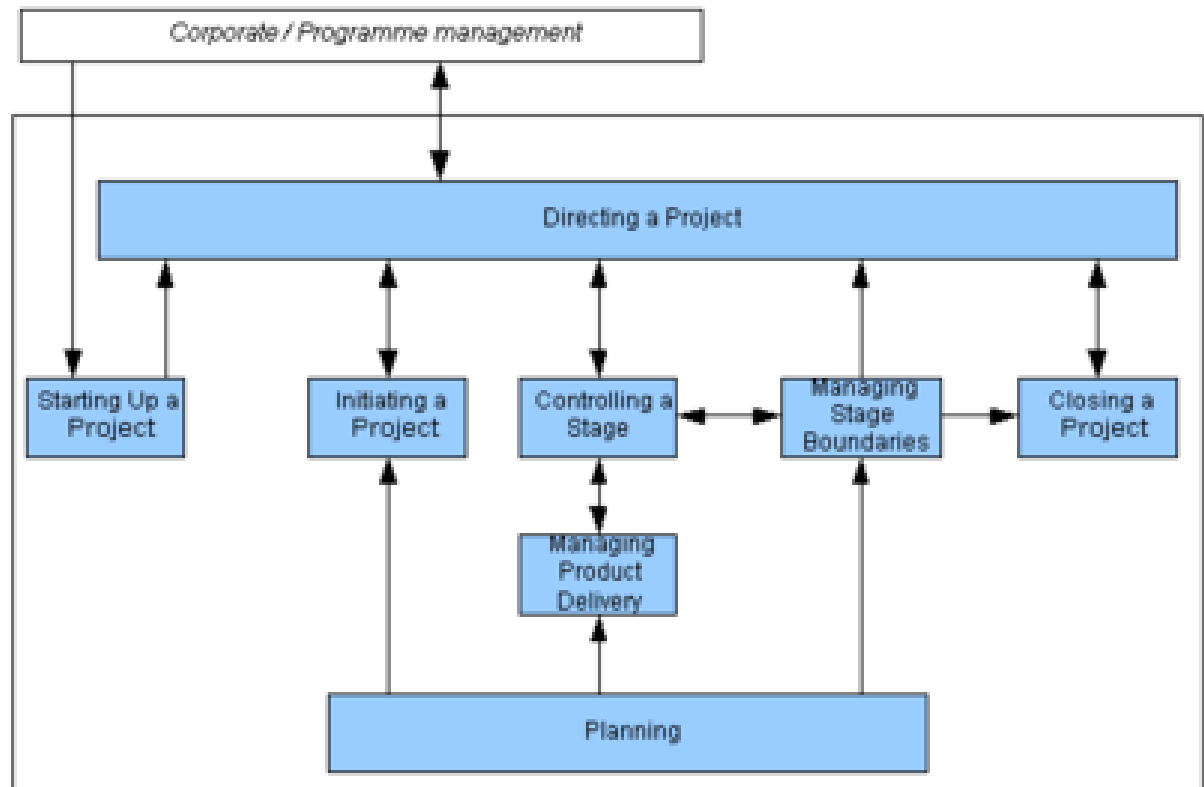


Figure 5. Prince2 Project Life Cycle

16. Project Management Process Groups in PMBOK

These processes are presented on the next figure [19]:

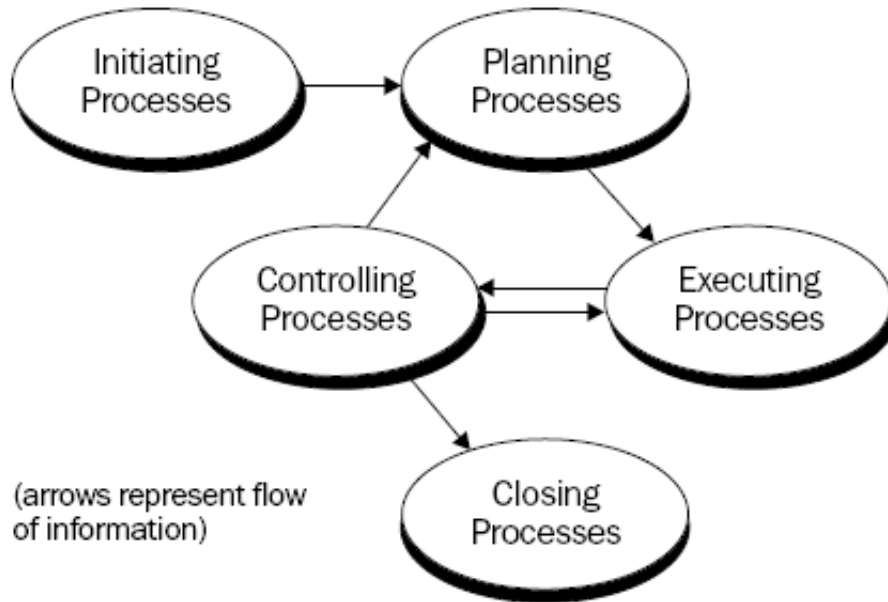


Figure 6. PMBOK Process Groups

Every process group is in each project time period more or less repeated, pictorially expressing:

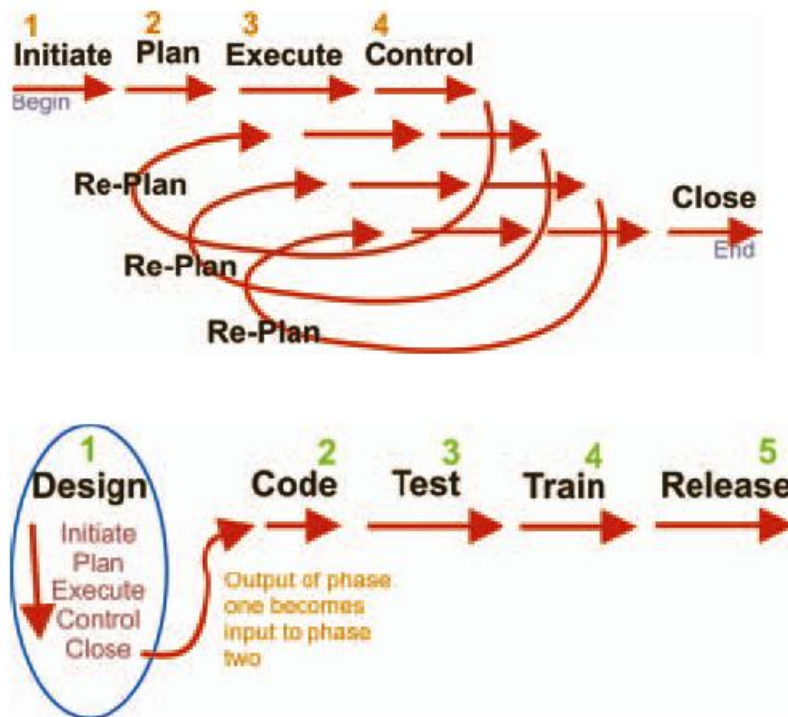


Figure 7. PMBOK Iteration of Process Groups

17. Knowledge Areas in PMBOK

Management objects or areas in process groups:

- Integration management
- Scope management
- Time management
- Cost management
- Quality management
- Human resource management
- Communication management
- Risk management
- Procurement management

Pictorially expressing [20]:

18. Differences in Project/Product Life Cycle

Differences are presented in the next table [17]. As shown from the table, project is aimed to creation of product (or result) and after project end product starts its life cycle.

Table 2. Differences in Project and Product Life Cycle

Table 1

Project/Product lifecycle stages and milestones

	Project lifecycle	Product lifecycle	Owner/Actions
Stage 1	Project conception	Product feasibility	The client organisation, assisted by specialists
Milestone 1	Project commitment	High level product requirement produced	The client <i>commits</i> to the project and <i>appoints</i> a project team
Stage 2	Project execution	Design, development or acquisition	The project team (the prime contractor assisted by subcontractors)
Milestone 2	Project closure	Product created	The project team <i>delivers</i> the created product to the client
Stage 3	N/A	Product operation	The client organisation, possibly transferred to a customer/user

19. Agile Project Management Processes

These processes are presented on the next figure [23]:

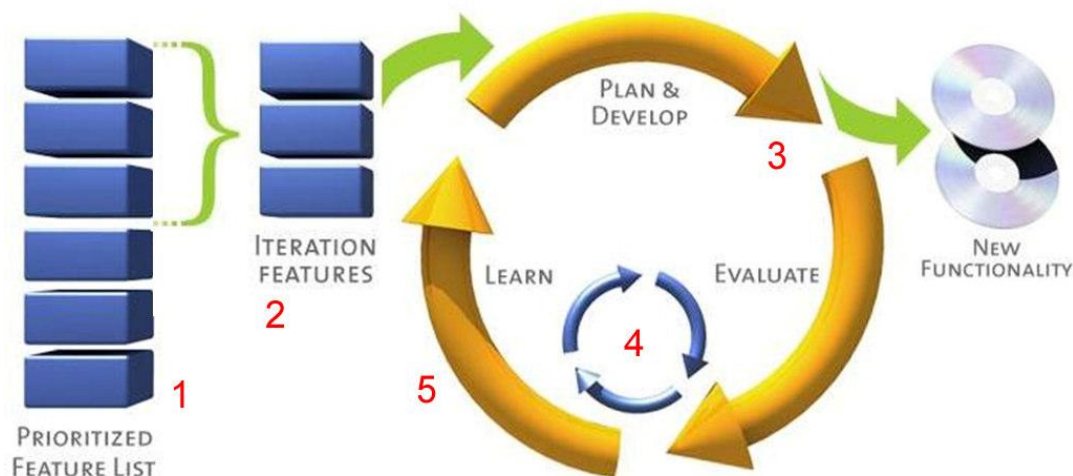


Figure 8. Example of Agile Process

20. Summary

Project management methodology defines project life cycle, management processes in life cycle with their inputs and outputs and usable techniques

Usable system development methodology depends on system nature under development, project criticality and usable resources (people, money etc). It is project managers task to agree with stakeholders what kind of project management and system development methodology to apply

21. Used Literature

1. IT Governance, http://en.wikipedia.org/wiki/IT_governance
2. Douglas Bernardini, „COBIT 4.0. Framework“, <http://www.doug-cobit.com/>
3. ITIL, <http://www.itil-officialsite.com/home/home.asp>
4. TOGAF, <http://www.opengroup.org/architecture/togaf9-doc/arch/>
5. FEAF, <http://www.gao.gov/bestpractices/bpeaguide.pdf>
6. Inspired Architecture Frameworks
<http://www.inspired.org/InspiredFrameworksWhitePaper.pdf>
7. A Tutorial on the Zachman Framework for Enterprise Architecture.
<http://apps.adcom.uci.edu/EnterpriseArch/Zachman/Resources/ZachmanTutorial.ppt>
8. System Development Methodology,
<http://encyclopedia2.thefreedictionary.com/system+development+methodology>
9. Alistair Cockburn, Methodology per project,
<http://alistair.cockburn.us/Methodology+per+project>
10. Mike Griffiths, “Agile Suitability Filters”,
http://leadinganswers.typepad.com/leading_answers/files/agile_suitability_filters.pdf
11. Jackowski Zygmunt “Business Modeling with UML: A Business Process Centred Architecture” <http://cf.agilealliance.org/articles/system/article/file/1202/file.pdf>
12. Vaclav Repa, Methodology Framework for Information Systems Development,
<http://mefis.panrepa.org/CITSA2004Presentation.pdf>
13. Scott W. Ambler, „The Agile Software Development Life Cycle (SDLC)“,
<http://www.ambyssoft.com/essays/agileLifecycle.html>
14. Agile Software Development,
http://en.wikipedia.org/wiki/Agile_software_development
15. Glen B. Alleman, AGILE PROJECT MANAGEMENT METHODS FOR IT PROJECTS,
[http://www.niwotridge.com/PDFs/PM%20Chapter%20\(short%20no%20email\)%20Update%202.pdf](http://www.niwotridge.com/PDFs/PM%20Chapter%20(short%20no%20email)%20Update%202.pdf)
16. Jason Charvat, “Understanding Project Methodologies”,
http://media.wiley.com/product_data/excerpt/83/04712217/0471221783.pdf
17. Angus G. Yu, Peter D. Flett and John A. Bowers, “Developing a value-centred proposal for assessing project success”,
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V9V-4G0M3Y5-1&_user=553274&_coverDate=08%2F31%2F2005&_rdoc=1&_fmt=high&_orig=sear

ch&_origin=search&_sort=d&_docanchor=&view=c&_searchStrId=1642531053&_rerunOrigin=google&_acct=C000028238&_version=1&_urlVersion=0&_userid=553274&md5=169b4e927bd14db93d3653373d9c0b42&searchtype=a

18. Prince 2, <http://en.wikipedia.org/wiki/Prince2>
19. Michael Solomon, PMP Exam Cram 2, http://i.i.com.com/cnwk.1d/i/tr/downloads/home/0789734621_chapter_1.pdf PMBOK, <http://en.wikipedia.org/wiki/PMBOK>
20. PMBOK 4th edition Process Map, http://www.pmroadtrip.com/files/PMPBOKV4_ProcessMap.pdf
21. Updating the Project Management Bodies of Knowledge, <http://www.indeco.co.uk/filestore/UpdatingthePMBodiesofKnowledge.pdf>
22. Mike Griffiths, "PMBOK v4 Process Mappings (large format)", http://leadinganswers.typepad.com/leading_answers/pmbok-v4-process-mappings-large-format.html
23. Mike Griffiths, "Agile Interfaces – PMO Integration", http://leadinganswers.typepad.com/leading_answers/2007/06/agile-interface.html