COMMONALITIES AND DIFFERENCES IN PROJECT MANAGEMENT AROUND THE WORLD: A SURVEY OF PROJECT CATEGORIES AND LIFE CYCLES

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ABSTRACT

The professional discipline of project management holds the promise of enabling peaceful global cooperation and collaboration across all political, cultural and economic boundaries. However in order to realize that goal we must achieve a common understanding and reasonably uniform application of the underlying principles and practices of project management on a global basis. This paper

- Presents a framework that we hope can be used to 1) identify the project categories and related life cycles that are common to all parts of the world, regardless of the local political, cultural and economic conditions, and 2) identify where significant differences exist within those same areas.
- Requests all participants in the 17th IPMA International PM Congress 2003, plus other PM practitioners around the world, to complete and submit the survey questions related to the framework from their perspectives relating to their home countries, so that the authors of the paper can compile the survey results and present them at the 18th IPMA Congress in Budapest, June 2004

The intention is to enable all PM practitioners to focus on the areas of differences so that these can be narrowed and hopefully eliminated—or at least well defined and understood—within a reasonable time. The vision of having an agreed, global definition of project management principles and practices will then have been achieved in part, with the ultimate goal of enabling investors and practitioners in all countries to conceive, plan and execute projects anywhere in full collaboration for the betterment of humankind.

The proposed framework is a set of matrixes with defined project categories and related life cycle phases listed on one axis and countries listed on the other. Codes are proposed to identify the extent to which these project categories and life cycle definitions are accepted and used within each country. If the experience in applying the proposed framework is successful then it, or something similar, can then be applied by various practitioners to other aspects of the project management discipline.

INTRODUCTION

Modern project management has developed over the past 60 years to the status of a recognized management profession. Its principles and practices are published in many languages and applied, one way or another, in essentially all countries of the world. However, there probably are significant differences in those countries at present in the methods, terminology, and understanding of what project management really is and how it is best practiced. While there are large areas of common understanding in project management, the differences that exist prevent the fullest cooperation and collaboration across political, cultural and economic boundaries.

Project Management and Global Geography

The rapid growth in all parts of the world of the various professional associations that focus on project management confirms the global nature of the project management profession. A number of Global Project Management Forums at IPMA and PMI conferences in recent years have attracted participants from many countries and produced useful reports on the globalization of the project management discipline as a management profession. These efforts have focused on such topics as standards, education, certification, accreditation and credentialing, and research. However, so far there has been little information produced that clearly shows the commonalities and differences in specific project management practices and their understanding around the world.

A Vision of Global Project Management Practices

A vision of globally accepted project management practices produces a picture of a widely used and understood set of concepts, procedures, methods, systems and tools that have a high degree of uniformity and understanding across geopolitical, economic, linguistic and cultural boundaries. Such practices would enable broad collaboration on international projects with minimum confusion and conflict. They would also enable managers and specialists to move from one part of the world to another and to work effectively on projects, within the obvious cultural and linguistic constraints.

A SYSTEMATIC MODEL OF PROJECT MANAGEMENT

Voropaev and Secletova [1999] have defined and described a useful model linking all aspects of the discipline of project management. This model enables us to put this present paper in the proper context of our overall knowledge of project management. Their systematic PM model (see Figure 1) consists of three modules that include seven major elements to which have been assigned arbitrary code letters. This systematic model enables all aspects of project management as a professional management discipline to be viewed in an integrated, correlated manner. As mentioned earlier, we will focus here on two important elements of this model—the projects themselves and their life cycles—and relate them to the selected geographic areas of application around the world.

PROJECTS: THE COMMON DENOMINATOR

Projects in all their various sizes, shapes, degrees of risk and complexities, and widely varying products or results, are the common denominator for all aspects of project management. However, a useful analytical framework requires that projects be systematically grouped into categories and sub-categories. In some cases a further grouping within sub-categories and types based on other characteristics will be required, as discussed below. Crawford et al (2002) report the results of a PMI funded research project regarding the various project classification systems in use in North America and Australia. They discuss the need for classification systems and the related issues, implications and problems, concluding that "The categorization of projects is beneficial and useful to organizations, but it needs to be practically and not theoretically oriented." We agree, and believe that the most practical approach is based first on the products of projects.

Defining Project Categories and Sub-Categories

Ten recommended basic project categories are listed in Table 1, plus an eleventh category for all others, oriented primarily to products of the projects. Projects within each of these ten specific categories are believed to have very similar life cycle phases and utilize similar authorizing, planning, budgeting, scheduling, monitoring and controlling procedures and tools throughout their life cycles no matter where in the world they are located. Subcategories are also identified within nine of the eleven basic categories. In most cases there will be differences—in some cases significant—between the project life cycle management process for the basic category and at least some of its subcategories. Others may wish to add subcategories where none are shown in Table 1, or to add additional subcategories to those that are listed. Additional major categories may also be required to assure that all conceivable projects of significance to the international PM community are included.

It should be noted that these categories are not necessarily mutually exclusive: many projects will include aspects of two or more categories. For example, most communications systems projects include at least the adaptation of information system software. Many facilities projects also include communication systems, and vice versa. In such cases the project probably should be classified in the more dominant category, or—if justified by their size, complexity, or risk—defined as two or more projects (of different categories) within a program, with each project having a different life cycle definition.

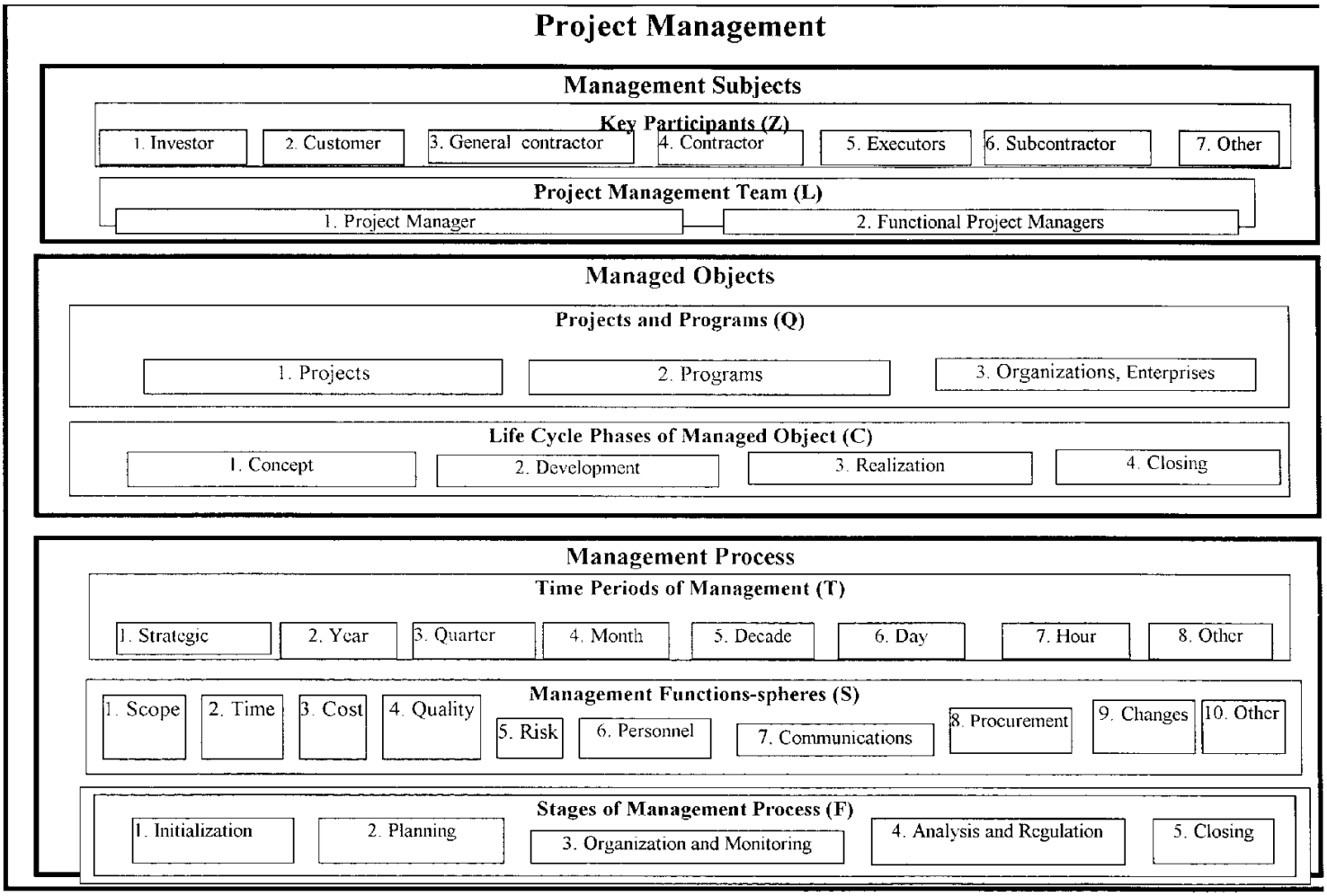

Fig. 1. Systematic Model of Project Management

Project Categories: Each having similar life cycle phases and a unique project management process	**Examples**
1. Aerospace/Defense Projects	
1.1 Defense systems	New weapon system; major system upgrade.
1.2 Space	Satellite development/launch; space station mod.
1.3 Military operations	Task force invasion
2. Business & Organization Change Projects	
2.1 Acquisition/Merger	Acquire and integrate competing company.
2.2 Management process improvement	Major improvement in project management.
2.3 New business venture	Form and launch new company.
2.4 Organization re-structuring	Consolidate divisions and downsize company.
2.5 Legal proceeding	Major litigation case.
3. Communication Systems Projects	
3.1 Network communications systems	Microwave communications network.
3.2 Switching communications systems	3rd generation wireless communication system.
4. Event Projects	
4.1 International events	2004 Summer Olympics; 2006 World Cup Match.
4.2 National events	2005 U. S. Super Bowl; 2004 Political Conventions.
5. Facilities Projects	
5.1 Facility decommissioning	Closure of nuclear power station.
5.2 Facility demolition	Demolition of high rise building.
5.3 Facility maintenance and modification	Process plant maintenance turnaround.
5.4 Facility design/procurement/construction	Conversion of plant for new products/markets.
Civil	Flood control dam; highway interchange.
Energy	New gas-fired power generation plant; pipeline.
Environmental	Chemical waste cleanup.
High rise	40 story office building.
Industrial	New manufacturing plant.
Commercial	New shopping center; office building.
Residential	New housing sub-division.
Ships	New tanker, container, or passenger ship
6. Information Systems (Software) Projects	New project management information system. (Information system hardware is considered to be in the product development category.)
7. International Development Projects	
7.1 Agriculture/rural development	**People and process intensive projects**
7.2 Education	in developing countries funded by The World Bank, regional development banks, US AID, UNIDO, other UN, and government agencies; and
7.3 Health	
7.4 Nutrition	
7.5 Population	
7.6 Small-scale enterprise	**Capital/civil works intensive projects—**
7.7 **Infrastructure:** energy (oil, gas, coal, power generation and distribution), industrial, telecommunications, transportation, urbanization, water supply and sewage, irrigation)	often somewhat different from *5. Facility Projects* as they may include, as part of the project, creating an organizational entity to operate and maintain the facility, and lending agencies impose their project life cycle and reporting requirements.
8. Media & Entertainment Projects	
8.1 Motion picture	New motion picture (film or digital).
8.2 TV segment	New TV episode.
8.2 Live play or music event	New opera premiere.
9. Product and Service Development Projects	
9.1 Information technology hardware	New desk-top computer.
9.2 Industrial product/process	New earth-moving machine.
9.3 Consumer product/process	New automobile, new food product.
9.4 Pharmaceutical product/process	New cholesterol-lowering drug.
9.5 Service (financial, other)	New life insurance/annuity offering.
10. Research and Development Projects	
10.1 Environmental	Measure changes in the ozone layer.
10.2 Industrial	How to reduce pollutant emission.
10.3 Economic development	Determine best crop for sub-Sahara Africa.
10.4 Medical	Test new treatment for breast cancer.
10.5 Scientific	Determine the possibility of life on Mars.
11. Other Categories?	

Table 1. Recommended project categories/sub-categories, with each category (or subcategory) having similar project life cycle phases and one unique process management process [Archibald 2003, Fig. 2.3, p.35].

Classifying Projects Within Categories and Sub-Categories

There is usually a wide range of projects within each project category or sub-category in large organizations. The project management process for each project category must provide the flexibility to choose the proper level of planning and control for large, complex, high-risk, 'new territory' projects compared to smaller or 'old hat' projects. Similarly it may be necessary for purposes of the proposed analytic framework to further classify projects within categories or sub-categories using the following classifying characteristics:

Project Size: Project size can be measured in several dimensions: amount of money or other scarce resources (skilled people, facilities, other), scope, and geography are the most tangible and obvious. Larger projects in any of these dimensions usually carry greater risks, of course—but not always.

Project Complexity: The complexity of a project is indicated by the:

- Diversity inherent in the project objectives and scope;
- Number of different internal and external organizations involved, which is usually an indication of the number of required specialized skills;
- Sources of technology; and/or
- Sources of funding.

A project that requires only the skills and other resources of one operating division is usually less complex from a management viewpoint than a joint venture project supported by two or more separate corporations or agencies. Interaction of the project with ongoing operations is a common source of complexity, especially for facilities projects closely involved with current manufacturing, assembly, or process plant operations. Projects that are carried out under the surveillance of one or more regulatory agencies are usually more complex than those without such surveillance.

External or Internal Customer: If a project is to be performed under a formal contract with an external customer it will pose different management challenges than if it is to satisfy an internal customer and need. The contractual terms will directly affect the degree of risk associated with a contractual project. A project for an internal customer requires similar authorization and control (using work orders and other internal contractual documents and agreements) to a project under a formal contract with an external customer. The legal restraints and recourses may not be available on a project for an internal customer, so in that case the tendency may be not to exert as diligent an effort in project planning and control. This of course adds to the risk that the project will not meet its desired objectives. The relative importance of a given project customer will often have a great effect on how a particular project is prioritized and managed.

Degree of Customer Involvement in the Project: In many projects the customer must perform significant work, make important decisions, and provide key deliverables on schedule if the project is to be completed on schedule. Customer delays are frequent causes of delay and added cost on projects. It is imperative that the customer portions of the project be planned and scheduled on an integrated basis with the rest of the project, that the customer project manager participate actively in the project evaluation and review meetings, and take responsibility for actions assigned to that project manager. The customer's project management process must be integrated appropriately with that of the project in question.

Levels of Risk in Projects: The risks involved in projects vary between project categories and within each category/sub-category. Some of the major factors affecting risk are:

- Degree of newness of the project type to the organization.
- Size, as discussed above.
- Duration and urgency of completion: Higher risk if short duration with fixed end date, or if long duration with likely unpredictable economic or political changes.
- Complexity, as discussed above.

- Technology: degree of innovation and uncertainty regarding the product technology or its production process.
- External customer (project under contract) or internal customer, as discussed above, and their overall importance to the organization.
- Contractual terms: penalties, guarantees, foreign exchange.
- Regulatory surveillance and approvals required.
- Degree of customer involvement in the project.
- Market volatility.
- Availability of scarce resources: skilled, experienced people, specialized facilities.

Major and Minor Projects Within a Category: It is useful to identify at least two classes of projects within each category. For purposes of discussion here we will call these major and minor projects, although each organization can probably define more descriptive names. The distinction between these major and minor classes will be noted in the following definitions:

Major Projects are those whose large size, great complexity and/or high risk require:

- Designation of an executive Project Sponsor.
- Assignment of a full-time Project (or Program) Manager;
- The full application of the project management process specified for the particular project category for major projects (all specified forms, approvals, plans, schedules, budgets, controls, reports, frequent project review meetings, with substantial levels of detail in each.)

Minor Projects are those whose size, simplicity and low risk allow:

- One project manager to manage two or more minor projects simultaneously;
- Less than the full application of the complete project management process for the project category (selected basic forms, approvals, plans, schedules, budgets, controls, reports, less frequent project review meetings, with less detail required in each.)
- No formal assignment of an executive Project Sponsor; sponsor role retained within line organization.

"Mega" Projects or Programs are extremely large, complex projects (or programs) that are so unique in their size, scope, risk and duration that they require specially designed organizational arrangements (usually joint ventures, often including both private companies and governmental agencies.) As these are broken down into their component elements it is usually practical to identify a number of major and minor projects within one or more categories that comprise the mega project/program.

"Stand-Alone" Versus "Create Supporting Infrastructure" Projects: A "stand-alone" project is one that can be planned and executed without having to create any additional organizational, legal, or economic infrastructure to support it after project completion. An example is a new product that will be introduced for production in an existing plant. Another example is a project to design and construct a new petroleum processing unit within a large existing petroleum refinery. A "create supporting infrastructure" project is one that includes in the project objectives the creation of a new company or agency, or a new division of a company complete with a new staff, corporate structure, trained people, financing, and all that goes with the new organizational infrastructure. An example would be a new petrochemical plant in a location distant from any existing industrial facilities. It is expected that there would be more differences in project management in different parts of the world between projects of this second type than there are between projects of the first type.

"Standard" Versus "Transitional" Projects: It may be useful to look at projects from the perspective of how "standard" they are versus how much change they bring to their owners, their sponsoring company or agency, or the affected economy as "transitional" projects. Here again perhaps we can find better terms for each of these characterizations. What is standard in one economic setting may bring very significant changes or transitions in another setting, requiring major differences in the project management practices.

IDENTIFYING COMMONALITIES AND DIFFERENCES IN PROJECT CATEGORIES AND LIFE CYCLES

By focusing on systematically defining projects, their several categories, sub-categories and types, and documenting and understanding their life cycle phases, we believe that a useful understanding of the commonalities and differences in project management around the world will be gained. The proposed framework is thus based on:

- Defining appropriate project categories and sub-categories,
- Identifying the various life cycle definitions being used for each project category and sub-category, and
- Identifying the project management practices and tools being used by life cycle phase

within specified geographic regions or countries.

Survey to Determine Commonalities and Differences in Project Categories

The first major element of the proposed analytical framework is the comparison of project categories, sub-categories and types across geopolitical regions and countries. We request that all participants in this 17th IPMA World Congress answer the questions posed in the survey on-line to determine the usage and/or acceptability of the project categories and sub-categories listed in Table 1. The survey can be found and completed at http://ipmaglobalsurvey.com after May 15, 2003. The survey seeks to determine, within each country:

- If the concept of categorizing projects is used, and if so how common it is;
- Whether these or other category/sub-category definitions are being or can be used;
- What additional or alternative project category names are in use or recommended;
- What the usual practice is, if any, regarding classifying projects within categories (size, risk, customer, complexity, and so on).

The survey is interactive and is to be completed and submitted on line. The authors will compile the results and transmit via email copies of the resulting report to all persons who have submitted their survey responses before August 31, 2003, and also make the results available for publication by IPMA and present them at the 18th IPMA World Congress in Budapest.

Project Life Cycles: Searching for Common Processes

Within each project category and sub-category we expect to identify the commonly used models for project life cycle phases and decision points. These will form the basis for identification of common management processes within each phase.

Defining Project Life Cycles: The purposes of designing and documenting the overall project life cycle process for each project category are to:

- Enable all concerned with creating, planning and executing projects to understand the process to be followed during the life of the project.
- Capture the best experience within the organization so that the life cycle process can be improved continually and duplicated on future projects.
- Enable all the project roles and responsibilities and the project planning, estimating, scheduling, monitoring and control methods and tools to be appropriately related to the overall project life cycle management process.

Unless a well-documented, understandable picture of the life cycle process for each project category exists it will be difficult to achieve the full benefits of modern, systematic project management. In our search for commonalities and differences in project management the identification of common life cycle processes within agreed definitions of project categories is thus an important starting point.

Life Cycle Phases and Decision Points: There is general agreement that the four broad, generic project phases are (common alternative terms are shown in parentheses):

- Concept (initiation, identification, selection.)
- Definition (feasibility, development, demonstration, design prototype, quantification.)

- Execution (implementation, realization, production and deployment, design/construct/ commission, installation and test.)
- Closeout (termination, including post-completion evaluation.)

However, these phases are so broad and the titles so generic that they are of little value in documenting the life cycle process so that it can be widely understood, reproduced, and continually improved. What is needed is the definition of perhaps five to ten basic phases for each project category, usually with several sub-phases defined within each basic phase.

In designing and documenting a life cycle process (or model) for a given project category there are three basic parameters to work with:

1. The number of basic phases and the number of sub-phases within each, together with the definition of each of these.
2. Which of the basic phases (and the sub-phases) will be strictly sequential, which will overlap, and for those that overlap how much overlap can be tolerated; whether any phases are repeated; and how they are inter-related in a process flow chart (continuous flow, spiral, or other graphic shape.)
3. The number and placement of decision points (approval, go/kill, go/hold) in the process.

Table 2 lists a number of various life cycle models with references for some of the categories and subcategories listed in Table 1, reflecting the results of an incomplete literature search.

Survey to Determine Commonalities and Differences in Project Life Cycle Models

The second major element of the proposed analytical framework is the comparison of project life cycle models in use for each project category and sub-category in the involved countries/regions within various industries, companies and agencies. The survey described earlier includes questions in this regard, with the intention of determining, for each category and sub-category, and within each country/region:

- Which life cycle models listed in Table 2 are being used;
- Whether additional life cycle models are in use, their names, and references to them;
- How the models are used, and what benefits have been obtained as a result;

Summary and Conclusions: Project Management Commonalities

By December 31st 2003 the authors will compile the survey results received prior to November 1st 2003, and draw appropriate conclusions from these results, primarily focusing on the areas of commonality and differences regarding project categories and life cycles within those categories. The report will include matrices with countries on one axis and categories/project life cycles on the other, with appropriate codes entered in the matrix intersections to provide an understanding of where the commonalities and differences exist.

Recommended Further Actions

Based on the survey results and related conclusions the authors will recommend further actions to improve and apply the analytical framework presented here to additional areas of the project management discipline. Further actions will be recommended to focus on the areas of differences identified by the survey in order to achieve, ultimately, commonality of practices within those areas in all parts of the world.

Project Categories:	Life Cycle Models and References
Generic Project Models: All (or many) project categories below.	**Belanger 1998, pp 62-72:** Generic, Waterfall, Parallel-Work, Evolutionary Models. **Morris 1994, pp 245-248:** Standard, Waterfall, Cyclical, Spiral Models.
1. Aerospace/Defense Projects 1.1 Defense systems 1.2 Space 1.3 Military operations	**DOD 2000:** Defense Acquisition Model. **NASA 2002:** Process Based Mission Assurance (PMBA) Program Life Cycle, 8 phases: 1. Program Mgt, 2. Concept Development, 3. Acquisition, 4. Hardware Design, 5. Software Design, 6. Manufacturing, 7. Pre-Operations Integration and Test, 8. Operations.
2. Business & Organization Change Projects 2.1 Acquisition/Merger 2.2 Management process improvement 2.3 New business venture 2.4 Organization re-structuring 2.5 Legal proceeding	See generic models (above)
3. Communication Systems Projects 3.1 Network communications systems 3.2 Switching communications systems	See above generic models.
4. Event Projects 4.1 International events 4.2 National events	See above generic models.
5. Facilities Projects 5.1 Facility decommissioning 5.2 Facility demolition 5.3 Facility maintenance and modification 5.4 Facility design/procurement/construction	See above generic models.
6. Information Systems (Software) Projects	**Desaulniers and Anderson 2002:** Predictive (Waterfall, Prototyping, RAD, Incremental Build, Spiral) and Adaptive (ASD, XP, SCRUM) Models. **Whitten 1995, pp 19-22:** Code and Fix, Waterfall, Incremental, Iterative Model. **Muench 1994:** Spiral Software Development Model. **Lewin 2002, p 47:** "V" Software Development Model; p 50: Formula-IT Development Model. **Kezsbom & Edward 2001, p 122:** Refined Process Spiral Model.
7. International Development Projects 7.1 Agriculture/rural development 7.2 Education 7.3 Health 7.4 Nutrition 7.5 Population 7.6 Small-scale enterprise 7.7 **Infrastructure:** energy (oil, gas, coal, power generation and distribution), industrial, telecommunications, transportation, urbanization, water supply and sewage, irrigation)	**World Bank Institute 2002, Module 1.** **People and process intensive projects** in developing countries funded by The World Bank, regional development banks, US AID, UNIDO, other UN, and government agencies; and **Capital/civil works intensive projects—** often somewhat different from *5. Facility Projects* as they may include, as part of the project, creating an organizational entity to operate and maintain the facility, and lending agencies impose their project life cycle and reporting requirements.
8. Media & Entertainment Projects 8.1 Motion picture 8.2 TV segment 8.2 Live event	
9. Product and Service Development Projects 9.1 Information technology hardware 9.2 Industrial product/process 9.3 Consumer product/process 9.4 Pharmaceutical product/process 9.5 Service (financial, other)	**Cooper and Kleinschmidt 1993:** Stage-Gate ® Process Model **Kezsbom & Edward 2001, pp 108:** Stage/Gate Product Development Model. **Thamhain 2000:** Phase-Gate Process Model. **Murphy 1989:** Pharmaceutical Model.
10. Research and Development Projects 10.1 Environmental 10.2 Industrial 10.3 Economic development 10.4 Medical 10.5 Scientific	**Eskelin 2002, p 46:** Technical Acquisition: Basic Model, Phased Model, Multi-Solution Model.

Table 2. Project life cycle models and references: generic and for various project categories [Archibald 2003, pp 45-46].

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