A GLOBAL SYSTEM FOR CATEGORIZING PROJECTS: The Need for, Recommended Approach to, Practical Uses of, and Description of a Current Project to Develop the System

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ABSTRACT

Most organizations recognize that the projects they fund and execute fall within different categories, but the discipline of project management has not fully recognized that these different types of projects often exhibit different life cycle models and require different methods of governance: prioritizing, authorizing, planning, executing and controlling. In spite of this *de facto* categorization of projects by practitioners, no systematic method or system exists for identifying the several basic categories of projects, and the many variations in the key characteristics that can exist within those categories. This paper summarizes some of the research done to date on this subject, briefly discusses the need for and uses of an agreed project categorization system, and proposes a first approach to establishing a number of broad categories based on the products or end results being produced by the projects. It also briefly describes a current project to develop such an agreed system with a global virtual team: a system that can be translated into all the major languages around the world, and thereby become accepted and used on a global basis.

1. THE NEED FOR PROJECT CATEGORIZATION

Projects and Project Management: Much of the literature in the field of project management discusses, explains, and examines the discipline of project management overall, with little differentiation relating to the application of the principles of project management to various types or categories of projects. While it is obviously true that the basic principles apply generically to all types of projects, there are also many differences in how these principles and practices are best applied for projects within different categories.

Many papers and books, and much research, deal with project management in a general sense, but only a few to date examine the projects themselves: the common denominators for the discipline of project management. How are these various types of projects the same, and how are they different? Which aspects of projects can be standardized for *all* projects, versus those aspects that can be standardized only for specific project categories?

Why Categorize Projects? Crawford et al (2004), in their recent PMI funded research, concluded that all organizations that have large numbers of projects must and do categorize them, although the categories are not always immediately visible. This pervasive *de facto* categorization is often taken for granted: "That's the way we always do it."

The basic question here is not whether or not projects should be categorized, but *How can they best be categorized for practical purposes*? Two closely related questions are:

- *What are the purposes of project categorization?*
- *What criteria or project attributes are best used to categorize projects?*

Crawford et al (2004) state that it is dysfunctional to try to categorize projects without knowing what purpose will be served by the categorization.

"The categorization of projects is beneficial and useful to organizations, but it needs to be practically and not theoretically oriented. Focus groups confirmed that there are intended and

unintended consequences of that need to be considered in development of classification systems, such as loss of autonomy, creation of barriers and silos and effects of visibility or invisibility due to inclusion or exclusion from a classification system." (Crawford et al 2002.)

Categorization versus Classification: Some dictionaries use these terms interchangeably, but **t**o avoid potential semantic confusion the term *categorization* is used consistently in this paper to identify a set of items with similar characteristics or properties. An item may be placed in more than one category; in other words, categories are not mutually exclusive. A class is often used more rigorously to denote a set of items that can only be placed within a given class; classes are therefore mutually exclusive, when used in this sense. We will use this term here to classify projects within categories using specific classification criteria.

Purposes and Uses of a Project Categorization System: The existence of an agreed, global system for categorizing projects would enable and foster, for each project category/sub-category, continued improvements in:

- Definition of strategic project portfolios and their alignment with growth strategies
- Selection and development of the best project life cycle (or life span) models
- Identification and application of best practices for
    - Project selection and prioritization
    - Planning, executing and controlling methods and templates
    - Risk management methods
    - Governance policies and procedures
    - Development of specialized software applications
- Building of specialized bodies of knowledge
- Selection and training of project managers and project management specialists
- Focusing and improving PM education and training
- More effective individual PM certification and career planning
- More focused research efforts
- Organizing paper presentation tracks at professional meetings
- Plus additional benefits not yet identified.

Some Current Trends: Movement in this direction for a few of these points can be observed in the production of various standards within both PMI and IPMA (International Project Management Association) in recent years. For example, PMI has produced a government and a construction extension of the PMI Guide to the Project Management Body of Knowledge, and is working on an automotive extension at present. The PM body of knowledge produced by GPM, the German national association member of IPMA, distinguishes between investment projects (construction and systems engineering), research and development/innovation projects, and organizational projects. Many, if not most, of the PMI Special Interest Groups/SIGs, as shown in Table 1, are named for and dedicated to specific project categories of one kind or another. The top five areas of PM application/industries represented by the present 140,000 members of PMI in 120 countries are "Computers/software/data processing, information technology, telecommunications, business management, and financial services" (*PMI Corporate Council Update* March 2003, p 3), in spite of the fact that construction and aerospace/defense are the most mature PM areas of application, as discussed later in Section 7.

Aerospace & Defense	Automation Systems
Automotive	Design-procurement-construction (across all economic sectors)
Dispute Management	E-Business
Environmental Management (pollution remediation and prevention)	Financial Services (banking, investment)
Government	Healthcare Project Management
Hospitality Management (major events, such as the Olympic Games)	Information Systems (software)
Information Technology and Telecommunications	International Development (infrastructure, agriculture, education, health, etc., in developing countries)
Manufacturing	Marketing and Sales
New Product Development	Oil/Gas/Petrochemical
Pharmaceutical	Retail
Service and Outsourcing (buying rather than making)	Urban Development (potential SIG)
Utility industry (generation and distribution of electric power, water and gas)	

Table 1 The specific interest groups (SIGs) within PMI® that relate to project categories and specific areas of application of project management. For a directory of project management Specific Interest Groups go to www.pmforum.org/prof/sigdir.htm.

2. PROJECT CHARACTERISTICS AND ATTRIBUTES

Categorization Criteria: Several authors have identified the many characteristics and attributes of projects that could conceivably be used as criteria to categorize projects. These are summarized by Crawford et al (2004) with this list:

Attributes of projects

- Application area or product
- Stage of life-cycle
- Grouped or single
- Strategic importance
- Strategic driver
- Geography
- Scope
- Timing
- Uncertainty
- Risk
- Complexity
- Customer
- Ownership
- Contractual

Any of these, or any combination of them, could be used to categorize a group of projects, depending on the purpose at hand. Perhaps the reason that little progress has been made to date in developing an agreed overall categorization system is the existence of this wide variety of project attributes and their various combinations.

Four Possible Categorization Methods: Youker (1999) provides a very useful discussion of the alternative ways to categorize projects for practical purposes:

> There are four basic ways in which we can set up a classification system of projects:
> 1) geographical location, 2) industrial sector (Standard Industrial Classification System), 3) stage of the project life cycle, and 4) product of the project (construction of a building or development of a new product). The most important and the most useful breakdown is by type of product or deliverable that the project is producing, such as building a building, developing a new product, developing a new computer software program, or performing a maintenance turnaround or outage on a chemical plant or electric generating station.
>
> Each of these types of projects has more in common with other similar projects producing the same type of product than with other types of projects. Conversely there is much less commonality between different types of projects in the same industrial sector or company. For example, there is much more commonality between projects for developing a new software system in a construction company and a bank than there is between three projects in the same bank for constructing a new building, developing a new product, and developing a new computer software system.

Youker presents and discusses a list of nine categories based on project results, and concludes that:

> The most useful classification of types of projects is by the product of the project. This paper presented a list of nine different types, which should be expanded as more persons contribute ideas. PMI should adopt this breakdown as a basic segmentation of the Project Management business and use it in a number of different ways, including organizing the breakout of tracks at annual conferences.

3. CHARACTERISTICS OF A PRACTICAL PROJECT CATEGORIZATION SYSTEM

Hierarchical and Multi-Dimensional: A practical system for project categorization must be both hierarchical and multi-dimensional. The resulting categories must be based on the same hierarchical approach used in systematically defining a project, as in developing a project/work breakdown structure (P/WBS):

Category level			
1	2	3	4
Major category			
	Sub-category 2		
		Sub-category 3	
			Sub-category 4

It is probable that not all major categories will require as many as three additional sub-category breakdowns.

Classifying Projects Within Categories: Within each agreed category and sub-category, the system must allow practitioners to classify their projects according to the attributes that are most useful to the purpose at hand. This further classification could be a sort of multi-dimensional screen that identifies all of the projects that fit a particular set of attributes within a specific category. This is discussed in more detail later in Section 5.

4. RECOMMENDED FIRST AND SECOND LEVEL BREAKDOWN OF PROJECT CATEGORIES

Recommended Categories and Sub-Categories: Ten recommended basic project categories are listed in Table 2, 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 2, 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.

Not Mutually Exclusive or Rigorously Consistent: 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. The names used in the recommended list are not consistent in that some are descriptors of things and some describe functions (such as Category 10, Research and Development.)

Basis for the Recommended Categories: The list in Table 2 reflects agreement with the basic conclusion of Youker, mentioned above, plus the author's several decades of experience in working with many projects and clients in 16 countries on four continents. Both the major categories and the first level of sub-categories are primarily based on the products or results of the projects in question. The names of these categories are not identical with those recommended by Youker (1999) but are intended to be more generic and applicable within all countries. It remains for the international project team described later in Section 8 to work through these complex questions to reach agreement on the best definitions of the basic and sub-categories for a globally agreed project categorization system.

Semantics Are Important: Since the system to be developed is intended to be global and therefore useful in essentially all languages, the choice of the words used to describe the categories becomes important, since they must easily be translatable into those various languages without losing or changing the agreed meaning. For example, Category 5 in Table 1 uses the word 'facilities' to denote various kinds of 'fixed assets', 'capital investments', 'construction', or "built environment," and such tangible products as are illustrated by the names given in the sub-categories. Although the English word "facilities" captures this meaning reasonably well ("something that is built, installed, or established to serve a particular purpose"), it also has several other definitions in English. The word "facility" when translated to Portuguese, for example, usually means "the quality of being easily performed," which is also one of the other definitions of the English word. So perhaps this category should be defined (in English) as "Physical Facilities," or with some other term. Clarifying and selecting the best terms to use for each category will be an important part of the work to be done by the international team identified in Section 8 of this paper.

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 2. 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].

5. 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. It is probably desirable for purposes of the proposed system to further classify projects within categories or sub-categories using some of the attributes identified by Crawford et al (2004) cited earlier, or using some of 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.

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 the line organization.

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.

For example, a project that requires only the skills and other resources of one operating division of an organization 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 physical 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 formal, 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 costs 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, and 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.

"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.

The Project Category/Class Matrix: The result of placing projects within the appropriate category (or sub-category) and then classifying them using one or more other attributes will produce an n-dimensional matrix. For practical purposes this will probably most often be displayed in 2 or 3 dimensions. Table 3 illustrates this concept for one of the proposed basic categories, Physical Facilities, using several of the classification attributes discussed above.

6. PROJECT LIFE CYCLES: SEARCHING FOR COMMON PROCESSES

Within each project category and sub-category we must 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 life cycle phase. The PMI PMBOK recognizes the *de facto* categorization of projects with its illustration of four typical project life cycle models (defense acquisition, construction, pharmaceuticals and software) (PMI PMBOK 2000, pp. 14-17.)

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.

Classifying Projects within Project Categories & Sub-Categories			Project Size: $M	Major Project: Yes or No	Complexity: 1 to 10	Customer: Int or Ext	Customer Involvement: Hi or Low	Risk Level: 1 to 10		
Category	**Level 2**	**Level 3**								
5. Physical Facilities										
	5.1 Decommissioning									
	5.2 Demolition									
	5.3 Maint & Modification									
	5.4 Design/proc/const									
		5.4.1 Civil								
		5.4.2 Energy								
		5.4.3 Environmental								
		5.4.4 Industrial								
		5.4.5 Commercial								
		5.4.6 Residential								
		5.4.7 Ships								
		5.4.8 Other								
	5.5 Other									

Table 3. Simple Illustration of a Category/Classification Matrix

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 generic life cycle 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. (The PMI PMBOK 2000 [p.31] identifies five overlapping "process groups" within each project life cycle phase, the names of which [initiating, planning, executing, controlling and closing] can be confused with the names sometimes used of the project life cycle phases.)

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 4 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. The existence of the fairly extensive writings in the project management literature describing these various life cycle models for different types of projects is further validation of the need for a global project categorization system that can be accepted and used by all concerned.

7. MATURITY OF PROJECT MANAGEMENT WITHIN ORGANIZATIONS AND BY PROJECT CATEGORY

PM Organization Maturity Models: "In recent years the use of maturity models has grown in popularity for evaluating where a given organization stands in comparison to its potential and to other organizations in particular areas of management. Improving an organization's project management capabilities generally involves moving up the ladder of whatever maturity model best suits the needs of that organization." (Archibald 2003 p 62). Greater PM maturity is presumed to indicate greater capability for successfully selecting, authorizing, planning, executing, controlling and closing out projects and programs that achieve the strategic goals of the organization.

The basic purposes of the many available PM maturity models are 1) to assess an organization's current PM capabilities, 2) to educate and train people involved in PM, and 3) to enable continued improvement in organizational and individual PM capabilities. These models include PMI's OPM3, the United Kingdom's Office of Government Commerce/OGC approach based on its PRINCE2, and Japan's Project and Program Management/P2M model, developed jointly by government and industry. All of these are intended to assess the maturity of an organization in project management.

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

PM Maturity Within Specific Project Categories: A different understanding of the question of maturity can be obtained if one views PM maturity from the perspective of project categories, rather than organizations. Table 5 presents a subjective view of PM maturity within each of the major categories listed in Table 2. While this view is not supported at present by any extensive research, it illustrates the wide range of maturity in the application of project management principles and practices across the range of project categories. The categories of aerospace/defense and physical facilities are considered to be the most mature: they have the longest history of the use and development of these disciplines, and also are believed to have the most extensive body of PM literature. Maturity in the international development category depends on whether the project is being implanted in a developing country by a foreign entity (using mature methods and people), or whether the project is being created and managed totally from within the developing country.

Project Category	Still Maturing	Fairly Mature	Most Mature
1. Aerospace/Defense			**X**
2. Business & Organizational Change	**X**		
3. Communication Systems		**X**	
4. Events	**X**		
5. Facilities			**X**
6. Information Systems	**X**		
7. International Development	**X?**	**X?**	
8. Media & Entertainment	**X**		
9. Product/Service Development		**X**	
10. Research & Development		**X**	

Table 5. Project Management Maturity Within Project Categories

8. CONCLUSIONS

1. Different project categories require different governance practices.

2. Each project category and many sub-categories differ in:
   - Maturity of related PM methods and practices
   - How PM methods of planning, authorizing, scheduling, contracting, and controlling the work are adapted and applied
   - Most effective life cycle models
   - Once-through versus repetitive models
   - Predictive versus adaptive models
   - Degree of uncertainty: technology, funding, environmental, political, other
   - How the project manager role is assigned and conducted

- Experience and technical knowledge needed by the project manager
- *Plus others....*

3. A globally agreed project categorization system is urgently needed and will have many practical uses:
   - Selecting the best PM methodologies and life cycle models
   - Defining project management systems and developing systematic methodologies for their creation
   - Tailoring education and training curricula
   - Developing specialized PM software applications
   - Certifying project managers and PM specialists
   - Others:

4. Application of "One-Size-Fits-All" PM methods causes many project failures
   - "Best practices" must be identified for each agreed project category
   - In the absence of agreed categories, the wrong PM methods are often applied
   - This is a root cause for many project failures.

For example: software development projects using 'standard/waterfall' life cycle models.

5. Development of a global project categorizing system is a major, multinational project:

   - This requires a global team with global sponsorship and involvement.

9. BRIEF DESCRIPTION OF THE INTERNATIONAL PROJECT CATEGORIZATION PROJECT/PCP

Background: The author has made several presentations on this subject at the IPMA World Congresses on PM in Moscow (June 2003) and Budapest (June 2004), as well as at various PMI and other meetings in Europe. Following a presentation on this subject at the *2nd Latin American PMIGOVSIG Forum on Project Management In Government*, September 21-22, 2004, Brasilia, Brazil, during which the author proposed establishing an international Project Categorization Project, Peter Mello, PMP, located in Brasilia, volunteered to develop a web site (building on an existing site in the Portuguese language) and to act as both the Project Leader for Brazil and WebMaster for the site.

Draft Statement of PCP Objectives (to be reviewed, revised and adopted by the PCP Virtual Project Team)**:**

1. **System Need:** Define the need for a globally agreed system for categorizing projects of all types and sizes.
2. **System Uses:** Identify specific, practical uses of an agreed project categorization system.
3. **Project Categorization System:** To satisfy the defined needs and uses, develop appropriate systems, methodologies, and related categorization criteria that are acceptable, practical, and useful to PM practitioners, consultants, educators, software developers, and researchers in all parts of the world.
4. **System Test Applications:** Prove the validity of the resulting system by applying it in as many different settings as possible.

5. **Continuous Improvement:** Incorporate the results of both test and operational application of the system by continually improving the system methodologies and categorization criteria.

Draft Statement of PCP Scope (to be reviewed, revised and adopted by the Virtual Project Team)**:**

The Global Project Categorization System to be developed will:

1. Be applicable to all types of projects, all areas of PM application, in all countries and languages.
2. Be defined and developed by a virtual team composed of volunteer members from as many countries speaking as many languages as is possible to engage.
3. Be translatable into all major languages of importance to the global project management community.

Present Status of the Project: At this writing, three weeks after launching the initial PCP web site, an English language site is partially operational, and the project is entering its Planning/Definition Phase. All ideas are welcomed that help to create a solid set of project objectives, a good statement of project scope, a Project Charter, a well-defined project/work breakdown structure, a realistic task/responsibility matrix to define our virtual team members' agreed responsibilities, and an achievable master schedule.

As of the middle of October 2004 36 people from 10 countries speaking 7 languages have joined the virtual team, and by the end of 2004 we expect to have at least 20 countries and 15 languages represented, with over 100 team members. We plan to designate 3 levels of team members: Project Gurus, Project Leaders (for a country or region, a project category or sub-category, specific language, or an over-arching special interest area), and Project Specialists (who will work with a specific Project Leader.)

Although English is the common language in use for the project, a primary objective is to produce a project categorization system (or method) that is available, practical and usable in all the major languages used in the world of project management.

Visit the PCP Site and Join the Virtual Team: Anyone working in the project management field who has an interest in contributing to its advancement in this area of project categorization is invited to visit the PCP web site at http://www.project categories.org.

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