A GLOBAL SYSTEM FOR CATEGORIZING PROJECTS

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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.

1. THE NEED FOR PROJECT CATEGORIZATION

Projects and Project Management: The project management literature, including much research, deals with project management in a general sense, but only a few publications 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 project management 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) 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 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 to 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.

**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:

- 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.
2. DEFINING THE PURPOSES OF CATEGORIZING PROJECTS

**Strategic Project Management:** The most effective method of categorizing projects for strategic management purposes will not be the same as the best categorization method for operational project management purposes. These strategic purposes include:

- Project selection: Determining which potential projects are to be funded and executed.
- Prioritize selected projects: Determining the relative importance of selected projects to assist in allocating scarce resources.
- Define Portfolios: Determining the most effective way of grouping projects within specifically defined project portfolios.
- Manage project portfolios: Designing, implementing, and operating the project portfolio management process of the organization.
- Allocate resources to portfolios and projects within portfolios: Deciding the best deployment of money and other limited resources across all project portfolios and among the projects within each portfolio.
- Other: No doubt other strategic PM uses can be identified.

**Operational Project Management:** This area of use focuses on the specific practices, systems and methods of authorizing, planning, and controlling projects and multi-project programs. The method used for categorizing projects for these purposes will no doubt be very different from those used for strategic and other purposes. These operational PM purposes include:

- Select/assign project managers: Matching the background and experience of available project managers with specific projects is greatly facilitated when the projects are appropriately categorized.
- Design/select best project life-cycle models: Determining which of the many currently used project life-cycle models is best for each project demands that each project must be identified within a defined project category.
- Select/improve project planning, scheduling, executing, and controlling methods: The ‘best practice’ for each of these basic PM functions varies considerably for different project categories.
- Select/develop PM software applications: The strengths and weaknesses of currently available PM software application packages will vary according to the specific project category. One package that is very strong in the procurement area, important to the ‘facilities design/procure/construct’ category, may not be very useful to a project in the ‘software new product development’ category, for example.
- Build knowledge base of best practices: As indicated above, what is ‘best practice’ within one project category is not necessarily the ‘best practice’ in another category.
- Improve risk management methods: At a general level risk management is very much the same across all project categories. However, as one moves into the details significant differences in the sources of risk and methods for mitigating them emerge.
• Evaluate organizational PM maturity: It is obvious from an examination of the PM literature that there are great differences in the basic maturity of the PM discipline itself when one compares one basic project category with another. The maturity of any organization will likewise vary considerably between one category and another. To assign an overall maturity rating to any organization without specifying which project category is involved has little practical significance. See current research in this area at http://www.maturityresearch.com/.

• Link success and failure factors: The factors that are important to success or failure in one project category are, in many cases, very different from those in another project category.

• Select tools and approach: The PM ‘toolbox’ is very large and varied. No-one will try to apply each and every PM tool, technique, ‘best practice,’ method, or system to each and every project for which they hold responsibility.

• Other: Additional purposes and uses of effective project categorization can surely be identified.

Project Management Education, Training, and Certification: PM education, training, and certification is a very big business throughout the world. However, many of the courses and programs are ineffective in actually developing and certifying skilled project managers for specific types or categories of projects. Use of practical project categorization methods in this area include:

• Improve/focus educational and training courses: It is obvious that, if the arguments given above are valid, more specific educational and training courses for defined project categories will result in the wider use of ‘best practices’ developed for those categories.

• Develop specialized case studies: Case studies related to each of the agreed project categories will be more effective in the focused educational and training courses and programs.

• Organize speaker tracks at congresses: One of the major problems for participants in large congresses on PM is how to choose which speaker track to attend. With tracks focused on specific project categories, this problem will be reduced significantly.

• Develop specialized certification of project managers: The most popular current PM certification programs (PMI and IPMA) purport to certify individuals in some aspects of PM without regard for any specific project categories.

• Develop specialized certification of PM support positions: Certification of project estimators and schedulers, as examples, for large engineering design and construction projects will require proof of very different knowledge, skills and capabilities than the equivalent support positions in research and development, new product development, or software development projects.

• Develop PM career paths for individuals: Career planning and development of PM career paths differ widely for many of the basic project categories that can be identified.
• Other: Certainly there will be other purposes and uses related to people development of a systematic definition of project categories.

Prioritizing Purposes and Uses: Each organization will benefit from examining the various purposes and uses that are important to them, and determining which purposes are the most important for their strategic growth. Then they can determine which of the several methods of categorization make the most sense within their political, business and economic environment.

Rather than elaborating and making the list of purposes and uses longer and more complex, it is recommended that efforts be directed to consolidating and simplifying them as much as possible.

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):

<table>
<thead>
<tr>
<th>Category level</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Major category</td>
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<tr>
<td>Sub-category 2</td>
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<tr>
<td>Sub-category 3</td>
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<tr>
<td>Sub-category 4</td>
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Recommended Categories and Sub-Categories: Eleven recommended basic project categories are listed in Table 1, plus a twelfth category for all others, oriented primarily to products of the projects. Projects within each of these specific categories 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 most of these 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. 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.

<table>
<thead>
<tr>
<th>Project Categories:</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>Each having similar life cycle phases and a unique project management process</td>
<td></td>
</tr>
<tr>
<td>1. <strong>Aerospace/Defense Projects</strong></td>
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<tr>
<td>1.1 Defense systems</td>
<td>New weapon system; major system upgrade.</td>
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<tr>
<td>1.2 Space</td>
<td>Satellite development/launch; space station mod.</td>
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<td>1.3 Military operations</td>
<td>Task force invasion</td>
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<tr>
<td>2. <strong>Business &amp; Organization Change Projects</strong></td>
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<tr>
<td>2.1 Acquisition/Merger</td>
<td>Acquire and integrate competing company.</td>
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<tr>
<td>2.2 Management process improvement</td>
<td>Major improvement in project management.</td>
</tr>
<tr>
<td>2.3 New business venture</td>
<td>Form and launch new company.</td>
</tr>
<tr>
<td>2.4 Organization re-structuring</td>
<td>Consolidate divisions and downsize company.</td>
</tr>
<tr>
<td>2.5 Legal proceeding</td>
<td>Major litigation case.</td>
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<tr>
<td>3. <strong>Communication Systems Projects</strong></td>
<td>Microwave communications network.</td>
</tr>
<tr>
<td>3.1 Network communications systems</td>
<td>3rd generation wireless communication system.</td>
</tr>
<tr>
<td>3.2 Switching communications systems</td>
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<tr>
<td>4. <strong>Event Projects</strong></td>
<td>2004 Summer Olympics; 2006 World Cup Match.</td>
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<tr>
<td>4.2 National events</td>
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<tr>
<td>5. <strong>Facilities Projects</strong></td>
<td>Closure of nuclear power station.</td>
</tr>
<tr>
<td>5.1 Facility decommissioning</td>
<td>Demolition of high rise building.</td>
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<tr>
<td>5.2 Facility demolition</td>
<td>Process plant maintenance turnaround.</td>
</tr>
<tr>
<td>5.3 Facility maintenance and modification</td>
<td>Conversion of plant for new products/markets.</td>
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<tr>
<td>5.4 Facility design/procurement/construction</td>
<td>Flood control dam; highway interchange.</td>
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<tr>
<td>Civil</td>
<td>New gas-fired power generation plant; pipeline.</td>
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<tr>
<td>Energy</td>
<td>Chemical waste cleanup.</td>
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<tr>
<td>Environmental</td>
<td>40 story office building.</td>
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<tr>
<td>High rise</td>
<td>New manufacturing plant.</td>
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<tr>
<td>Industrial</td>
<td>New shopping center; office building.</td>
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<tr>
<td>Commercial</td>
<td>New housing sub-division.</td>
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<tr>
<td>Residential</td>
<td>New tanker, container, or passenger ship</td>
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<tr>
<td>Ships</td>
<td></td>
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<tr>
<td>6. <strong>Information Systems (Software) Projects</strong></td>
<td>New project management information system. (Information system hardware is</td>
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<td></td>
<td>considered to be in the product development category.)</td>
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</tbody>
</table>
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)

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 play or music event

New motion picture (film or digital).
New TV episode.
New opera premiere.

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)

New desk-top computer.
New earth-moving machine.
New automobile, new food product.
New cholesterol-lowering drug.
New life insurance/annuity offering.

10. Research and Development Projects
10.1 Environmental
10.2 Industrial
10.3 Economic development
10.4 Medical
10.5 Scientific

Measure changes in the ozone layer.
How to reduce pollutant emission.
Determine best crop for sub-Saharan Africa.
Test new treatment for breast cancer.
Determine the possibility of life on Mars.

11. Healthcare Projects

Major surgical procedure.

12. 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 – with addition of Category 11.]

Classifying Projects Within Categories and Sub-Categories: A wide range of projects within each project category or sub-category exists in large organizations. It is 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 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.

**Major and Minor Projects Within a Category:** It is useful to identify at least two classes of projects within each category. 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.

**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.

“Mega” **Projects or Programs** are extremely large, complex projects (usually programs, in fact) 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.

“**Commercial or Delivery**” Versus “**Transformational**” Projects: It is important to differentiate between commercial (or standard, somewhat repetitive) projects and transformational projects (and programs) that create strategically important changes to the organization, which are often enterprises within the enterprise and include both projects and on-going operations.

4. 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.

**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.

**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, together with an appropriate number of decision points (approval, go/kill, go/hold) in each.

**5. CONCLUSIONS**

1. Different project categories require different governance, management, planning, scheduling and control 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
   - 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, materials, and case studies
- Developing specialized PM software applications
- Certifying project managers and PM support 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.

References


