

THE WORLD OF PROJECT MANAGEMENT - A TAXONOMY

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1. Abstract

This paper presents a taxonomy or classification system to divide the World of Project Management into a variety of categories or parameters based on key characteristics. In effect it provides a Work Breakdown Structure for Project Management itself. The five basic categories are; [1] type of project, [2] sector or industry, [3] subject or topic, [4] phase of the life cycle and [5] geography. The taxonomy or classification scheme is a communications tool with many uses such as organizing conferences, outlining books and aiming advertising at the right customer.

2. Introduction-The Problem

The World of Project Management is complicated because projects are temporary systems that cut across several dimensions including normal administrative boundaries. Anyone involved in a project has interests in several of the different parameters. For example the current stage of a project is within some phase of the project life cycle. The project is at a certain geographical location or locations. The organization owning the project fits within a sector or industry of the economy. The project is for a certain purpose with a specific type of work and involves one or more functional units or departments of the organization. And finally the particular work that a person does on project management at a certain time would fall within a general list of subjects or topics such as CPM network planning, cost control or resource allocation. The project management profession has had difficulty communicating with itself because the profession does not have an agreed scheme of classification that is fully inclusive and mutually exclusive. The Project Management Institute Body of Knowledge [PMBOK] was an attempt in this direction but it has been criticized by many in the profession. One purpose of this paper is to contribute to the ongoing process of revising the PMBOK.

The key point is that the classification system needs to be multi-dimensional to handle the various parameters mentioned above. A useful model for displaying three of these dimensions is the cube. [Exhibit 1] Also helpful is a

-1-

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matrix relating the stages of the project life cycle to the different purposes or end results of a project as shown in Exhibit 2. This paper will look at each of these dimensions in turn.

3. Project Life Cycle

The concept of the project life cycle is well understood. Different organizations and different type projects will naturally use different terms for the various stages or phases but the basic concept is the same. Obviously the nature of the work will be different in the different stages of the cycle.[Exhibit 2]

Phases of the Project Life Cycle

INITIATION DEFINITION IMPLEMENTATION COMPLETION

Manufacture or

Research-Feasibility-Design-Construction -Operations

4. Sector or Industry

Everybody in project management works in some sector or industry. Every project takes place within a sector or industry. There is a Standard Industrial Classification system with code numbers [SIC] published by the US Government Office of Management and Budget in 1987. A similar system is used by the United Nations agencies. There are 11 basic groupings as follows.

- 01 to 09 Agriculture, Forestry, and Fishing
- 10 to 14 Mining
- 15 to 17 Construction
- 20 to 39 Manufacturing
- 40 to 49 Transportation, Communications, Electric, Gas, and Sanitary Services
- 50 to 51 Wholesale Trade
- 52 to 59 Retail Trade
- 60 to 67 Finance, Insurance, and Real Estate
- 70 to 89 Services
- 91 to 97 Public Administration
- 99 Nonclassifiable Establishments

Under each basic grouping there are sub-groups. For example under Manufacturing there are groups for food, textiles, chemicals and industrial machinery. A shopping mall will fall under retail trade. The construction company building the mall will be in the Construction

group. An electric power plant will be under Electric. [SIC 49] Aerospace is a special industry sub-category under the manufacturing sector. The client in aerospace/defense is under the Public Administration sector.

5.Type of Project

The most important breakdown and the one that seems to be most difficult to understand is the breakdown by type of project. This seems to be because many people experience only one or two different types of projects and they do not have a background from which to generalize. The type of project is based on the specific objective[end product] and specific type of work involved such as research, construction, development of software or maintenance of an oil refinery. The breakdown by type of project is important because the similarity is greatest within a similar type of project. For example projects to develop new computer software systems will be very similar whether they are in the banking, construction or manufacturing industries. The type of project seems to also relate to the Business Function or Department involved as shown on the following chart.

TYPE OF PROJECTS	FUNCTION OR DEPARTMENT
Research	Research
Engineering Design	Engineering
Construction	Facilities
New Product Development	several
Marketing	Marketing
Installation of Major Equipment	Manufacturing
Development of Computer Software	Info Systems
Implementation of Major Systems	?
Maintenance [continuous process]	Maintenance
Administrative	Administration
Major Events [olympics]	?
Relocation/Moves	Facilities
Organizational Development	Personnel ?
Management Services	Management?
General/Misc. N.E.S.	?
Aerospace/ Defense [Manufacture of major one of a kind equipment]	

Aerospace projects may be a sub-category under new product development for the manufacture of major one of a kind equipment under the defense contracting type of business.

One way to organize such a long list is to group the type

of projects into fewer general categories as shown on Exhibit 2. These six categories are based on the purpose or end result of the project as follows:

1. FACILITIES and WORKS
2. PRODUCTS
3. SYSTEMS
4. PROCESSES
5. ORGANIZATIONS
6. EVENTS

Exhibit 2 illustrates several important points. The definition of a program, project or sub-project depends on whose viewpoint is considered. The entire life cycle of a project can be called a project or each phase such as construction can be called a project. Any one of the six basic types of project can take place in any of the sectors or industries. The breakdown of the stages or phases of the life cycle relates quite closely to organizational breakdowns by functional department such as engineering, marketing and facilities. One project can include one or more or even all of the six types of end results. For example a telecommunications system project could include construction of facilities, development of computer software, training of staff and a key event of switchover. Finally a project can be defined as the whole program of the life cycle from start to finish or as just one or more of the phases such as construction.

The nature of each of these different types of projects is different. For example construction projects are well defined with long histories of experience to improve estimating. On the other hand research and computer software projects are by nature often ill defined, unique and difficult to estimate. Maintenance projects such as electric utility outages are intense short term [6 to 9 weeks] projects where one day of downtime could cost more than \$200,000. Engineering projects involve knowledge workers while construction involves blue collar workers. It is very important that the Project Management Profession recognize these differences in the nature of the different type projects. The key to the definition of the type of project is the actual content of the work.

The definition of what are the different types of projects or sub-projects must include a combination of both the end result or end product and the function or process [phase of life cycle] involved such as design or construction. For example from Exhibit 2 the design of a new product or the

programming of a software system are defined as projects or sub-projects.

6. Subjects/Topics

The subjects/topics of project management are the many different methodologies involved in the processes of managing projects. This section will provide some examples and a classification scheme for the many different subjects but there is not enough room in this paper to lay out a complete system.

The recommended classification system is a matrix of the processes of project management on the vertical axis and the four basic variables of time, cost, performance and resources on the horizontal axis as follows.

PROCESSES	PARAMETERS			
	PERFORMANCE	TIME	COST	RESOURCES
DEFINE OBJECTIVES	[SCOPE/QUALITY]			
ORGANIZE PEOPLE				
PLAN ACTIVITIES				
SCHEDULE RESOURCES				
CONTROL PROGRESS				

This model is somewhat different from the PMI PMBOK. It is based on the principle that scope, time, cost and resources must be integrated rather than separated. It is also organized by the processes of project management in a chronological order of defining, planning, scheduling and control. Resources are listed separately from money because money can not always buy resources.

The following table will list the subjects of project management in more detail but it still is just a sample. This is an area where more work is needed and all of us can contribute to developing an all inclusive classification system.

Processes	Parameters			
	Performance	Time	Cost	Resources
Define Objectives and Scope				
Project Environment				
Organize People				
Organizational Structure				

- Project Manager Role
- Plan Activities
 - Project Breakdown Structure
 - Project Plan
 - Bar Charts
 - Critical Path Networks
 - Computerized CPM
 - Project Budgets
 - Risk Analysis
 - PERT
- Schedule Resources
 - Project Schedule
 - Resource Allocation
- Manage People
 - Communication and Perception
 - Motivation
 - Personality and Management Style
 - Power, Authority and Influence
 - Leadership
 - Teamwork and Group Dynamics
 - Conflict Resolution
 - Trust
- Control Progress
 - Reporting Systems MIS
 - Cost Control
 - Accounting
 - Management Systems
- Procurement
 - Contracts
 - Legal
- Project Termination
- Implementing Project Management
 - Training in Project Management

This list includes all of the general categories of the PMBOK but in a matrix form. For example a contract must cover the four variables of scope, time, cost & resources.

7. Conclusion

This paper has proposed a four way matrix or classification system for the taxonomy of Project Management. A fifth dimension would be geographical but that is self explanatory. The field of project management needs to be thought of as a multi-dimensional matrix. For example there are construction projects in all industries or sectors. The subject of computerized CPM planning systems is relevant in all construction projects in all industries.

It is also relevant for all types of projects in all categories of industries. The same is true for other subjects or topics. The project life cycle is another breakdown that must be considered. For example the subject of feasibility studies would fall under the phase of project initiation.

The important point to remember is that the specific nature of the work on projects will be different based on where the project fits in this four way matrix by type of project, industry, phase and subject.

8. References

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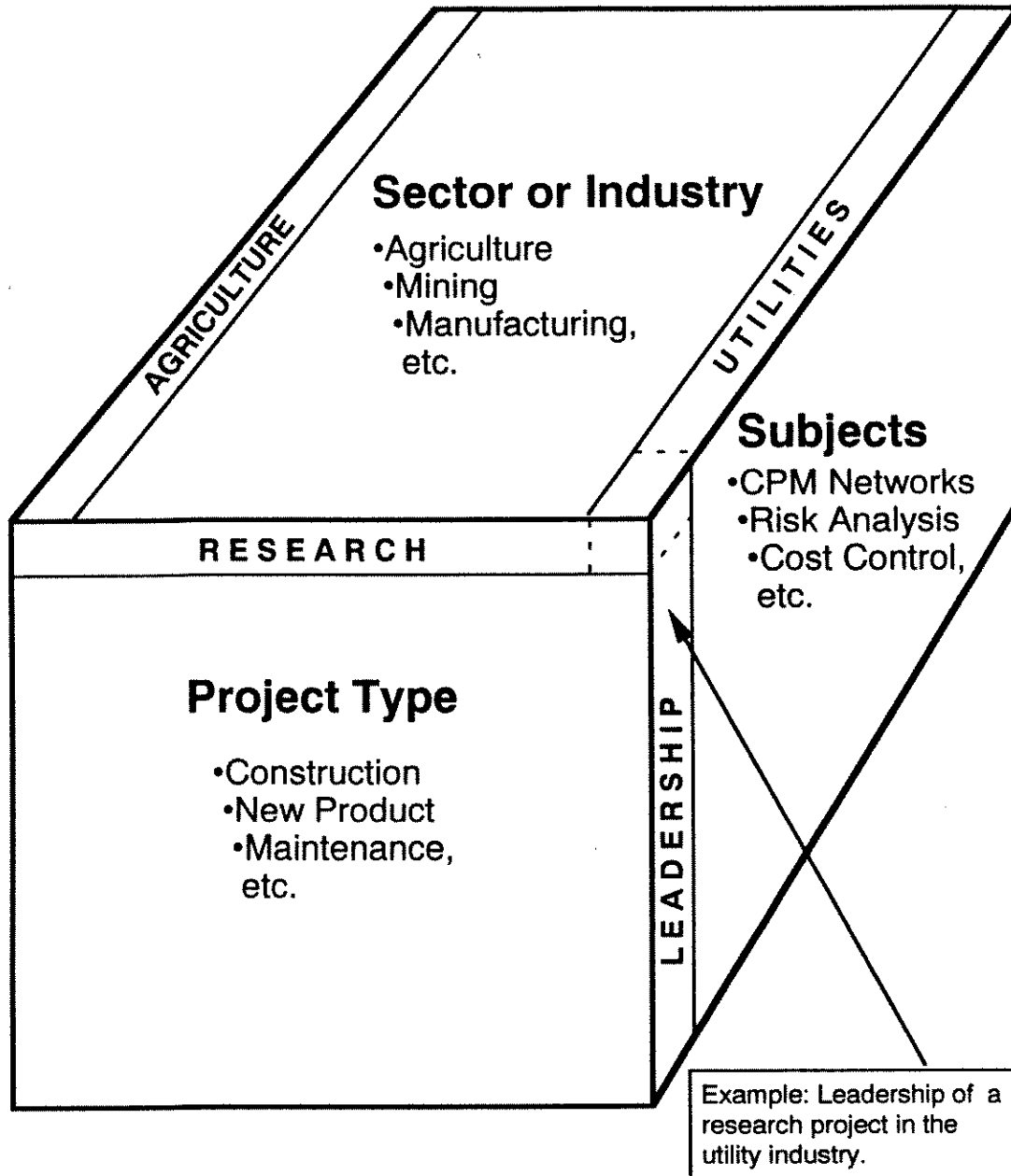
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Project Management Cube

EXHIBIT 1



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The Definition of Projects and Sub-Projects

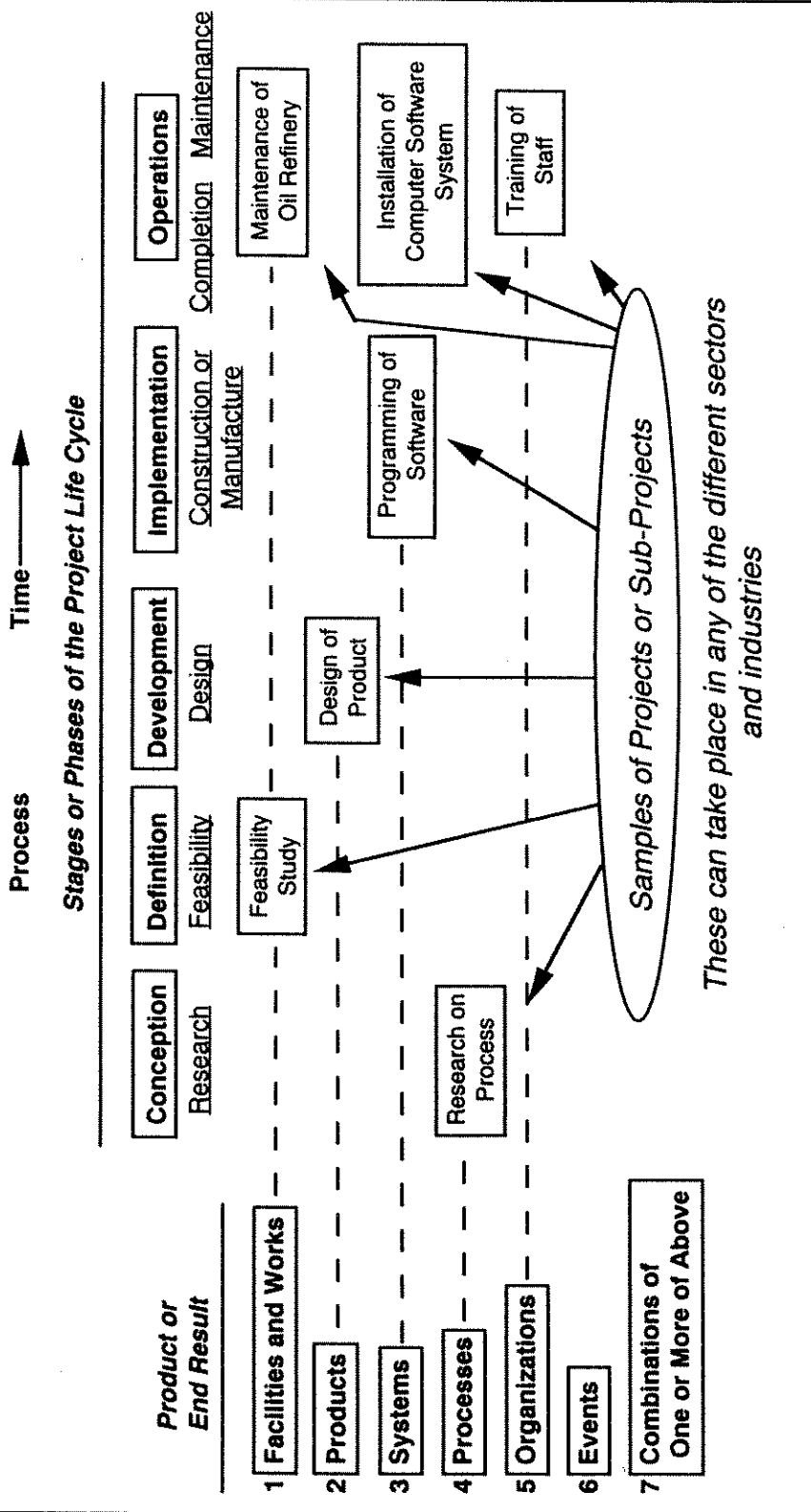


EXHIBIT 2