Scuola universitaria professionale della Svizzera italiana
Dipartimento tecnologie innovative
Istituto CIM per la sostenibilità nell'innovazione

SUPSI

The Six-Phase Comprehensive Project Life Cycle Model

Including the Project Incubation/Feasibility Phase and the Post-Project Evaluation Phase

Russell D. Archibald

We hope you have or will read our paper

- Download this rather long paper at http://pmworldjournal.net/volume-i-issue-v-december-2012/

Origin of this Paper

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- **Ivano Di Filippo**

  – In charge of GenialSoftware, Certified PM and Member, *Istituto Italiano di Project Management/ISIPM*; in charge of human resources in the Operations Center of *Radiotaxi 3570 Roma*, Italy

- **Daniele Di Filippo**

  – ISIPM member, IT/Engineering Graduate Student at *Roma3 University*

My Background

- BSME 1948, MSME 1956, PhD (Hon) 2005
- 3 careers:
  - USAF Senior Pilot/Aerospace 15 years
  - Corporate Executive (Exxon, Bendix, ITT) 15 years
  - Consultant in project management 35 years, clients in 16 countries on 4 continents
    - Expert witness: Trans-Alaska Pipeline, 5 nuclear power plant projects
- Author, Speaker, Teacher:
  - 5 books (Italian, Japanese, Chinese, Russian), 12 chapters in 9 other books, 85 papers at international conferences, courses at UCLA, MIT
  - PM seminar/workshops for thousands of men and women in many countries

The authors acknowledge the positive comments and criticisms by:

- Wayne Abba
- Franco Caron
- Prof. Gianluca Di Castri
- Prof. Dr. Jean-Pierre Debourse
- Prof. Dr. Harold Kerzner

- Prof. Dr. Stanislaw Gasik
- David Pells
- Dr. Darci Prado
- Bob Prieto, and
- Prof. Jorge Tarazona

Presentation Outline

1. Introduction

- Systems thinking
- Scope of "project management"
- Importance of models and some examples

2. Origins of Projects

- Project-driven vs project-dependent organizations
- Delivery vs strategic transformational projects
- Incubation/feasibility project phase

3. Evaluating Projects and Project Results

- Post-project evaluation phase
- Project success vs project value

4. Conclusion and Recommendation

Part 1. Introduction

Systems thinking

Scope of "project management"

Importance of models and some examples

Systems Thinking

A holistic systems perspective of projects and programs is required today to achieve the full benefits of systems thinking in project management.

- Senge, Peter M. (1990), **The Fifth Discipline**, Doubleday/Currency;

- Gharajedaghi, Jamshid (1999), **Systems Thinking: Managing Chaos and Complexity**, Burlington, MA: Butterworth-Heinemann.

Two New Project Life Cycle Phases are Required

To achieve this perspective we need a **Comprehensive Project Life Cycle** definition for application on all important projects.

This Model recognizes a **Project Incubation/Feasibility Phase** prior to the Project Starting Phase, and also a **Post-Project Evaluation Phase** after the standard Project Close-out Phase.

When Does Project Management Start and End?

Scope of 'project management':

- **Traditional scope includes start-plan-execute-closeout phases, but**
- **Projects begin their existence before the traditional start phase and their products continue to exist and must be evaluated after the projects are closed out.**

These 2 new phases must be recognized as belonging within the domain of project management.

Importance of Models

> ## We use models in every walk of life:

- Physical scale models
- Graphic models: drawings, photos, 2 or 3 dimensions, animation
- Information models: words, numbers, equations, project plans, computer simulators, contracts
- "What is your business model?"

> ## "A small replica of the real thing"

Predictive Life Cycle Models

Predictive life cycle models *"favor optimization over adaptability"* (Desaulniers and Anderson 2002):

- **Waterfall** (also known as traditional): linear ordering of the phases, which can be strictly sequential or overlapping to some extent; no phase is normally repeated.
- **Prototyping:** functional requirements and physical design specifications are generated simultaneously.
- **Rapid Application Development (RAD):** based on an evolving prototype that is not thrown away.
- **Incremental Build:** decomposition of a large development effort into a succession of smaller components.

PMI Standard 4 Phase Project Life Cycle Model
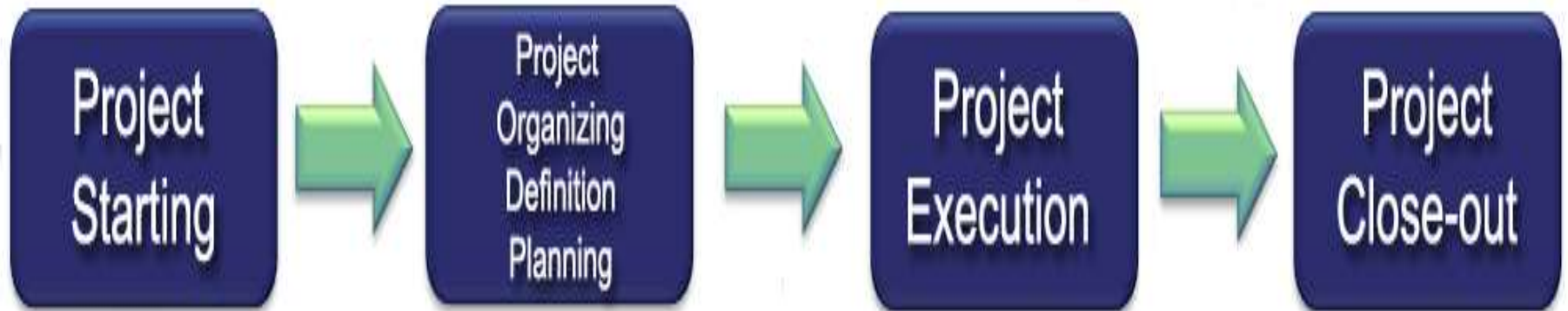
**Figure 1. Typical current "standard" top level
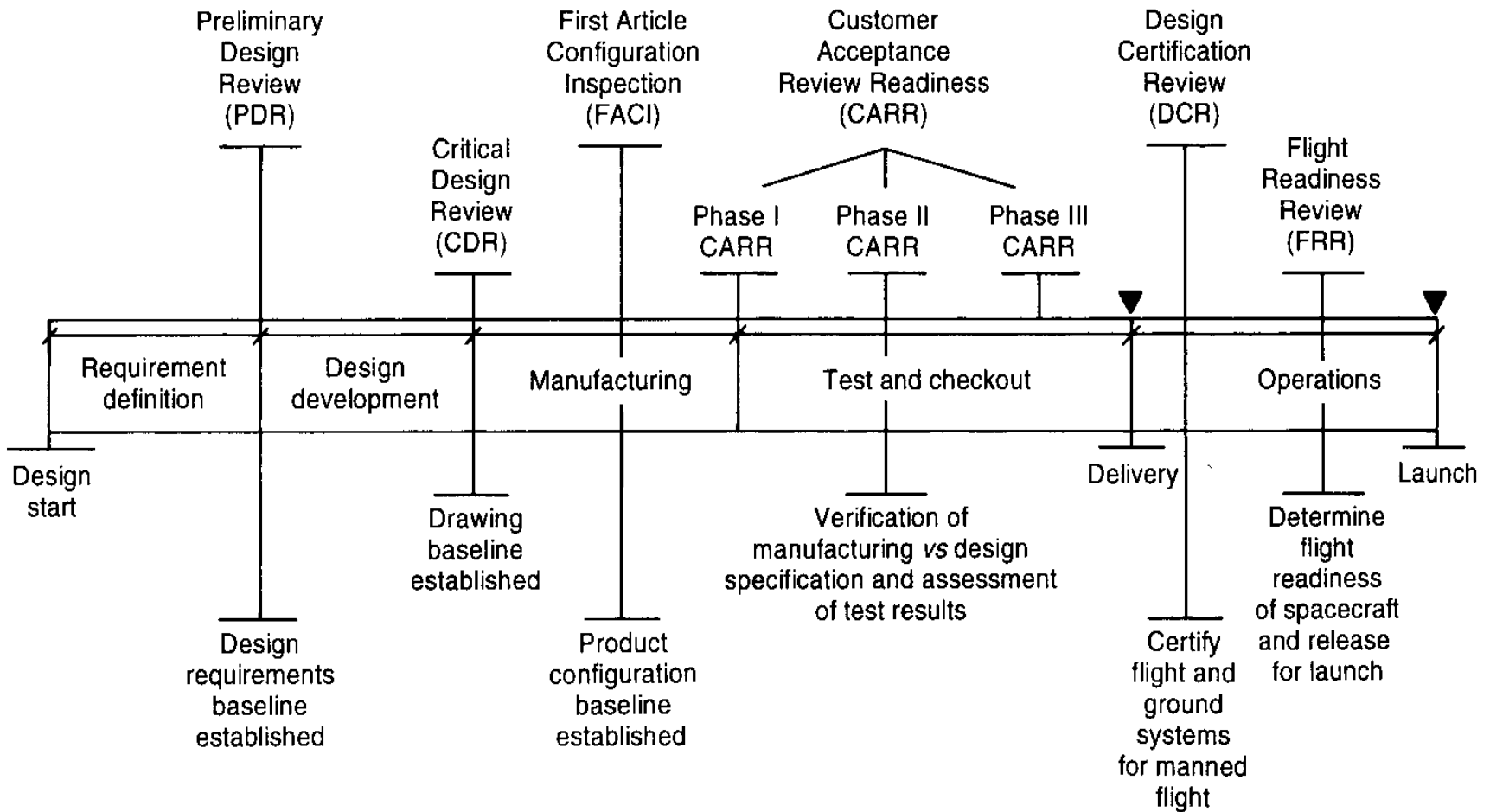project life cycle model.
(PMIa 2008, p 16)**
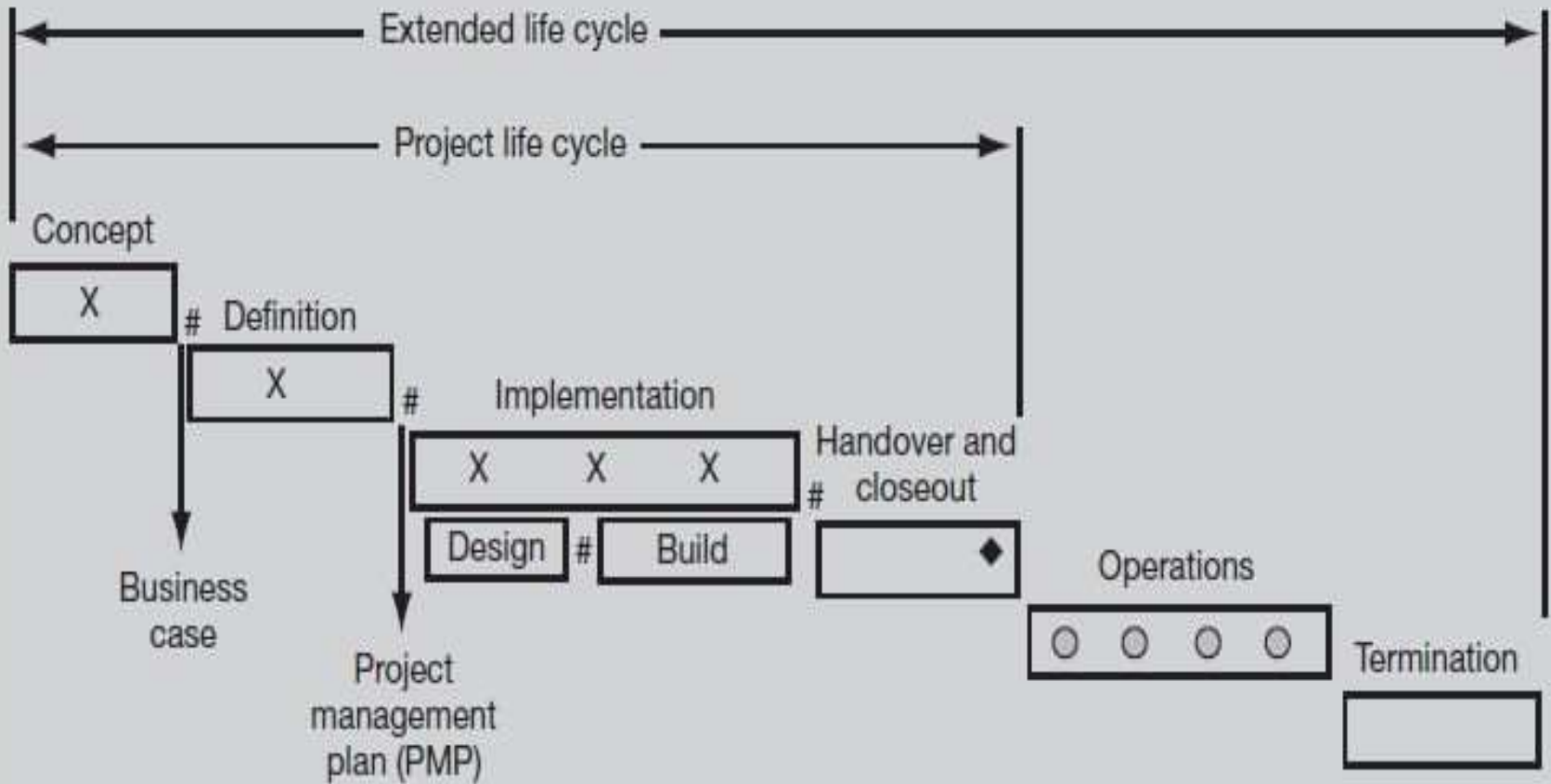
Figure 2. A second "standard" project and extended life cycle model. (APM 2006 p 80.)
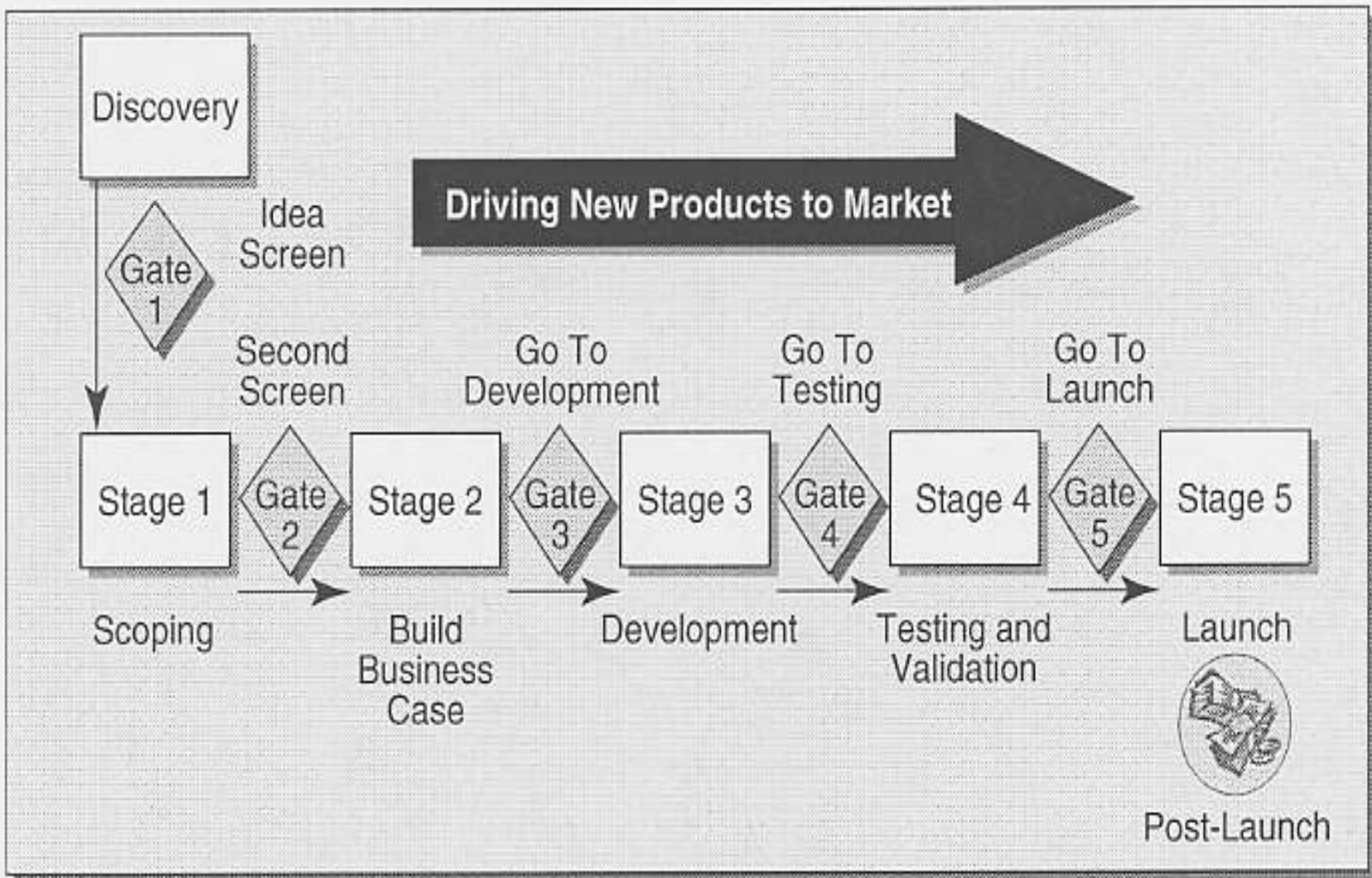
Figure 3. NASA's Project Life Cycle Process. See
http://spacese.spacegrant.org/uploads/Project%20Life%20Cycle/PPF_WallChart_color.pdf
for a very detailed wall chart that expands this simplified version.
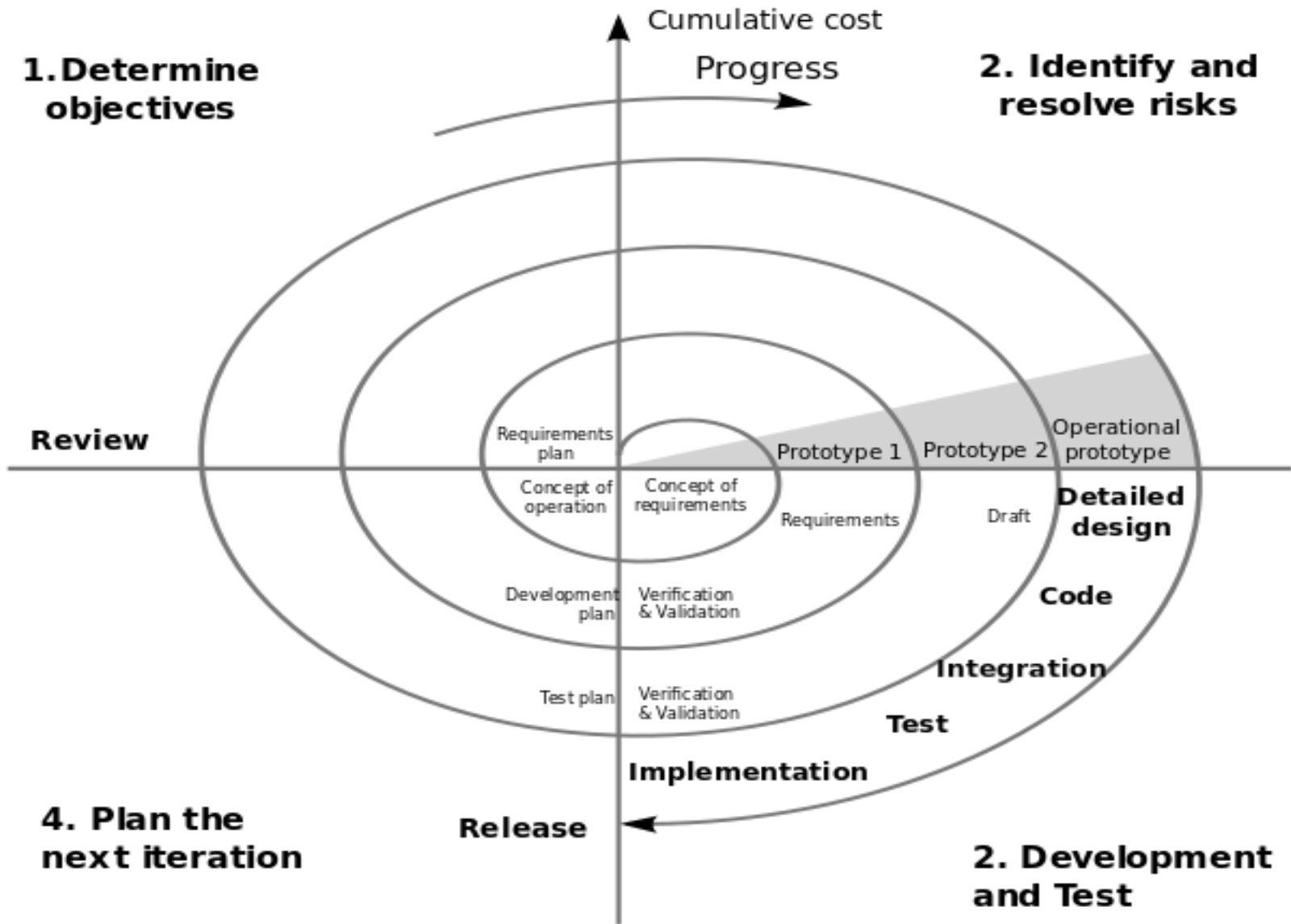
Adaptive Life Cycle Models

Adaptive life cycle models *"accept and embrace change during the development process:"*

- **Adaptive Software Development/ASD:** Mission driven, component based, iterative cycles, time boxed cycles, risk-driven, and change-tolerant. IBM Rational Unified Process (RUP) (Ref. Appendix B), is a good example.

- **Spiral:** Repetition of the same set of life-cycle phases such as plan, develop, build, and evaluate until development is complete.

- **Extreme Programming/XP:** Teams of developers, managers, and users; programming done in pairs; iterative process, collective code ownership.

- **Agile and SCRUM:** Similar to above adaptive life cycle models with iterations called "sprints" that typically last one week to 30 days with defined functionality to be achieved in each sprint.
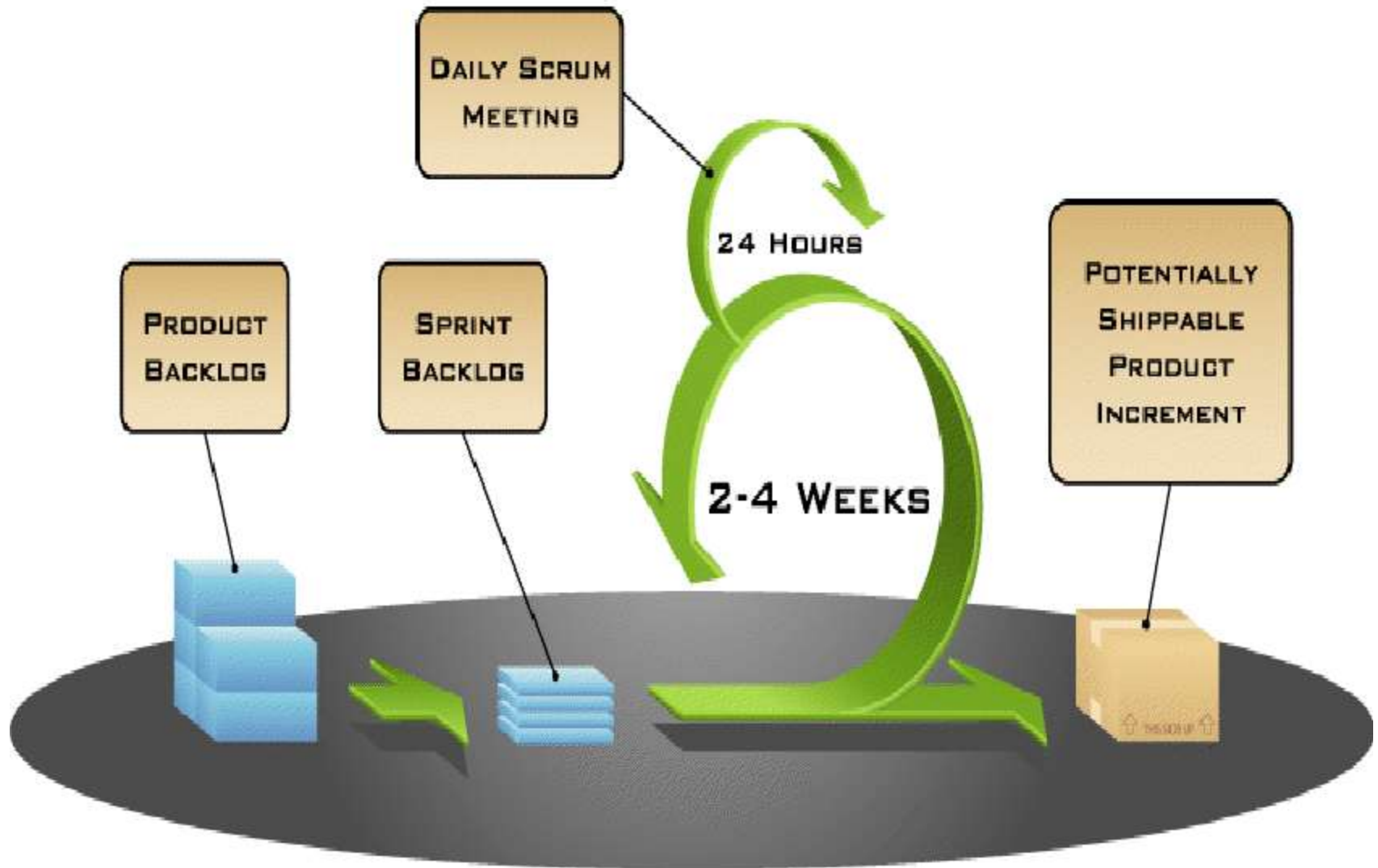
Figure 4. Overview of a typical Stage-Gate™ project life cycle process for new product development. Source: Robert G. Cooper et al, Portfolio Management for New Products (Cambridge, MA, 2001), p. 272.

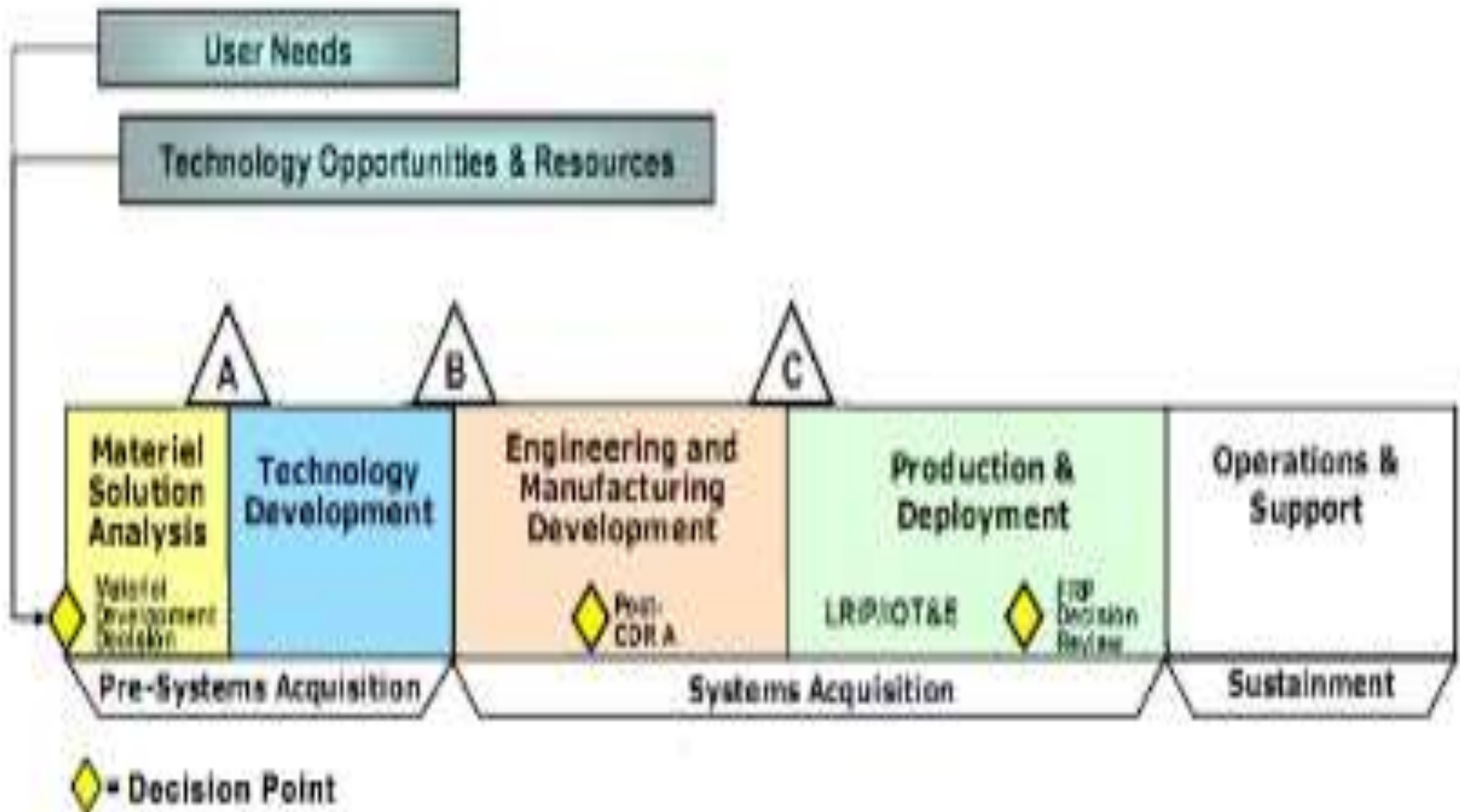**Figure 5. Spiral software development project life cycle model.**
Source: http://commons.wikimedia.org/wiki/Category:
Spiral_model_of_Boehm?uselang=en

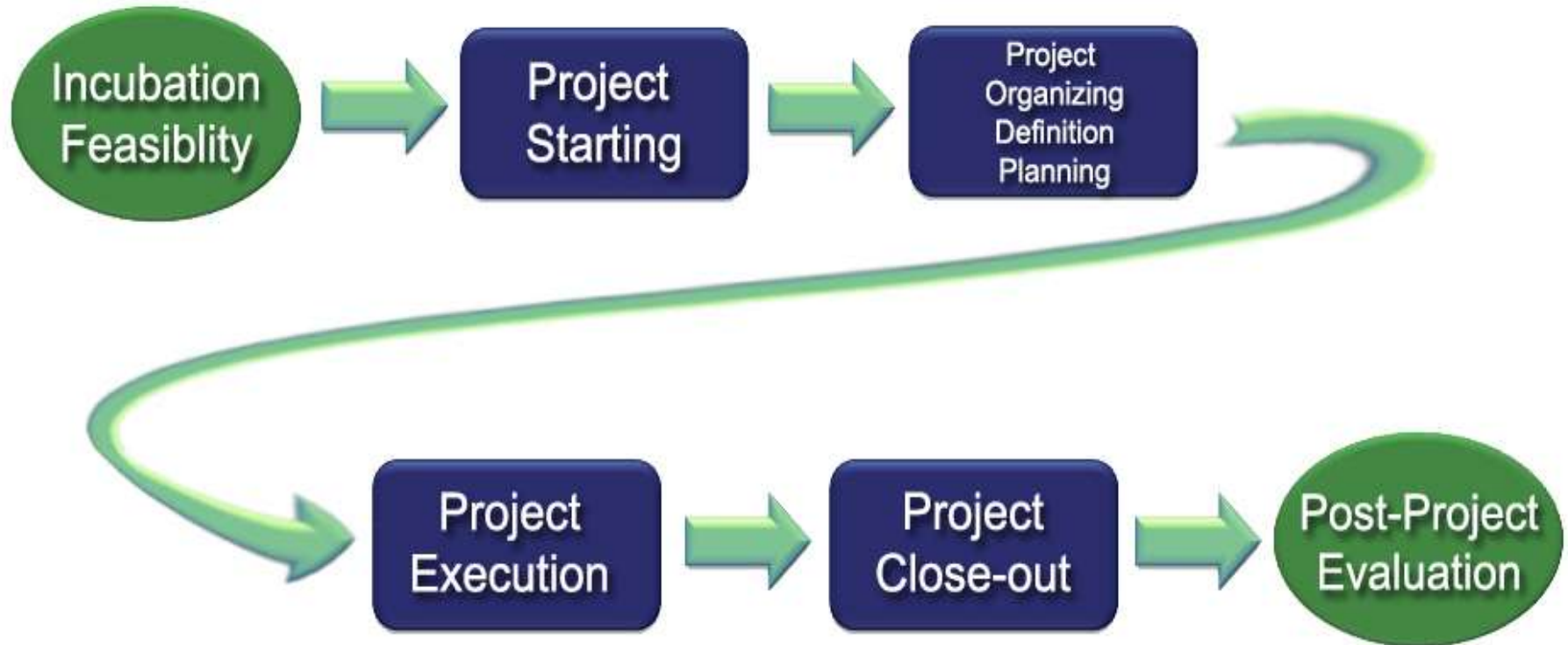**Agile Life Cycle Model (Partial)**

COPYRIGHT © 2005, MOUNTAIN GOAT SOFTWARE

**Figure 6. United States DoD 5000
Defense Acquisition System Life Cycle**
Source: DoD Defense Acquisition System

Proposed Comprehensive Model

Project versus Product Life Cycle Management and Models

Standard **project life cycle** comes to an end when the project close-out phase is complete.

Product life cycle begins when the product begins to be used, sold or placed in operation, to produce the benefits that justified the project in the first place.

For **consumer products** the product life cycle has five phases: introduction, growth, maturity, decline, and termination.

Other Product Life Cycle Examples

Petrochemical processing plant: commissioning, **operation, decommissioning**, and **demolition**

IT software project: commissioning, operation, and **decommissioning** .

With **agile project management** there will often be a long period of continuous improvement during the project execution phase overlapping with system commissioning.

Improved Success in PPPM Depends on Two Desirable Goals

Definition of the Comprehensive Project Life Cycle Models for both the transformational and the delivery projects and programs within an enterprise; and

The proper and effective use of Information Technology (IT) with Business Process Management (BPM) plus Project, Program and Portfolio Management (PPPM.)

Purposes of Project Life Cycle Models are to:

Enable all persons to understand the processes to be followed throughout the life of the project.

Capture and document the best experiences so that the processes within each project phase can be improved continually and applied on future similar projects.

Purposes of Project LC Models (Cont'd)

Enable all the project roles and responsibilities and the project controls **methods and tools** to be appropriately related to the overall project life cycle management process;

- This includes most importantly assigning qualified persons to the roles of Project Executive Sponsor and Project Manager at the proper points in the project life cycle.

Enable the effective application of project management software application packages that are integrated with all appropriate corporate information systems.

Application of Systems Thinking

Well-documented project life cycle models enable us to apply **systems thinking** to creating, planning, scheduling, and managing the project through all of its phases, and to evaluating the success and the value of both the project and the results that the project has produced.

Bob Prieto says:

"Often a barrier to effective lifecycle management is a split responsibility within an owner's organization for CAPEX [capital expenditures], OPEX [operations expenditures], and sales. Another barrier to lifecycle management systems is often corporate accounting systems which do not provide a total cost of ownership picture that includes initial studies, CAPEX, OPEX, cost of sales and financing costs."

Franco Caron says:

"I think that an extended view of the project life cycle is necessary. … Since I deal with large engineering projects, in any case projects with an external client, at the outset of the project I introduce the distinction between proposal phase (something like project incubation) and project phase (articulated in the classical stages) separated by the contract signature. During the proposal phase the project configuration is fluid and during project execution is fixed by project constraints. From the point of view of incubation phase, a distinction between internal and external projects is necessary."

Gianluca Di Castri says:

"In my opinion, all matters relevant to project management and controls will be extended in the next years in two different directions: horizontally including on one side the strategic phase and on the other side **the complete life cycle of the project**, until its dismissal or revamping, as well as vertically, to include multi-project, programme and, in some cases, portfolio management...."

Jorge Tarazona says:

"I think that your work is a very important contribution to the holistic and systems thinking approach applied to Project Management. I totally agree that it is very important to develop detailed life cycle models for each specific project category."
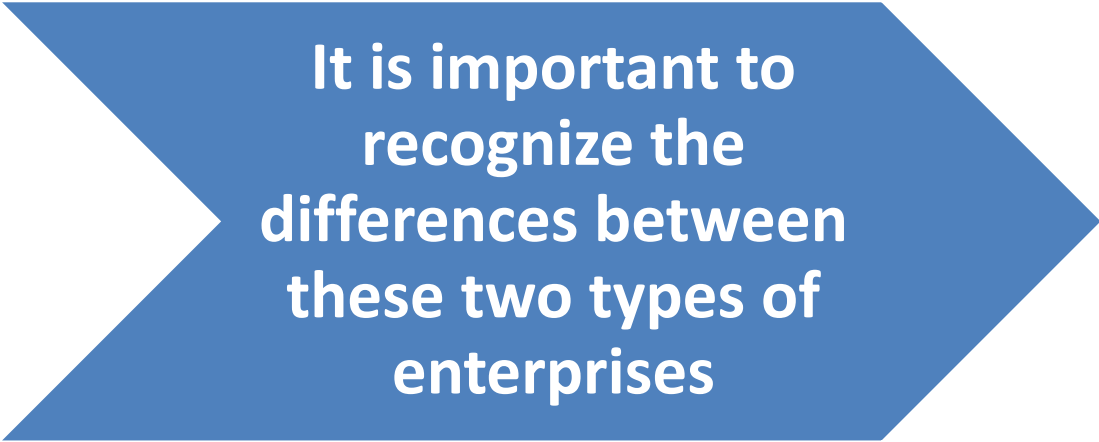
Part 2. Origins of Projects

Project-driven vs project-dependent organizations

Delivery vs strategic transformational projects

Incubation/feasibility project phase

Project-Driven and Project-Dependent Organizations

It is important to recognize the differences between these two types of enterprises

They usually exhibit widely different levels of maturity in their project management capabilities

How they Differ

Project-Driven Organizations:

- Rely on projects for normal revenue.
- Are usually mature in the management of their "delivery" projects.
- May be less mature in management of transformative programs and projects.
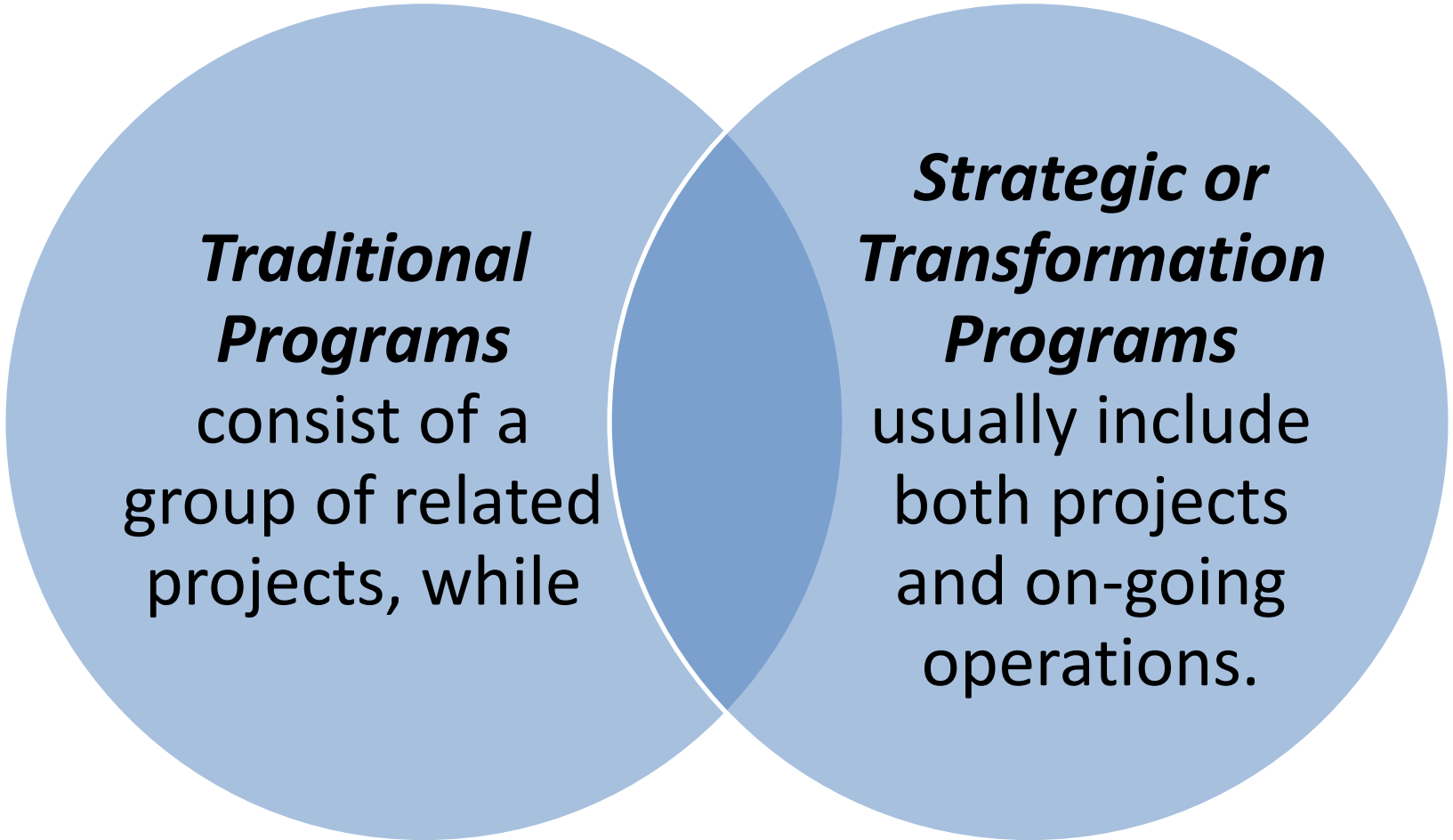
Project-Dependent Organizations:

- Derive most of their revenues from selling products or services.
- Rely on innovative projects for expansion: new/improved products or processes.
- Often employ Project-Driven organizations for specific needs.

Two Kinds of Projects

Delivery (Commercial) Projects produce or deliver benefits within the growth strategies of the enterprise.

Strategic Transformational Projects produce significant changes in the enterprise, its products, or its business processes.

Two Kinds of Programs

Traditional Programs consist of a group of related projects, while

Strategic or Transformation Programs usually include both projects and on-going operations.

A Practical Set of 12 Project Categories:

1. **Administrative and Organizational Change**
2. **Aerospace/Defense**
3. **Communication Systems**
4. **Events**
5. **Facilities**
   5.1 Facility decommissioning
   5.2 Facility demolition
   5.3 Facility maintenance and modification
   5.4 Facility Design-procurement-construction

Some separate facilities design and construction into two separate categories, but these must be closely integrated on one facility.

6. **Information Systems/IT**

7. **International Development**
8. **Media & Entertainment**
9. **Product and Service Development**
   9.1 Industrial product
   9.2 Consumer product
   9.3 Pharmaceutical product
   9.4 Service (financial, other)
10. **Research and Development**
    10.1 Environmental
    10.2 Industrial
    10.3 Economic development
    10.4 Medical
    10.5 Scientific
11. **Healthcare**
12. **Other Projects –** Disaster Recovery, others….

Definition of the Project Incubation/Feasibility Phase

The phase prior to initiation of the Project Starting Phase, during which the necessary information and "embryonic knowledge and understanding" of the potential project is collected, compiled, buffered, and analyzed sufficiently to enable a well-informed decision to proceed with initiation of the Project Starting Phase.

Kerzner: the Need for the Project Incubation/Feasibility Phase

"Perhaps the most challenging problem facing executives today is the determination of how much additional work they can take on without over-burdening the existing labor force. We refer to this as capacity planning.

Kerzner (Cont'd)

"Another important characteristic of the Incubation Phase is the determination of the availability of a qualified project manager for the project at hand. Regardless of the PM's years of experience and exposure to educational opportunities, not all project managers are equal in project management capability. The size, nature and complexity of the project should be used as a first look at the qualifications needed to manage such a project. This first look must also appear in the Incubation Phase."

When Does a Project Truly Start?

"Project Starting Phase" must begin with a reasonable understanding of what the principal objectives, scope, schedule, and cost of the project are expected to be, including:

- What the project will create;
- What benefits will be produced ;
- Verification that the project is aligned with the strategic plans ;
- A reasonable idea of the overall scope and expected time schedule and cost, and whether the needed money and other key resources will be available;
- Preliminary or conditional approvals and rights;
- Overall economic, technological, political, social, and physical feasibility under identified risks.

Basic Question

"Where does this initial 'embryonic knowledge and understanding' about the potential project come from?

Answer: The work and analysis performed and buffered during the Project Incubation/ Feasibility Phase of its life cycle model.

Origins of Projects

Projects are conceived and born differently for	• Delivery projects and • Strategically transformative projects
Within	• Project-driven and • Project-dependent organizations

Should Project Management Practices be Used Prior to the Project Start-up Phase? Peter Morris says:

"Two conclusions stand out from these two studies. One, that following the *PMBOK Guide®* elements may be sufficient to deliver projects properly in process and practice terms but probably is not enough to ensure that the project is successful. Two, that to do the latter one needs to concentrate more on the managing the front-end."

Peter Morris Continues:

"The reality, as shown by the results of two separate surveys, is that the overwhelming majority of practitioners polled believe that project management does apply in the pre-execution stages.

Peter Morris (Cont'd)

"We need to be voicing a view of the discipline which provides **a holistic approach** to managing projects, and programs, from their earliest stages to their last in order to deliver business benefit. I call this 'the management of projects'."

Unfulfilled Roles

The Project Executive Sponsor and Project Manager roles exist during the Project Incubation/ Feasibility Phase but often are not formally assigned.

Front End Loading (FEL)

- **Front End Loading (FEL) Phase** in Design/Procurement/ Construction Projects recognizes the importance of the Project Incubation/Feasibility Phase

- **Independent Project Analysis (IPA)** group (Norway): "FEL is the process by which a company (and project team) translates its marketing and technological opportunities into capital projects…. during the FEL phase, the questions of Why, What, When, How, Where and Who are answered.

- http://www.concept.ntnu.no/symposium/index.htm."

Corporate Strategy and the Incubation/Feasibility Phase

Prior to any important project beginning to take shape in the Project Incubation/Feasibility Phase, its genesis comes from the strategic decisions that have been made by the strategy managers of the organization.

Project Origins

Project Type > Organization Type	Commercial or Delivery Projects	Development or Transformational Projects
Project-Driven Organizations	**> Requests for proposals/RFPs** **> Project proposals** that comply with well-established strategic goals and are within the known capabilities **> Project Starting Phase** is not initiated until a contract is signed by both parties.	Statements below apply.
Project-Dependent Organizations	Few if any commercial/ delivery projects exist in these organizations. If so the above comments apply.	> Ideas **come from** strategic managers, marketing/business development, R&D, past customers, consultants. > When **the 'embryonic understanding' of the potential project** has been approved the project enters the Project Starting Phase.

March 20, 2013

Part 3. Evaluating Projects and Project Results

Post-Project Evaluation Phase

Project Success vs Project Value

Post-Project Evaluation Phase Definition

The Post-Project Evaluation Phase is devoted to the effort needed to first determining and then maintaining, improving, and even perfecting the ultimate success of the project in the following four dimensions:

Four Dimensions for Evaluating Project Success

1. The project from a project management viewpoint

2. The project's products and results

3. All project stakeholders' perspectives of both the project and its results

4. The overall project and its products from the project team cognitive performance perspective.

1. Project Management Dimension:

How closely did the project achieve the original objectives as defined in the Project Charter or Project Business Case?

Did the project meet the specified product specifications, budget, schedule, scope?

2. Product Dimension

How well does the product meet the Project Charter?

How well does the product achieve its Key Performance Indicators/KPIs?

What are the established Critical Success Factors (CSF) and how well does the product measure up against these?

Does the market like, buy and use the product?

3. Stakeholder Satisfaction Dimension:

What level of satisfaction or dis-satisfaction (accomplishment, enjoyment, pleasure, anger, conflict, frustration) exists in each of the project stakeholders?

These can be either positive or negative stakeholders.

Project Stakeholders Include

The project manager

Project core team members

Internal project executive sponsors

Functional contributors to the project and to its product

Owners of the final product of the project

Project Stakeholders (Cont'd)

Investors in the project and its products

Users and operators of the final product

Affected regulatory agencies

Communities (local, regional, and virtual) that are affected by the project and its products:

Success with Stakeholders

High

Degree of Authority Over Project

Keep Satisfied

Manage Closely

Monitor – Minimum Effort

Keep Informed

Low

Low   **Interest in Project**   **High**
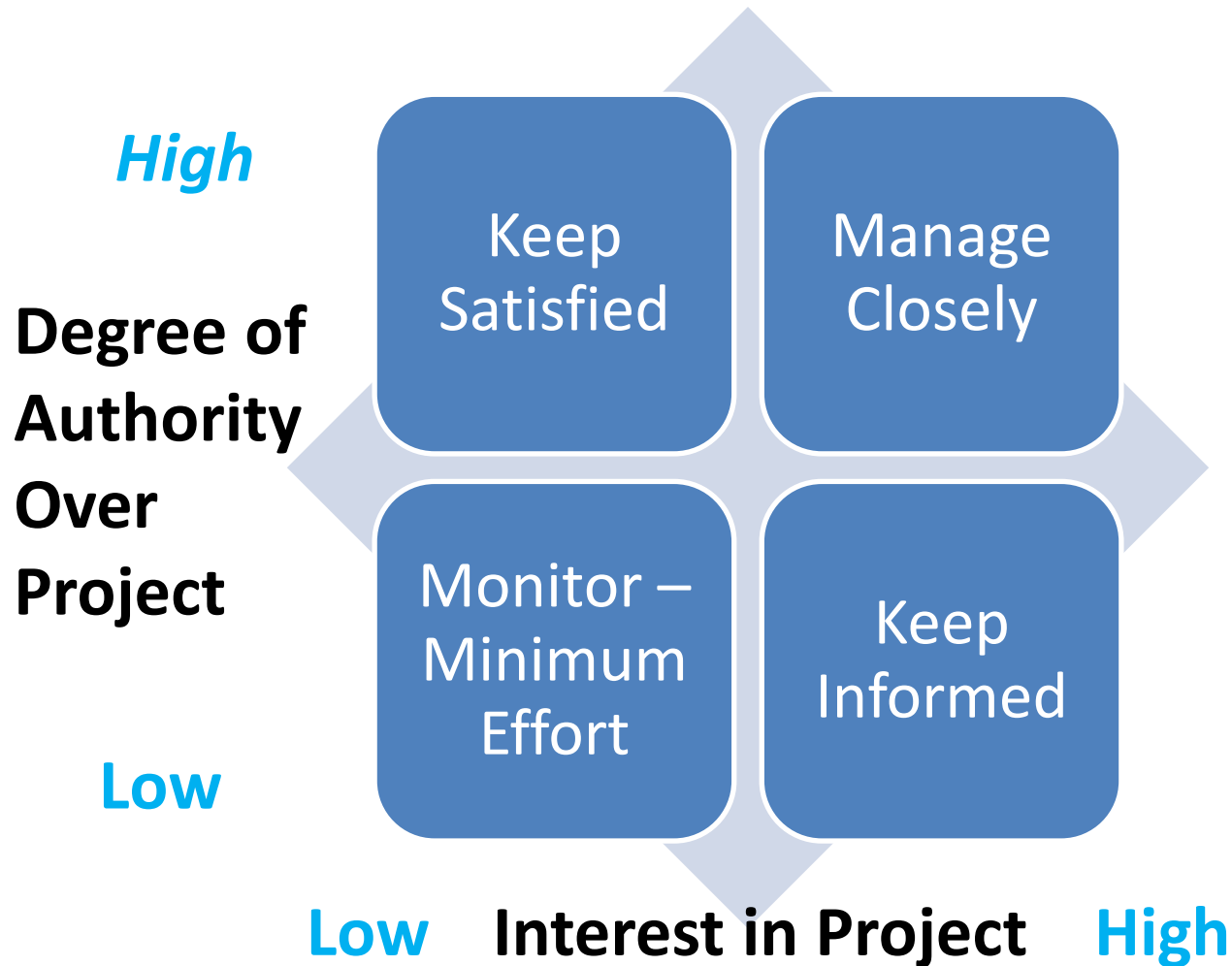
Gasik says:

- "I would add success as seen by stakeholders other than the project owner (after all the owner is the most important stakeholder). But we must have in mind that there are negative stakeholders for whom "project success" will be project failure. So success from the stakeholder perspective is success for positive stakeholders and converting as many negative stakeholders as possible to a positive attitude."

4. The Project Team Cognitive Performance Perspective.

Cognitive enables and constraints exist in all teams

Some examples of Cognitive Constraints:

- The Student Syndrome
- Parkinson's Law
- Overloading Stress
- Multi-tasking Stress
- Burnout Syndrome
- Internal conflicts that can lead to crises
- Drastic commitment reduction
- "Competence Borderline Syndrome" (I'm going to do just what I have to do, no more!)

Project Success is not Project Value

Sydney Opera House

Barcelona Sagrada Familia

Defense systems

Project for a major new client

Major stakeholder's perception

Project Close-out Phase versus the Post-Project Completion Phase

Close-out Phase: "… finalize all activities across all Process Management Groups to formally complete the project, phase, or contractual obligations." (PMI PMBOK 2008, p.65.)

Close-out Phase does not include the Product, Stakeholder, or Cognitive dimensions

Timing and Duration of the Post-Project Evaluation Phase

Project management dimension can be completed soon after Project Close-out Phase

Other dimensions will take longer

Time is required to obtain operational or marketing experience to evaluation the products of the project

Who does the Post-Project Evaluation Phase Benefit?

Most benefit is to the Project Owner

Measures the wisdom of initiating, creating, and authorizing the investment in the project and its products in the first place, and also how well the project was actually conducted and how well the final results achieved the initial project and product objectives.

Part 5. Conclusion and Recommendation

1. The addition of the Project Incubation Phase and the Post-Project Evaluation Phase to the standard top-level project life cycle model produces a truly realistic and comprehensive project life cycle model that recognizes the importance of each of these phases.

This Recognizes Actual Maturity

These phases are not actually new in very mature project management practice. By identifying and defining them we simply recognize the good strategic project management practices that are being used today in organizations that are fully mature in the project management discipline.

Recommendation

- We recommend that the Comprehensive Project Life Cycle Model described in this paper be taken into consideration for adoption by all professional associations involved in project management as an agreed standard.

A Final Request

- Please provide us with
  - Your comments on and criticisms of the proposed Model and
  - The names of and contact information for persons who are active in developing PM standards in associations in which you are active.
- We will in turn consider your inputs in our final revision and at the proper time submit the paper to all of those persons.

- *Thank you for your time and attention*

- *Our email addresses are:*
  - Russell_archibald@yahoo.com
  - ivano.difilippo@genialsoftware.it
  - Daniele.difilippo@live.com

- *Communicate with Ivano or Daniele in Italian or English*

LEADING & MANAGING INNOVATION

What Every Executive Team Must Know about Project, Program & Portfolio Management

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