SEWP ZG622: Software Project Management (Lecture #3)

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Text Books

T1: Bob Hughes, Mike Cotterel, and Rajib Mall, Software Project Management, 5th Edition, McGraw Hill, 2011

T2: Pressman, R.S. Software Engineering : A Practitioner's Approach, 7th Edition, McGraw Hill, 2010

R1: Sommerville, I., Software Engineering, Pearson Education, 9th Ed., 2010

R2: Capers Jones., Software Engineering Best Practices, TMH ©2010

R3: Robert K. Wysocki, Effective Software Project Management, John Wiley & Sons © 2006

R4: George Stepanek, Software Project Secrets : Why Software Projects Fail, Apress ©2012

R5: A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition by Project Management Institute Project Management Institute © 2013

R6: Jake Kouns and Daniel Minoli, Information Technology Risk Management in Enterprise Environments. John Wiley & Sons © 2010

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L3: Sotware Project Management Basics –

Definitions, Management Activities , Projects in Programs, Project Trends

Source Courtesy: Some of the contents of this PPT are sourced from materials provided by publishers of prescribed books

Project—Definitions

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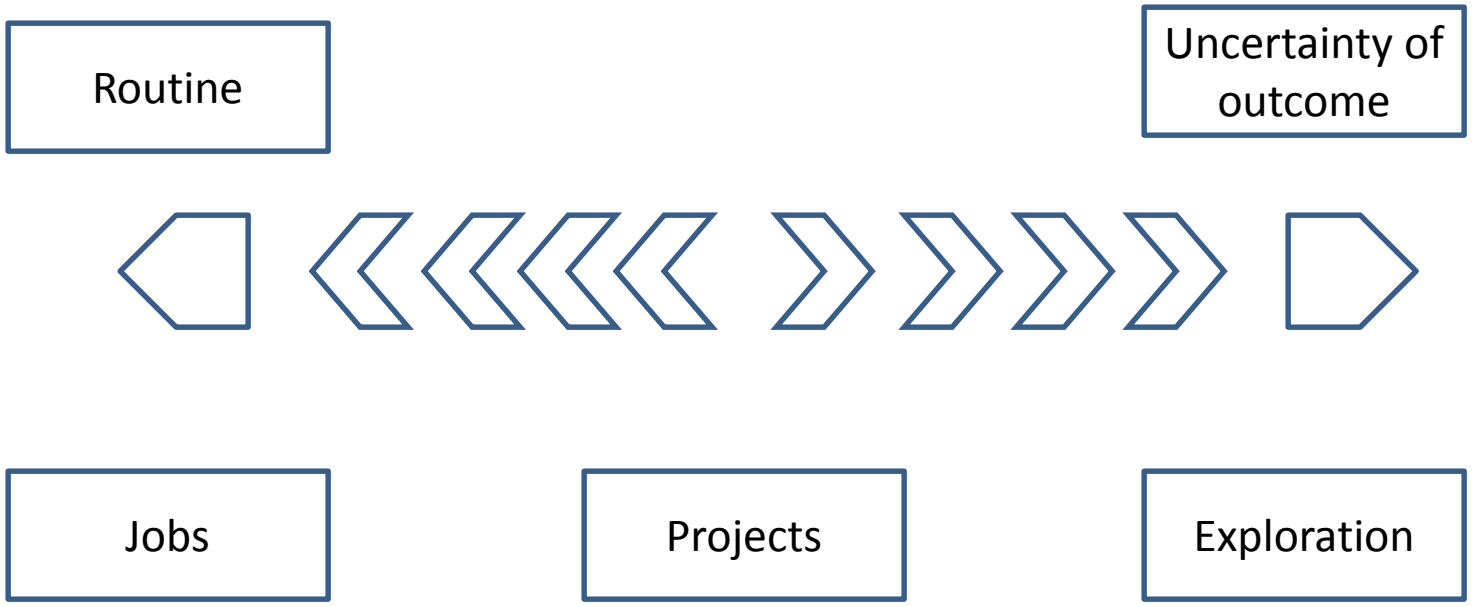
An individual or collaborative enterprise that is carefully planned to achieve a particular aim – Oxford Dictionary

A planned piece of work that has a specific purpose (such as to find information or to make something new) and that usually requires a lot of time – Merriam-Webster

Project – Definition



Project – Definition

'Jobs' – repetition of very well-defined and well understood tasks with very little uncertainty

'Exploration' – e.g. finding a cure for cancer: the outcome is very uncertain

'Projects' – in the middle!

Project Characteristics

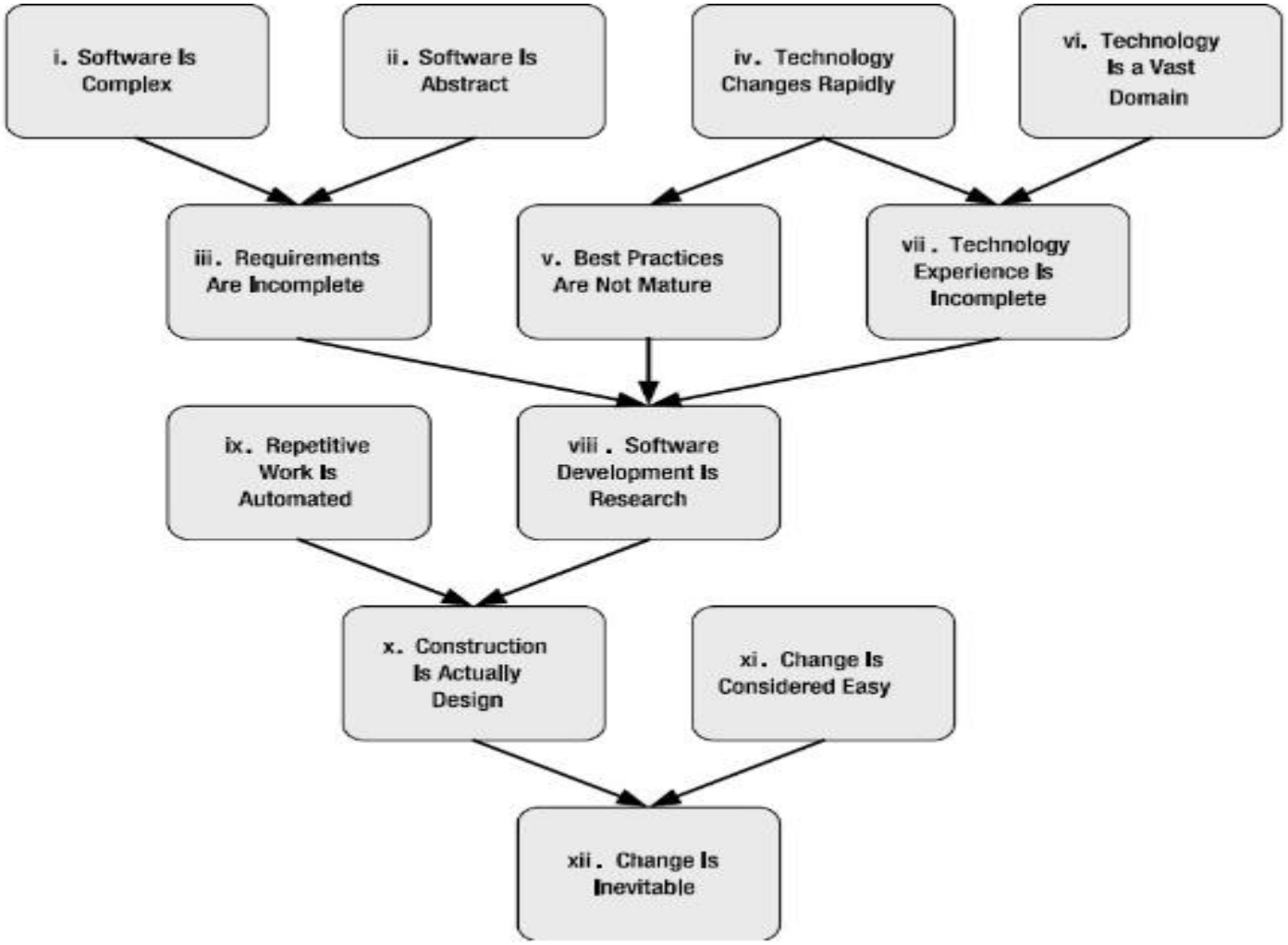
- Non-routine tasks
- Need for planning
- Objectives to be met
- Beneficiary
- Multi-disciplinary
- Ad-hoc team
- Phases
- Constraints
- Complexity

Software versus Other Projects

As per Fred Brooks (Mythical Man-month fame), major distinguishing characteristics are

- Invisibility
- Complexity
- Conformity
- Flexibility

Software versus Other Projects (George Stepanek)



Categorizing Software Projects

- Compulsory versus Voluntary Users
  - Software for bank teller versus computer game
- Information System versus Embedded System
  - Teller software versus ABS in car
- Outsourced Projects
- Objective-driven development

PMI Perspective (PMBOK)

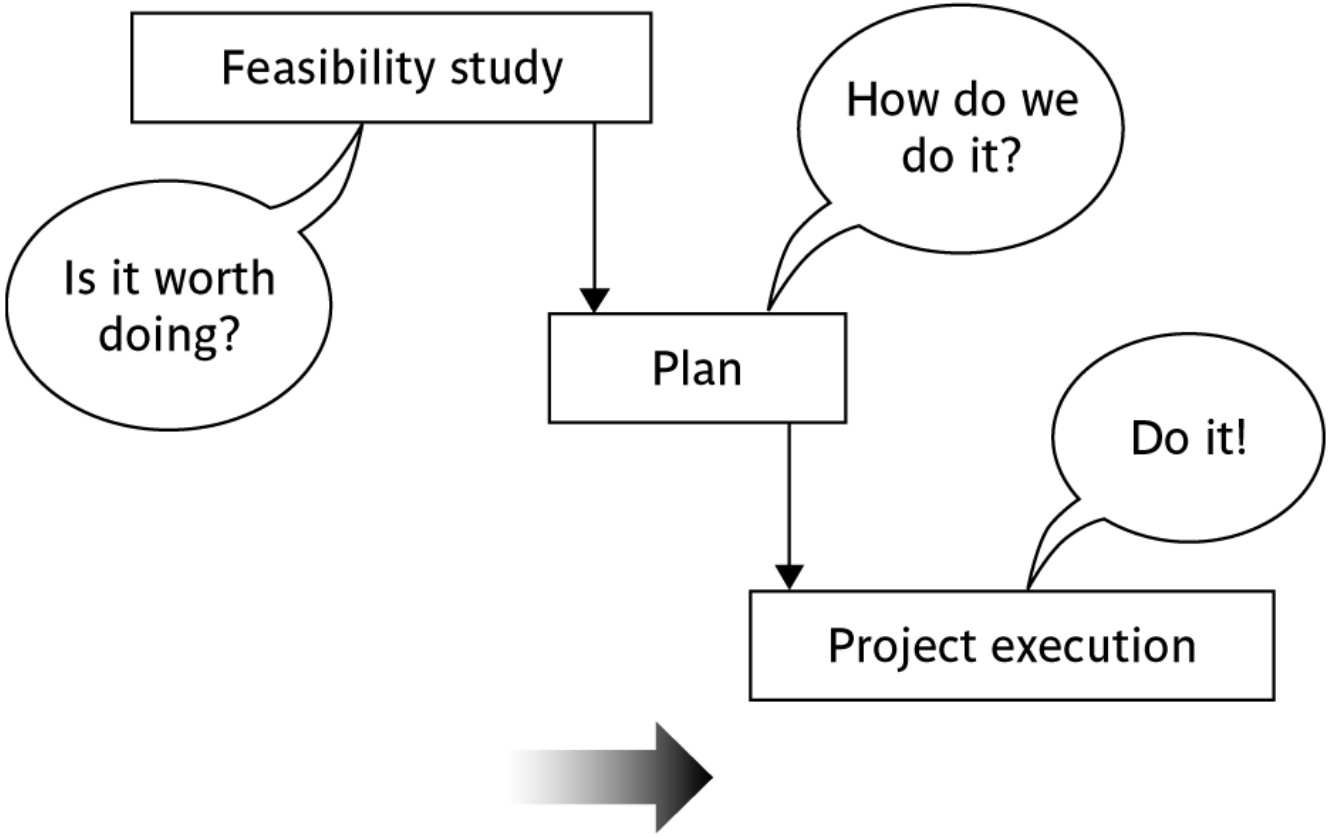
- **Project Definition:**
  - A project is a temporary endeavor undertaken to create a unique product, service, or result

- **A project can create**
  - A product that can be either a component of another item, an enhancement of an item, or an end item in itself
  - A service or a capability to perform a service
  - An improvement in the existing product or service lines (e.g., A Six Sigma project undertaken to reduce defects);
  - A result, such as an outcome or document (e.g., a research project)

PMI Perspective (PMBOK)

- **Project Phases and Project Life Cycle :**
  - Phases can involve a degree of uncertainty
  - Each project phase is marked by completion of one or more deliverables
  - A deliverable is a tangible, verifiable work product
  - The project life cycle serves to define the beginning and the end of a project
- **Project Stakeholders :**
  - Are individuals and organizations actively involved in the project,
  - Whose interests are impacted by project execution and project completion. (Project manager, Customer, Performing organization, Sponsor)
- **Organizational Influences :** Project is influenced by the
  - Organizational Systems,
  - Cultures,
  - Style and Structure of Organization that set-up the project
- **Key General Management Skills**
  - Leading, Communicating, Negotiating, Problem Solving…
- **Socioeconomic Influences**
  - Standards and Regulations, Internationalization, Cultural influence

High Level Project Cycle



SPM Activities(at high level)

- Feasibility Study
  - Is the project worth doing? Is business case valid?
  - For very large projects, feasibility study can be a project in its own right
- Planning
  - For significant projects, we create outline plan for the whole, detailed plan for the immediate
- Plan Execution
  - Here all framework, umbrella activities performed

Software Project Activities

Framework Activities

Communication

Involves communication among the customer and other stake holders; encompasses requirements gathering

Planning

Establishes a plan for software engineering work; addresses technical tasks, resources, work products, and work schedule

Modeling (Analyze, Design)

Encompasses the creation of models to better understand the requirements and the design

Construction (Code, Test)

Combines code generation and testing to uncover errors

Deployment

Involves delivery of software to the customer for evaluation and feedback

Umbrella Activities

Software project tracking and control *

Assess progress against the plan

Software quality assurance #

Activities required to ensure quality

Software configuration management #

Manage effects of change

Technical Reviews

Uncover errors before going to next activity

Formal technical reviews

Assess work products to uncover errors

Risk management *

Assess risks that may affect quality

Measurement

process, project, product #

Reusability management (component reuse) #

Work product preparation and production

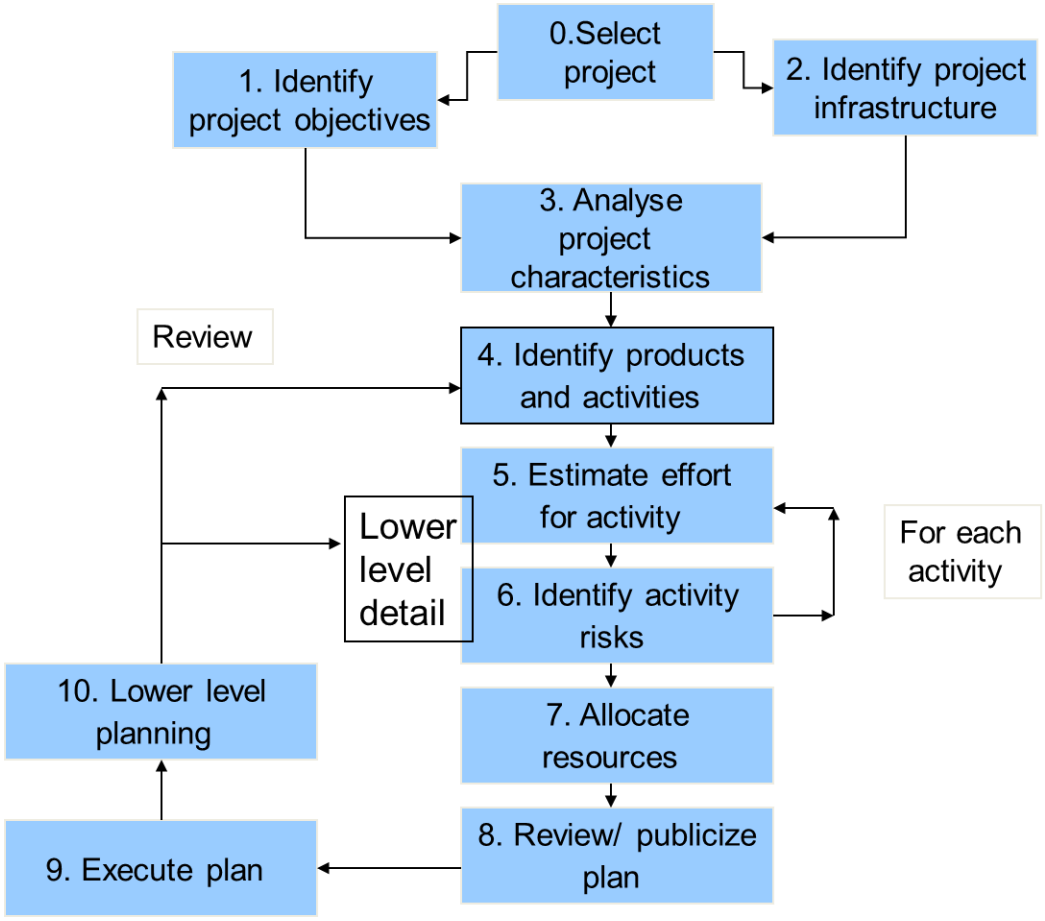
Models, documents, logs, forms, lists…

etc.

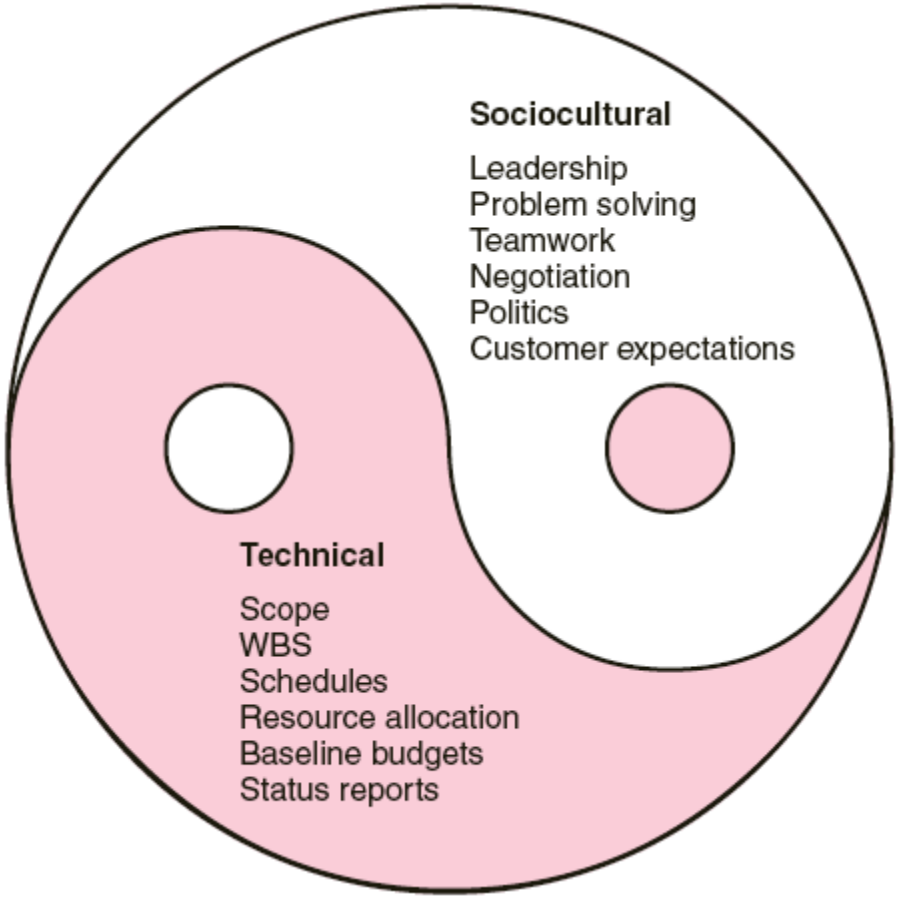
Management Activities

- **Planning** – deciding what is to be done
- Organizing – making arrangements
- Staffing – selecting the right people for the job
- Directing – giving instructions
- **Monitoring** – checking on progress
- **Controlling** – taking action to remedy hold-ups
- Innovating – coming up with solutions when problems emerge
- Representing – liaising with clients, users, developers and other stakeholders

Management Activity Flow



Management Responsibilities



The Technical and Sociocultural Dimensions of the Project Management Process

Stakeholders

These are people who have a stake or interest in the project

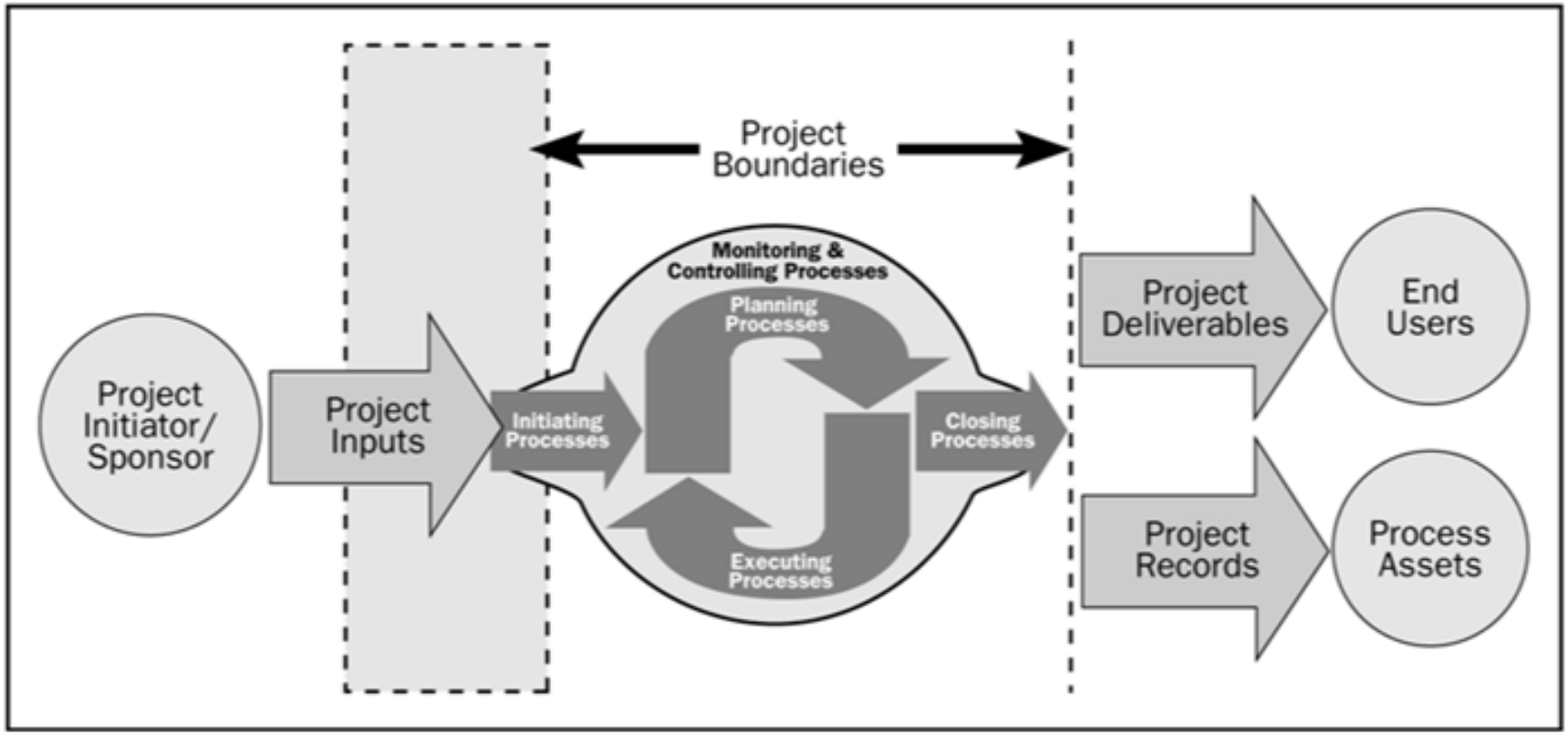
In general, they could be *users/clients* or *developers/implementers*

They could be:

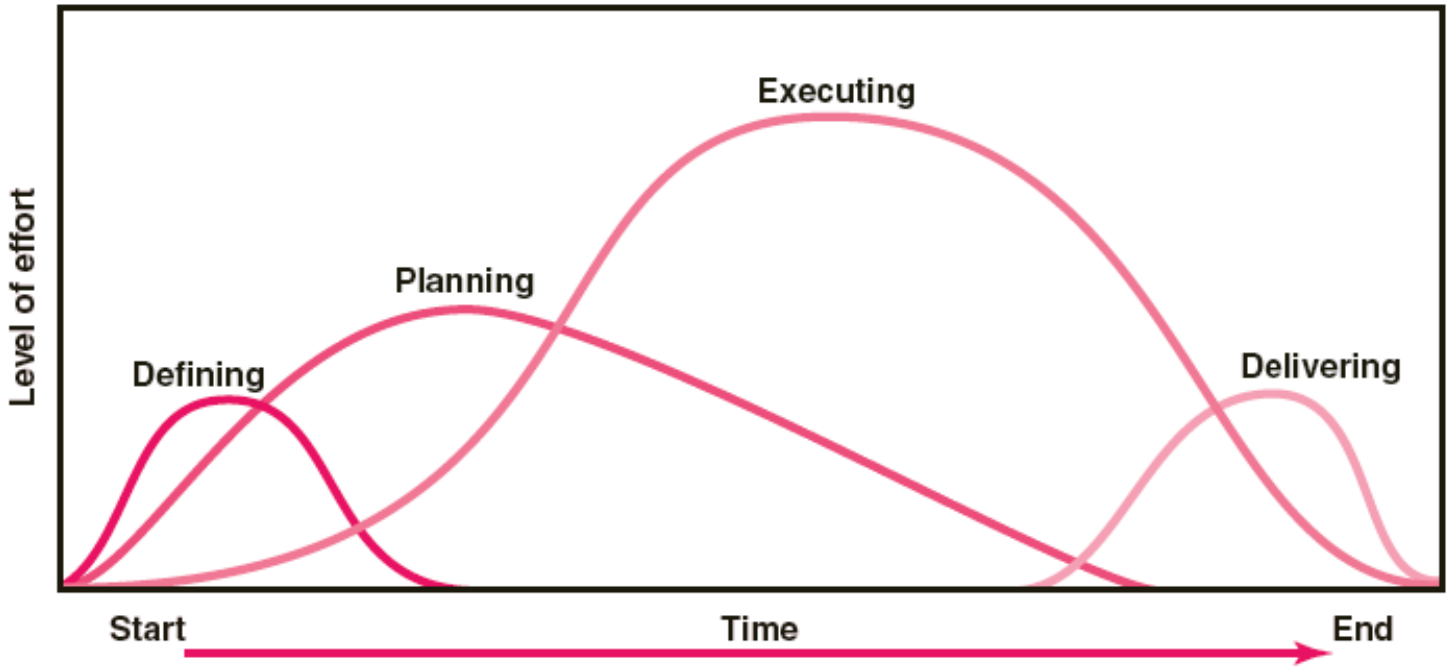
- Within the project team
- Outside the project team, but within the same organization
- Outside both the project team and the organization

Boehm proposes Theory of W (win-win)

PMI Activity Cycle

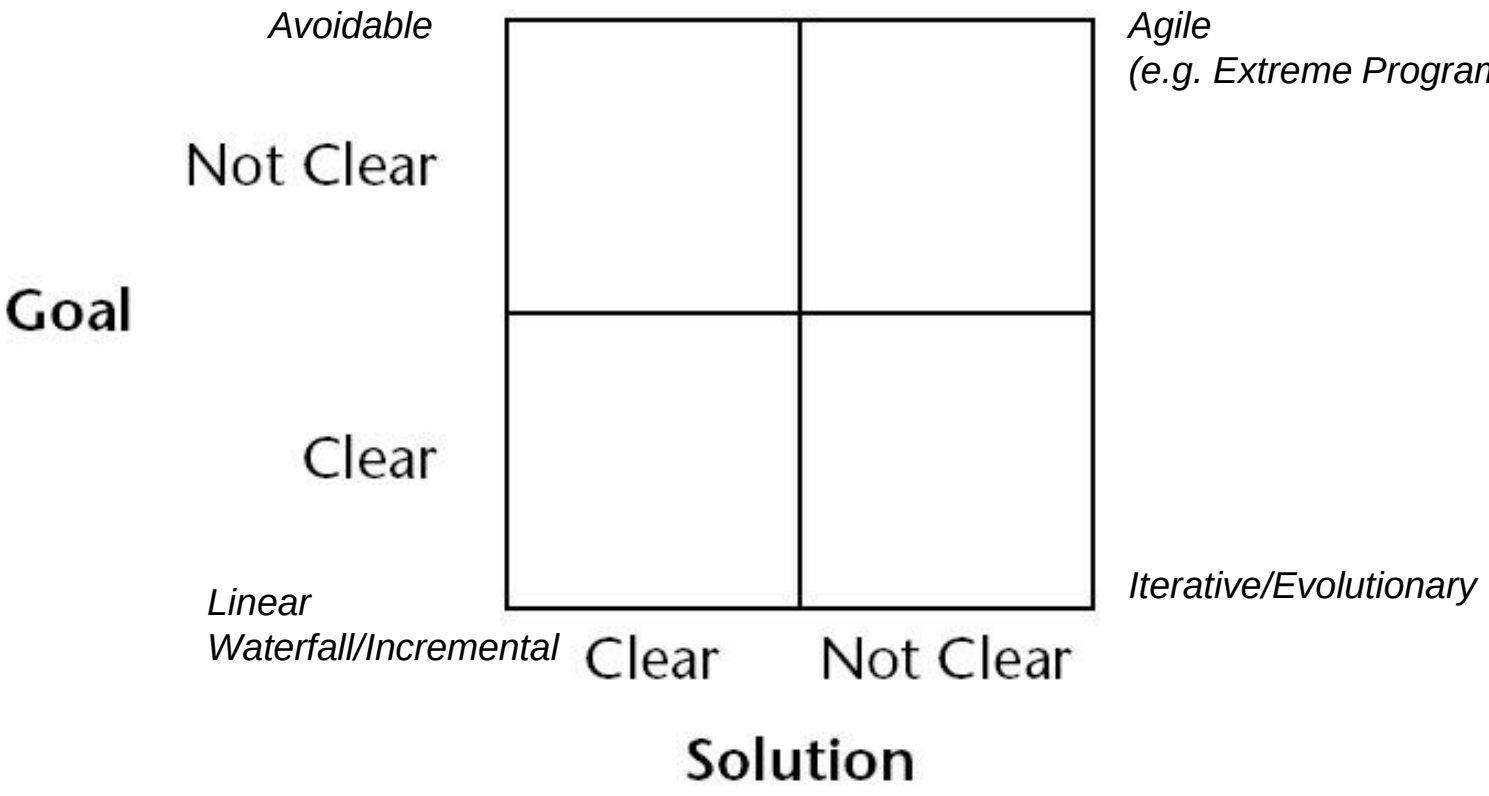


PMI Effort Levels



Defining	Planning	Executing	Delivering
1. Goals	1. Schedules	1. Status reports	1. Train customer
2. Specifications	2. Budgets	2. Changes	2. Transfer documents
3. Tasks	3. Resources	3. Quality	3. Release resources
4. Responsibilities	4. Risks	4. Forecasts	4. Release staff
	5. Staffing		5. Lessons learned

Project Lifecycles (Robert K. Wysocki)



‘Rules of thumb’ about which approach to be used

IF uncertainty is high
THEN use evolutionary approach

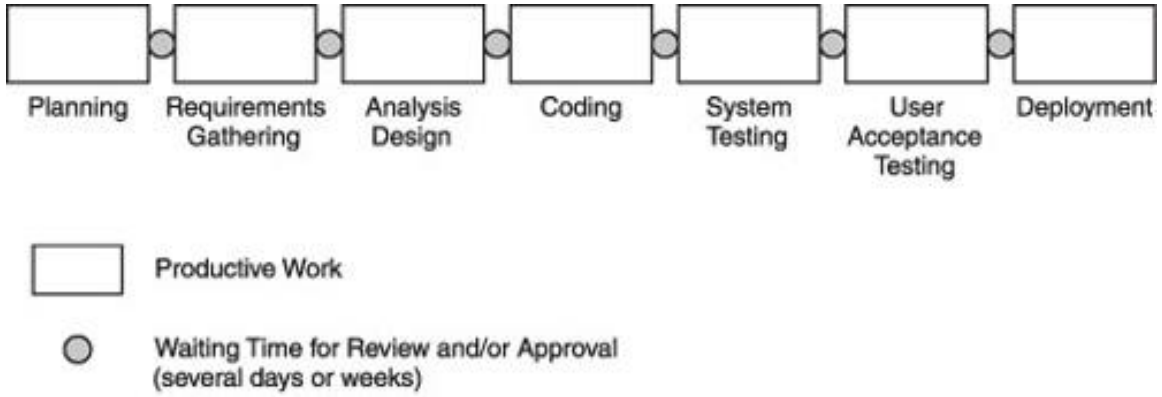
IF complexity is high but uncertainty is not
THEN use incremental approach

IF uncertainty and complexity both low
THEN use Water-fall model

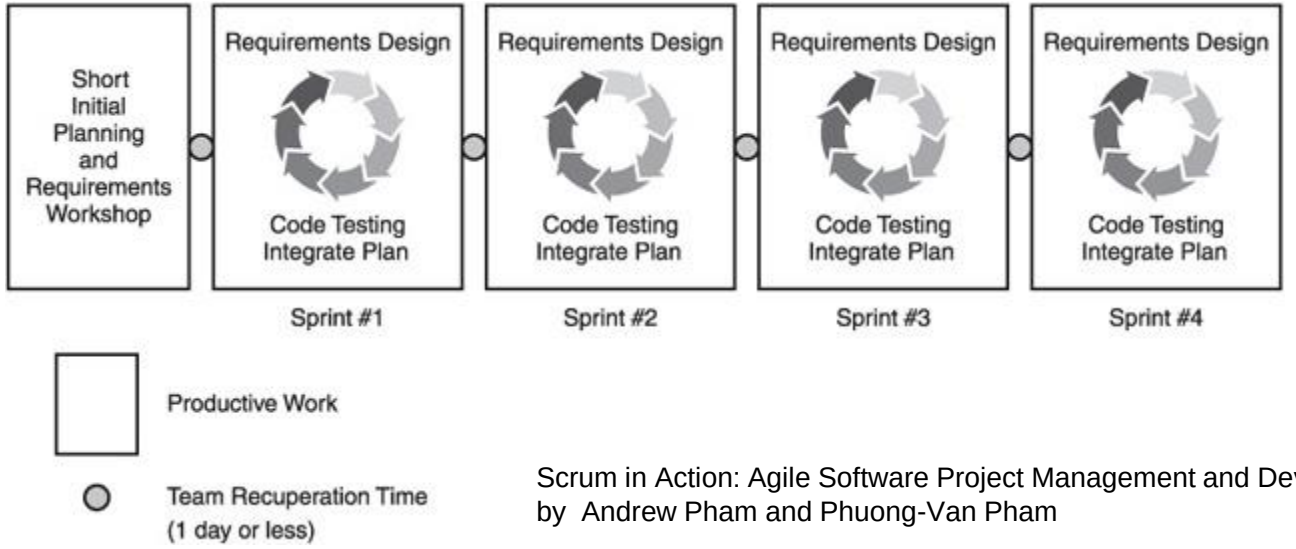
IF schedule is tight
THEN use evolutionary or incremental

Traditional vs. Agile Flows

Traditional value stream.



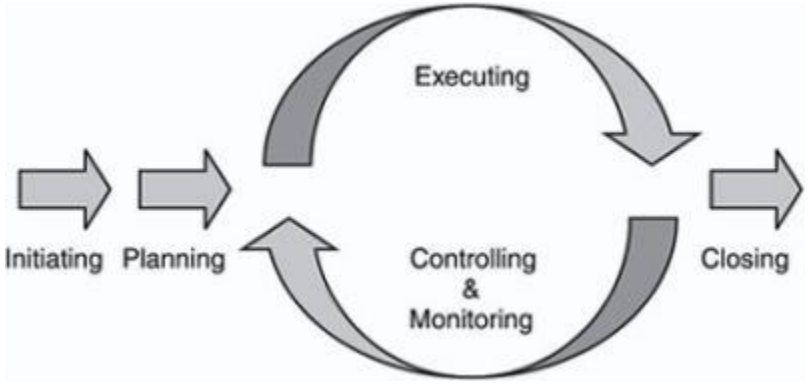
Scrum value stream



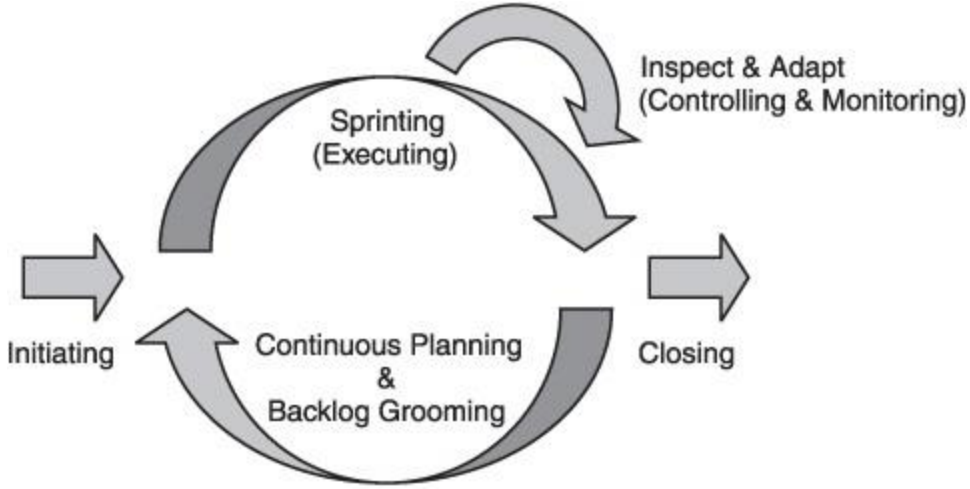
Scrum in Action: Agile Software Project Management and Development by Andrew Pham and Phuong-Van Pham

Traditional vs. Agile Management Process

Traditional project management process



Scrum project management process



Scrum in Action: Agile Software Project Management and Development by Andrew Pham and Phuong-Van Pham

Project Objectives

A Business-focused Definition of a Project by Robert Wysocki

- *A project is a sequence of finite dependent activities whose successful completion results in the delivery of the **expected business value** that validated doing the project.*

Setting objectives

- Answering the question '*What do we have to do to have a success?*'
- Need for a *project authority*
  - Sets the project scope
  - Allocates/approves costs
- Could be one person - or a group
  - Project Board
  - Project Management Board
  - Steering committee

Objectives

Informally, the objective of a project can be defined by completing the statement:

The project will be regarded as a success if……

Rather like *post-conditions* for the project, e.g. deliver

- agreed functionality
- to the required level of quality
- on time
- within budget

Focus on *what* will be put in place, rather than *how* activities will be carried out

Objectives should be SMART

S – specific, that is, concrete and well-defined

M – measurable, that is, satisfaction of the objective can be objectively judged

A – achievable, that is, it is within the power of the individual or group concerned to meet the target

R – relevant, the objective must relevant to the true purpose of the project

T – time constrained: there is defined point in time by which the objective should be achieved

Goals/sub-objectives

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These are steps along the way to achieving the objective. Informally, these can be defined by completing the sentence…

Objective X will be achieved

IF the following goals are all achieved

A……

B……

C…… etc

Goals/sub-objectives continued

Often a goal can be allocated to an individual.

Individual may have the capability of achieving goal, but not the objective on their own e.g.

Objective – user satisfaction with software product

Analyst goal – accurate requirements

Developer goal – software that is reliable

Measures of effectiveness

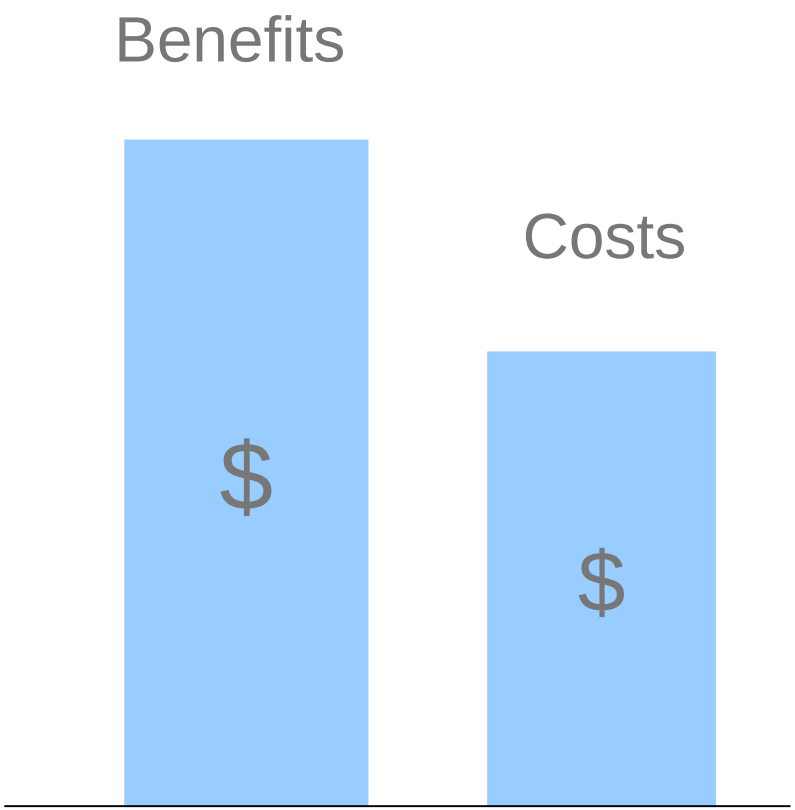
How do we know that the goal or objective has been achieved?

By a practical test, that can be objectively assessed.

e.g. for user satisfaction with software product:

- Repeat business – they buy further products from us
- Number of complaints – if low etc etc

The business case



Benefits of delivered project must outweigh costs

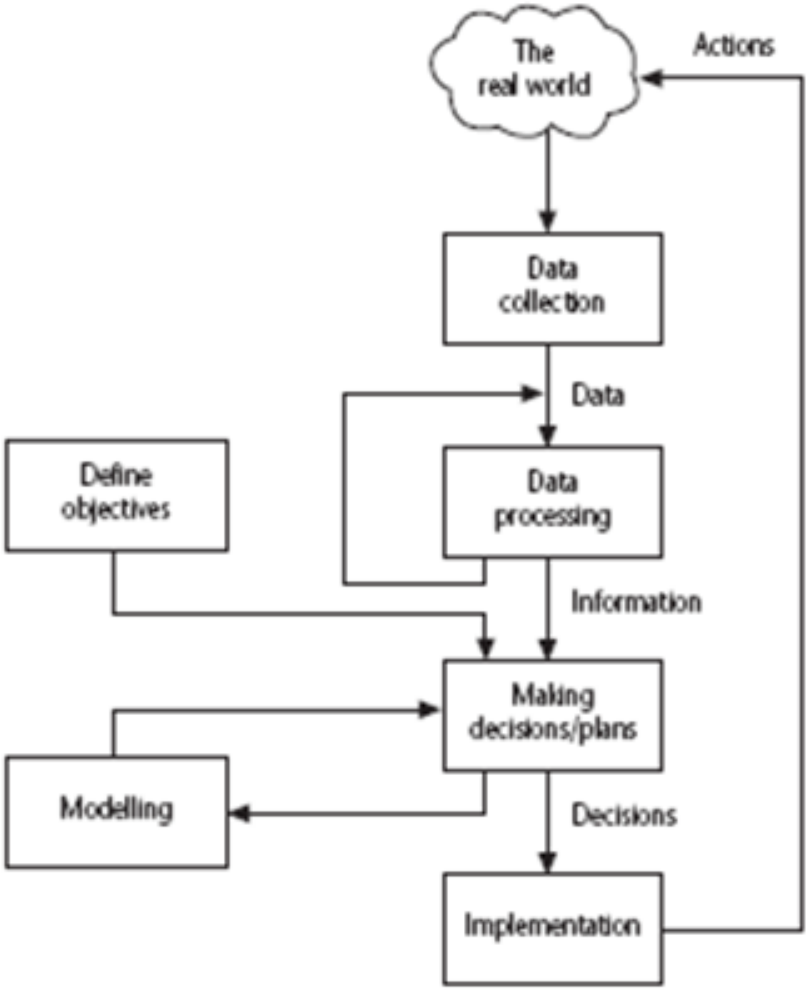
Costs include:

- Development
- Operation

Benefits

- Quantifiable
- Non-quantifiable

Management control



Management control

Data – the raw details

e.g. *'6,000 documents processed at location X'*

Information – the data is processed to produce something that is meaningful and useful

e.g. 'productivity is 100 documents a day'

Comparison with objectives/goals

e.g. we will not meet target of processing all documents by 31st March

continued…..

Management control - continued

Modelling – working out the probable outcomes of various decisions

e.g. if we employ two more staff at location X how quickly can we get the documents processed?

Implementation – carrying out the remedial actions that have been decided upon

Program management

- PMI Definition of Program :

  'A group of related projects, subprograms, and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually'

- Fern's definition of Program Management:

  'A group of projects that are managed in a co-ordinated way to gain benefits that would not be possible were the projects to be managed independently'

Program management

Programs comprise of various components—

- Major component being the individual projects within the program
- Programs may include other work related to the component projects such as
  - Training
  - Operations and
  - Maintenance

Program management

Programs benefit organizations by

- Generating business value,
- Enhancing current capabilities,
- Facilitating business change,
- Maintaining an asset base,
- Offering new products and services to the market, or
- Developing new capabilities for the organization.

Program management

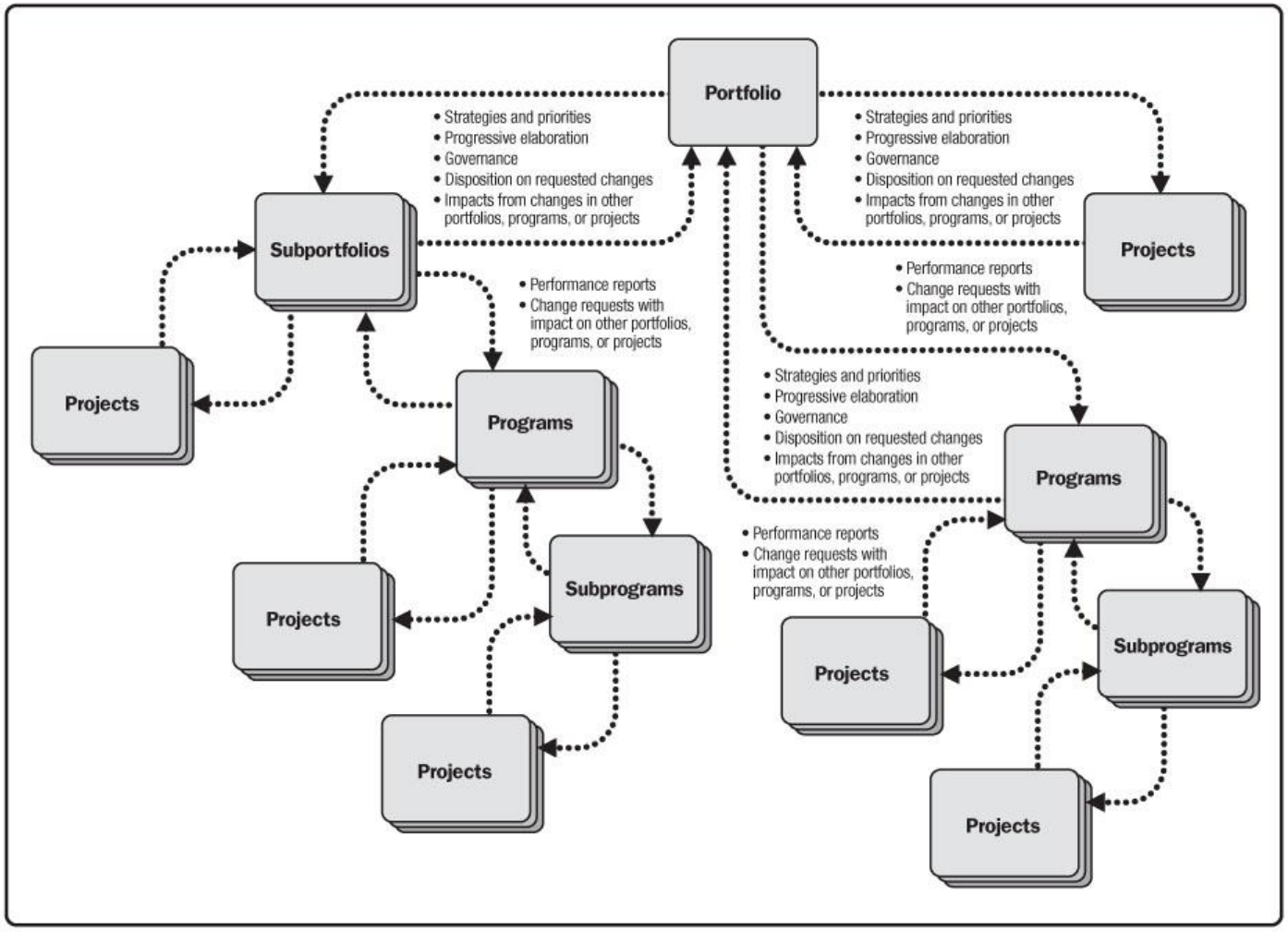
Program benefits may be realized incrementally throughout the duration of the program, or may be realized all at once at the end of the program.

- A business modernization program may include
  - a project to improve and consolidate financial management across multiple sites;
  - a project to improve personnel hiring and performance appraisals; and
  - a project to streamline logistical services
- A country's space program is an example of unified benefits delivery—where the individual components of the program do not deliver benefits until the program is operational

Project vs. Program vs. Portfolio (PMBOK)

	Organizational Project Management		
	Projects	**Programs**	**Portfolios**
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a larger scope and provide more significant benefits.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Program managers expect change from both inside and outside the program and are prepared to manage it.	Portfolio managers continuously monitor changes in the broader internal and external environment.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Program managers develop the overall program plan and create high-level plans to guide detailed planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Program managers manage the program staff and the project managers; they provide vision and overall leadership.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
Success	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	Success is measured by the degree to which the program satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.
Monitoring	Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.

Project vs. Program vs. Portfolio (PMI)



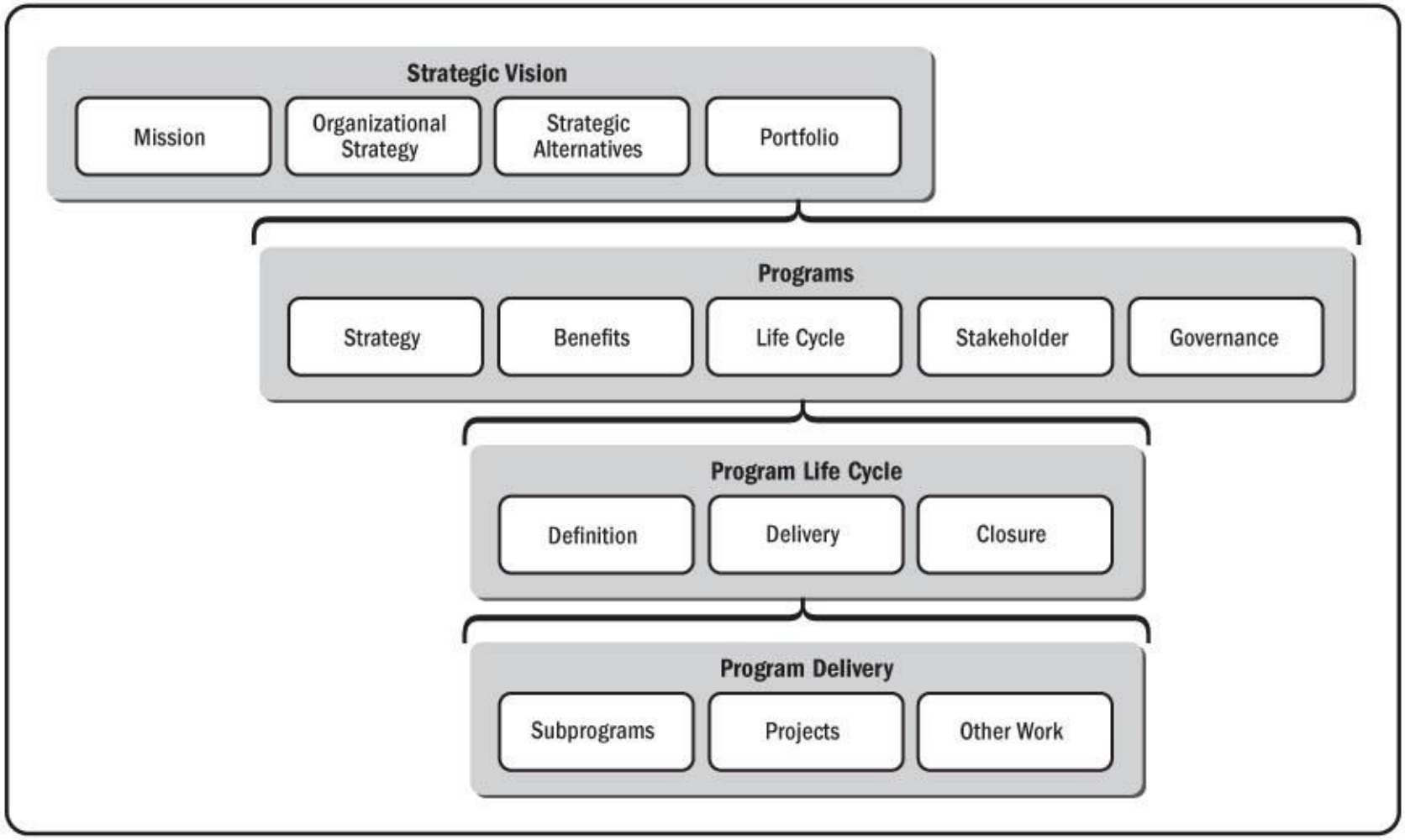
Origination of Programs

Organizations address the need for change (to its products and services) by creating strategic business initiatives delivered by projects, programs, and portfolios.

Portfolios, programs, and projects should be

- Aligned with organizational strategy and objectives,
- Aligned with organizational strategy and objectives,
- Make the best use of available resources.

Project vs. Program vs. Portfolio (PMI)



Evolution of Management

- During last few decades software development went through significant changes
  - More of reuse
  - Tailoring of existing products
  - Rarely from scratch
- Impact on project management practices include
  - Planning incremental delivery
  - Quality expectations
  - Acceptance of change

The Importance of Project Management

- Factors leading to the increased use of project management:
  - Compression of the product life cycle
  - Global competition
  - Knowledge explosion
  - Corporate downsizing
  - Increased customer focus
  - Rapid development of Third World and closed economies
  - Small projects that represent big problems

The Challenge of Project Management

- The Project Manager
  - Manages temporary, non-repetitive activities and frequently acts independently of the formal organization.
    - Marshals resources for the project.
    - Is linked directly to the customer interface.
    - Provides direction, coordination, and integration to the project team.
    - Is responsible for performance and success of the project.
  - Must induce the right people at the right time to address the right issues and make the right decisions.

Declaration of Interdependence

While the Agile Manifesto dealt with software development, the Agile Project Management "Declaration of Interdependence" which another group of experts pulled together in 2005 focused more on the project management side (http://pmdoi.org):

"We are a community of project leaders that are highly successful at delivering results. To achieve these results:

- We **increase return on investment** by making continuous flow of value our focus.
- We **deliver reliable results** by engaging customers in frequent interactions and shared ownership.

Declaration of Interdependence (contd)

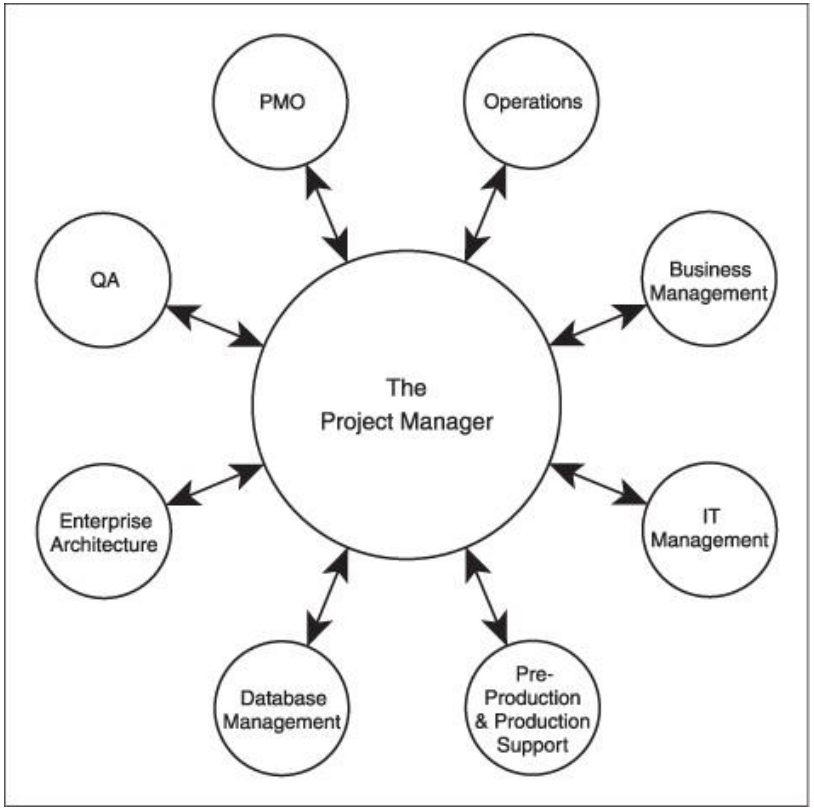
- We **expect uncertainty** and manage for it through iterations, anticipation, and adaptation.
- We **unleash creativity and innovation** by recognizing that individuals are the ultimate source of value, and creating an environment where they can make a difference.
- We **boost performance** through group accountability for results and shared responsibility for team effectiveness.
- We **improve effectiveness and reliability** through situationally specific strategies, processes and practices."

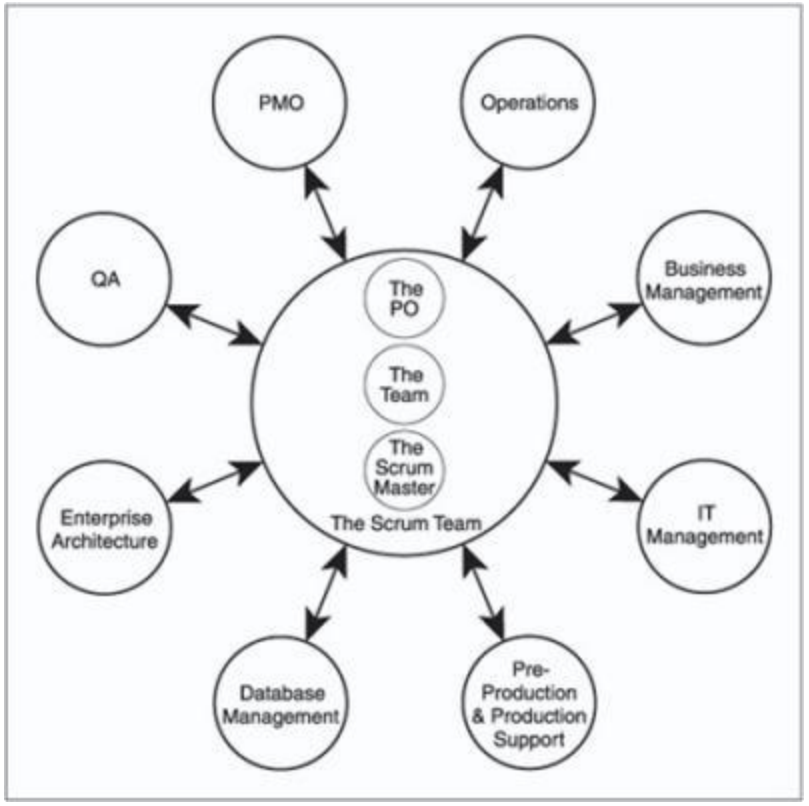
Agile Project Management

- Thrives on change rather than avoiding it
- Continuously adapts to the project situation
- Adopts traditional and extreme tools and processes
- Based on the principle that you learn by doing
- Seeks to get it right every time
- Client-focused and client-driven
- Grounded in a set of immutable core values
- Ensures maximum business value
- Squeezes out all non–value-added work
- It works—100 percent of the time!

– Wysocki

Changing Role of PM





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The seven qualities of a ScrumMaster

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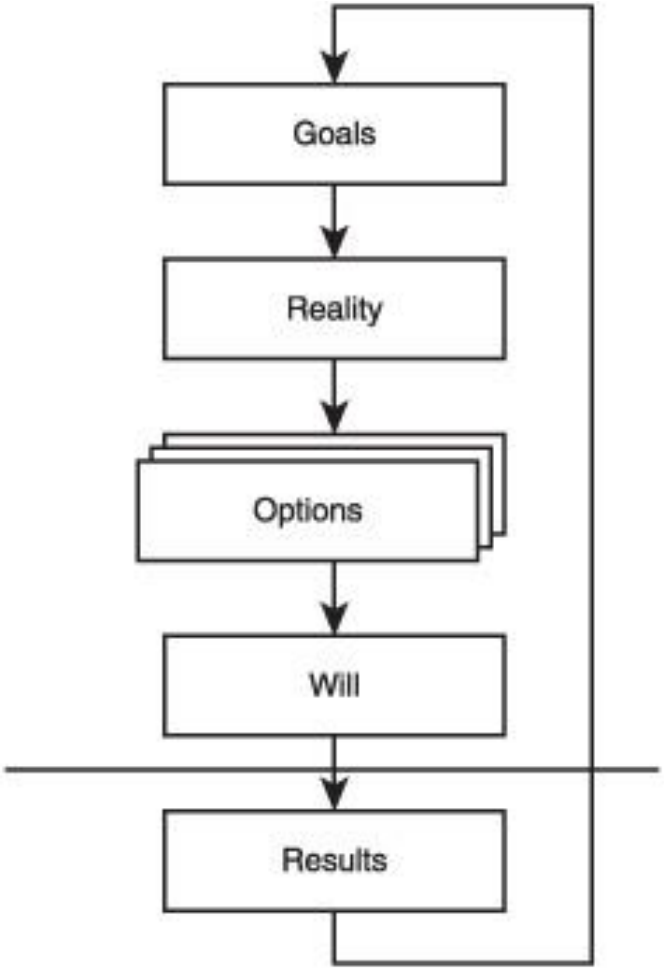
Agile Leadership (GROW Model)



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Agile Leadership (GROW Model)

Goal Establishing: First, help your team member define his goals. With SMART (Specific, Measurable, Achievable, Realistic, and Time-based) the goal can be achieved within a given timeframe.

Examine (Current) Reality: Ask your team member to describe her Reality, meaning the current reality she lives in. As your team member tells you about her Current Reality, the solution to her problem will begin to emerge.

Explore the Options: Once you and your team member have established the Goals and explored the (Current) Reality, explore all the possible options you have for solving the problem.

Establish the Will: By examining the current Reality and exploring the Options, your team member will now have a good idea of how to achieve Goal.

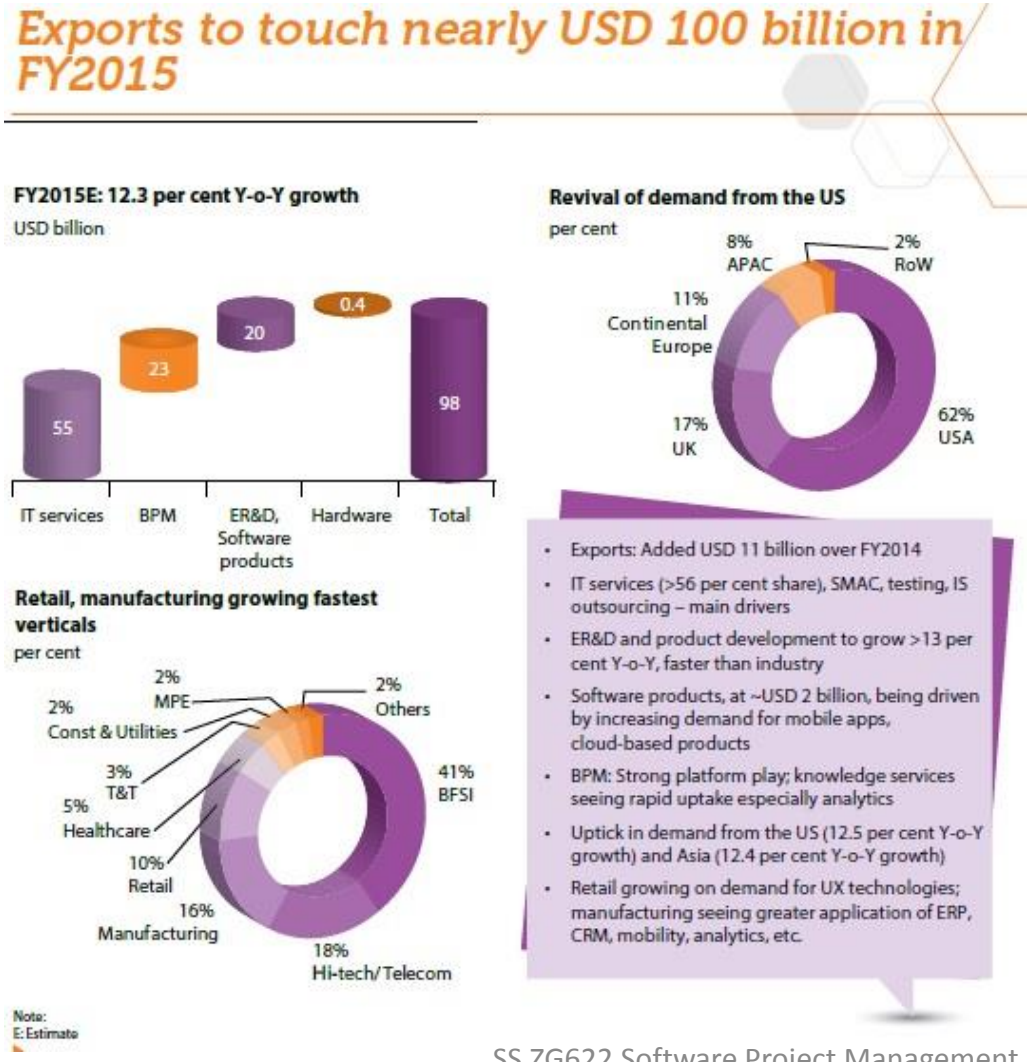
Your final step as coach is to get your team member to commit to some specific actions

Software Projects in India

- IT Services are at $69B (nearly 80% exports)
- Software Products are at $6.1B (30% exports)
- R&D, Product Development at India Centers of Global Organization are at $20B
- Indian eCommerce at $14B (software spending is likely to be small part)

– NASSCOM

Indian IT/BPM Exports (as per NASSCOM)



SMAC:
Social, Mobile, Analytics, Cloud

Thank You

Any Questions?