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# SS ZG622: Software Project Management (Lecture #11)

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# Text Books



**T1:** Bob Hughes, Mike Cotterell, 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, 9<sup>th</sup> Ed., 2010

**R2:** Disciplined Agile Delivery: A Practitioner's Guide to Agile Software Delivery in the Enterprise by Scott Ambler and Mark Lines IBM Press © 2012

**R3:** Gower Handbook of People in Project Management by Dennis Lock and Lindsay Scott (eds) Gower Publishing Limited © 2013

**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



# L11: Software Project Management –

Human Resources, Selection, Organizational Behavior

# The Management Spectrum

- Effective software project management focuses on these items (in this order)
  - The people
    - Deals with the cultivation of motivated, highly skilled people
    - Consists of the stakeholders, the team leaders, and the software team
  - The product
    - Product objectives and scope should be established before a project can be planned
  - The process
    - The software process provides the framework from which a comprehensive plan for software development can be established
  - The project
    - Planning and controlling a software project is done for one primary reason...it is the only known way to manage complexity
    - In a 1998 survey, 26% of software projects failed outright, 46% experienced cost and schedule overruns

– Pressman



# Human Resources Management (PMBOK)

- Project Human Resource Management includes the processes that organize, manage, and lead the project team.
- The project team is comprised of the people with assigned roles and responsibilities for completing the project.
- Project team members may
  - May have varied skill sets,
  - May be assigned full or part-time, and
  - may be added or removed from the team as the project progresses

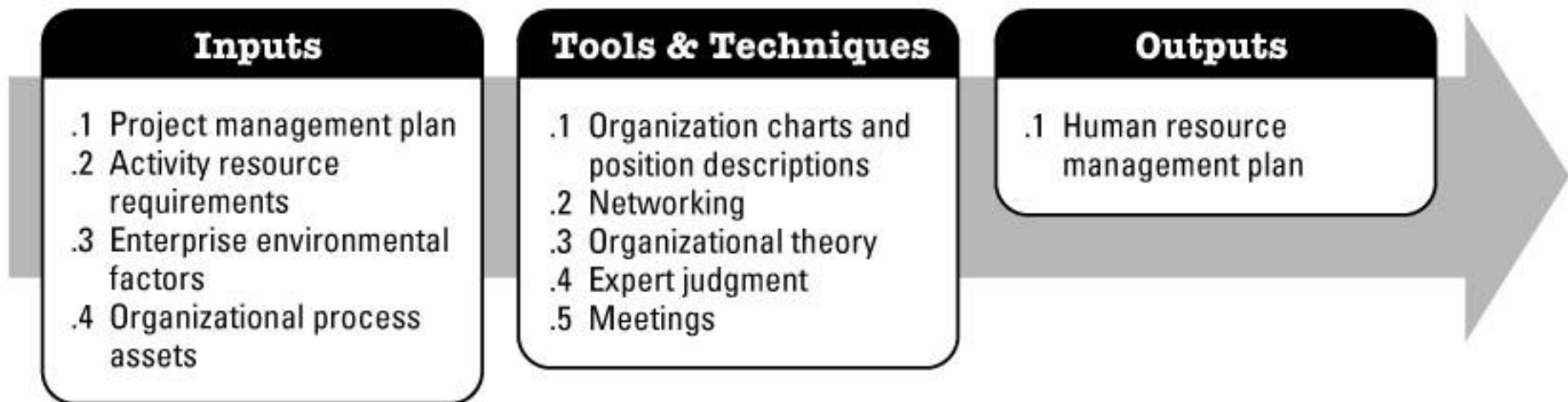
# Human Resources Management (PMBOK)

Project Human Resource Management processes, which are as follows:

- Plan Human Resource Management—The process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.
- Acquire Project Team—The process of confirming human resource availability and obtaining the team necessary to complete project activities.
- Develop Project Team—The process of improving competencies, team member interaction, and overall team environment to enhance project performance.
- Manage Project Team—The process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

# Human Resources Management (PMBOK)

## Plan Human Resource Management



# RACI Matrix

## *Responsible*

Those who do the work to achieve the task

## *Accountable*

answerable for the correct and thorough completion of the deliverable or task

## *Consulted*

Subject matter experts

## *Informed*

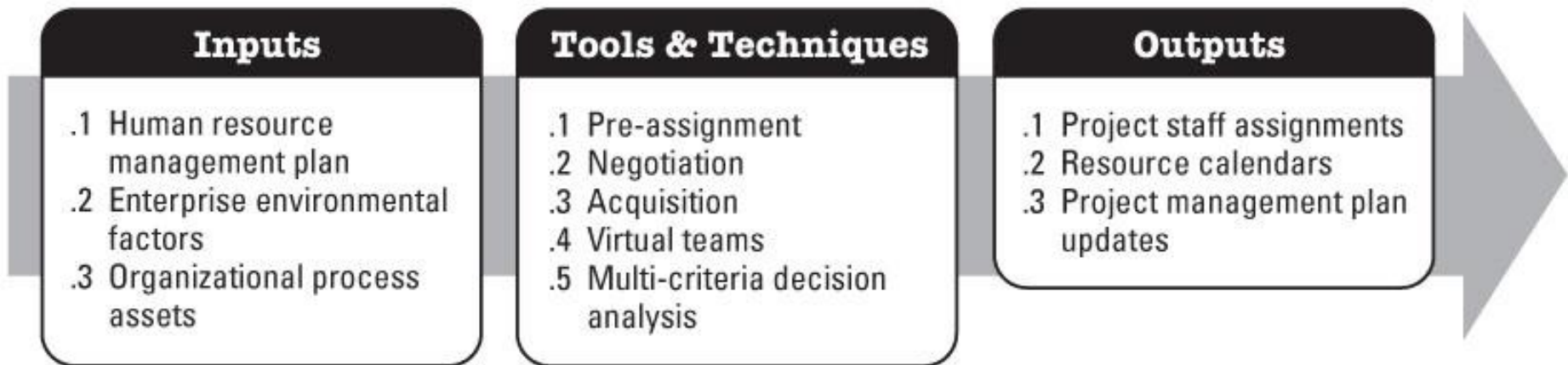
Updated upon completion of the task

RACI Chart	Person				
Activity	Ann	Ben	Carlos	Dina	Ed
Create charter	A	R	I	I	I
Collect requirements	I	A	R	C	C
Submit change request	I	A	R	R	C
Develop test plan	A	C	I	I	R



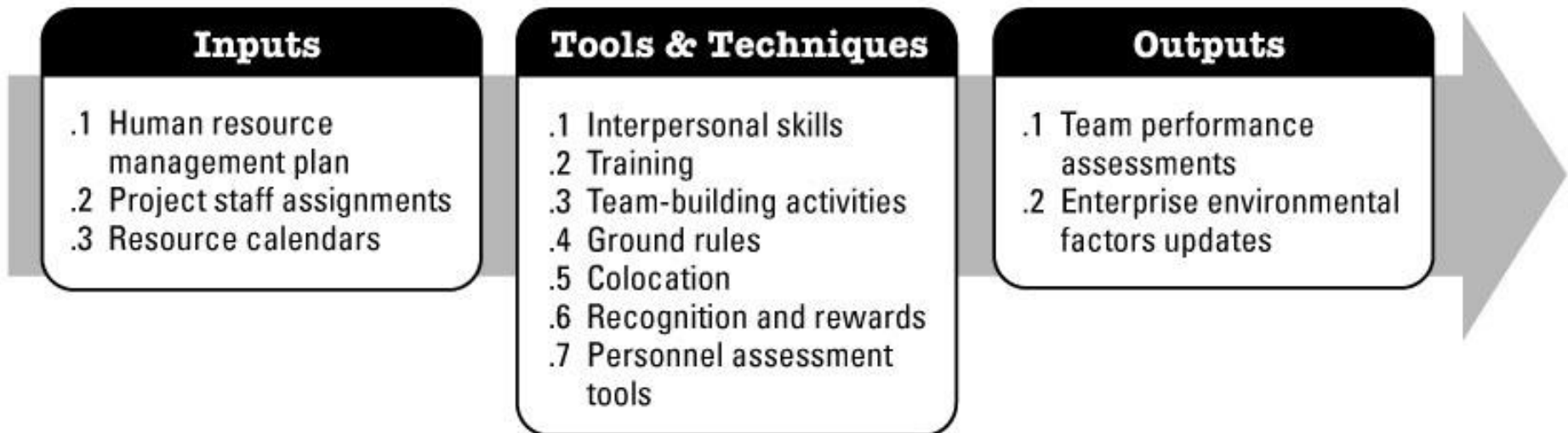
# Human Resources Management (PMBOK)

## Acquire Project Team



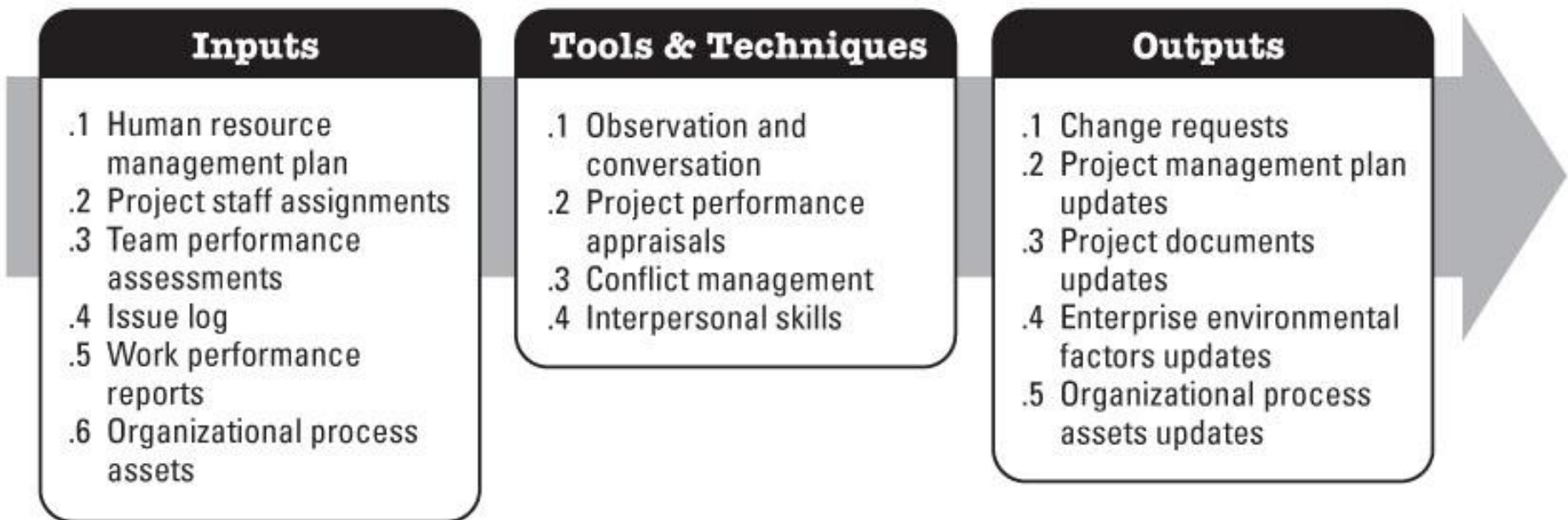
# Human Resources Management (PMBOK)

## Develop Project Team



# Human Resources Management (PMBOK)

## Manage Project Team



# Organizational behaviour

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- An organization is a collection of people who work together to achieve individual and organizational goals
- Organizational behavior (OB): the study of factors that have an impact on how people and groups act, think, feel, and respond to work and organizations, and how organizations respond to their environments

# Organizational behaviour

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- Frederick Taylor (1856-1915) ‘the father of scientific management’ observed that to achieve high productivity organization has to
  - To select the best people for the job;
  - To instruct them in the best methods;
  - To give financial incentives in the form of piece work
- ‘Taylorism’ looks simplistic, there have been more sophisticated theories, but it still holds references

# Organizational behaviour

Frederick Taylor carried out systematic study of relationships between people and tasks for the purpose of redesigning the work process to increase efficiency

- The amount of and effort each employee expends to produce a unit of output can be reduced by increasing specialization and the division of labor. Steps in Scientific management consist
  1. Study the way employees perform their tasks, gather informal job knowledge that employees possess, and experiment with ways of improving the way tasks are performed
  2. Codify the new methods of performing tasks into written rules and standard operating procedures
  3. Carefully select employees so that they possess skills and abilities that match the needs of the task, and train them to perform the task according to the established rules and procedures
  4. Establish an acceptable level of performance for a task, and then develop a pay system that provides a reward for performance above the acceptable level

# Hawthorne effect

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- 1920's – series of experiments at the Hawthorne Plant of Western Electric, Chicago
- Two control groups with different working conditions were observed for productivity
- Productivity improvement observed in both groups
- Found that simply showing an interest in a group increased productivity

# Attitudes in OB

- Theory X

- Humans have innate dislike for work
- They need coercion, direction, control
- They avoid responsibility

- Theory Y

- Work is natural (can't be idle)
- No need for coercion, control
- Commitment depends on rewards
- People take & seek responsibility

If team relaxes when manager is on leave, it is a Theory X organization

-Donald McGregor



# Selecting the best people

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- Belbin distinguishes between **eligible** (having the right qualifications) and **suitable** candidates (can do the job).
- The danger is to employ someone who is eligible but not suitable
- The best situation is to employ someone who is suitable but not eligible! For example, these are likely to be cheaper and to stay in the job.

# Innate characteristics of good software developers

- 1968 study – difference of 1:25 in time taken by different programmers to code program; 1:28 for time taken to debug it. Incorporated in empirical estimation models.
- Cheney's research found experience better than maths skills as a guide to software skills
- Weinberg's research suggested software developers less sociable than other workers
- Later surveys have found no significant social differences between IT workers and others – this could be result of broader role of IT in organizations

# Selection process

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## 1. Create a job specification.

Content includes types of task to be carried out.

## 2. Create a job holder profile

Describes the characteristics of the person who could do the job

## 3. Obtain applicants

Identify the media that potential job holders are likely to consult. Elicit CVs

# Selection process - continued

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## 4. Select potential candidates from CVs.

Do not waste everybody's time interviewing people whose CV clearly indicates are unsuitable.

## 5. Further selection, including interview

Could include aptitude tests. Make sure selection processes map to the job holder profile.

## 6. Other procedures.

e.g. taking up references, medicals etc

# Multi-Criteria Decision Analysis (PMBOK)

Selection criteria are often used as a part of acquiring the project team. By use of a multi-criteria decision analysis tool, criteria are developed and used to rate or score potential team members. The criteria are weighted according to the relative importance. Some examples of selection criteria are:

- **Availability.** Identify whether the team member is available to work on the project within the time period needed. If there are there any concerns for availability during the project timeline.
- **Cost.** Verify if the cost of adding the team member is within the prescribed budget.
- **Experience.** Verify that the team member has the relevant experience that will contribute to the project success.
- **Ability.** Verify that the team member has the competencies needed by the project.
- **Knowledge.** Consider if the team member has relevant knowledge of the customer, similar implemented projects, and nuances of the project environment.
- **Skills.** Determine whether the member has the relevant skills to use a project tool, implementation, or training.
- **Attitude.** Determine whether the member has the ability to work with others as a cohesive team.
- **International factors.** Consider team member location, time zone and communication capabilities.

# Instruction in the best methods

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- The induction of new staff should be carefully planned – worst case where new recruit is simply ignored and not given any tasks
- Good induction leads to new recruit becoming productive more quickly
- Need to review staff progress frequently and provide feedback
- Need to identify training that could enhance staff effectiveness.

# Motivation

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- Motivation and application can often make up for shortfalls in innate skills
- Taylor's approach - financial incentives
- Abraham Maslow (1908-1970)
  - motivations vary from individual to individual
  - hierarchy of needs – as lower ones fulfilled, higher ones emerge
  - Lowest level – food, shelter
  - Highest level – self-actualization

# Maslow's Human needs hierarchy



- In software development groups, basic physiological and safety needs are not an issue.
- Social
  - Provide communal facilities;
  - Allow informal communications e.g. via social networking
- Esteem
  - Recognition of achievements;
  - Appropriate rewards.
- Self-realization
  - Responsibility;
  - Training - people want to learn more.



# Job Satisfaction as per Herzberg

Herzberg suggested two sets of factors affected job satisfaction

1. *Hygiene or maintenance factors* – make you dissatisfied if they are not right e.g. pay, working conditions
2. *Motivators* – make you feel the job is worthwhile e.g. a sense of achievement

# Influences on Motivation - Vroom

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Vroom and colleagues identified three influences on motivation

1. *Expectancy* – the belief that working harder leads to better performance
2. *Instrumentality* – the belief that better performance will be rewarded
3. *Perceived value* of the reward

# Motivational Theories



We may take holistic view of major motivational theories

Frederick Taylor – Equity Theory

Vroom – Expectancy Theory

Peter Drucker etc. -

Management by Objectives, SMART goals

# Challenges in Organizational Behaviour

- Social/ Cultural Environment
- Global Environment
- Advancing Technology
- Shifting Work/ Employment Relationships
- National culture
- Organizational ethics and well-being
- Diverse work force

# Challenges in Organizational Behaviour

- Diversity can be based on
  - Age
  - Gender
  - Beliefs
  - Ethnicity etc.
- Diverse work force creates challenges w.r.t.
  - Fairness and Justice
  - Decision-Making and Performance
  - Flexibility

# Oldham-Hackman job characteristics

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Identified the following characteristics of a job which make it more 'meaningful'

- Skill variety
- Task identity
- Task significance

Two other factors contributed to satisfaction:

- Autonomy
- Feedback

# Methods to improve job satisfaction

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- Set specific goals
- Provide feedback on the progress towards meeting those goals
- Consider job redesign
  - Job enlargement
  - Job enrichment

# Stress

- Edward Yourdon quotes a project manager:  
*‘Once a project gets rolling, you should be expecting members to be putting in at least 60 hours a week....The project manager must expect to put in as many hours as possible.’*
- 1960 study in US: people under 45 who worked more than 48 hours a week twice the risk of death from coronary heart disease.
- XP practice – maximum 40 hour working week



# Stress can be reduced by good project management

Good project management should lead to:

- Reasonable estimates of effort
- Good project control leading fewer unexpected crises
- Making clear what is expected of each team member – reduces **role ambiguity**
- Reduced **role conflict** where a person is torn between conflicting responsibilities

Bullying tactics are a symptom of incompetent project management.

# Health and safety

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- Apart from stress, health and safety less likely to be an issue compared to other engineering projects.
- ...but sometimes IT infrastructure may be set up as other building work is going on
- UK law lays down that organizations employing over 5 staff should have a **written safety policy**
- Management of safety should be embedded in project management.

# Health and safety - continued

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- Top management must be committed to health and safety (H&S) policy
- Delegation of responsibilities relating to H&S should be clear
- Job descriptions should include H&S related responsibilities
- Need to ensure those given H&S responsibilities should understand and accept them

# Health and safety - continued

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- There should be a designated safety officer
- Staff, particularly knowledgeable technical specialists, should be consulted about safety
- There should be an adequate H&S budget

# Ethical and professional concerns

Ethics relates to the moral obligation to respect the rights and interests of others – goes beyond strictly legal responsibilities

Three groups of responsibilities:

- Responsibilities that everyone has
- Responsibilities that people in organizations have
- Responsibilities relating to your profession or calling

# Organizational ethics

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There are some who argue that ethical organizational ethics are limited:

**Stockholder theory** (e.g. Milton Friedman). An employee's duty is to the owners of the business (which often means the stakeholders) above all others – although legal requirements must be met.

**Competitive relationships between businesses.** Competition may cause you to do things that could have a negative impact on the owners or employees of competitive businesses



# Software Engineering Code of Ethics

- The *Software Engineering Code of Ethics and Professional Practice* (SE Code) was developed by the ACM/IEEE-CS Joint Task Force on Software Engineering Ethics and Professional Practices and jointly approved by the ACM and the IEEE-CS as the standard for teaching and practicing software engineering. (<http://www.acm.org/serving/se/code.htm>)
- The preamble to the SE Code (short version) states:
  - Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession. In accordance with their commitment to the health, safety and welfare of the public, software engineers shall adhere to the following Eight Principles:

# Software Engineering Code of Ethics - Eight Principles



- **PUBLIC** - Software engineers shall act consistently with the public interest.
- **CLIENT AND EMPLOYER** - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
- **PRODUCT** - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
- **JUDGMENT** - Software engineers shall maintain integrity and independence in their professional judgment.
- **MANAGEMENT** - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
- **PROFESSION** - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
- **COLLEAGUES** - Software engineers shall be fair to and supportive of their colleagues.
- **SELF** - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.



# People in Agile Processes

- The process molds to the needs of the people and team, not the other way around.
- Some key traits must exist among the people on an agile team
  - Competence
  - Common focus
  - Collaboration
  - Decision-making ability
  - Fuzzy problem-solving ability
  - Mutual trust and respect
  - Self-organization

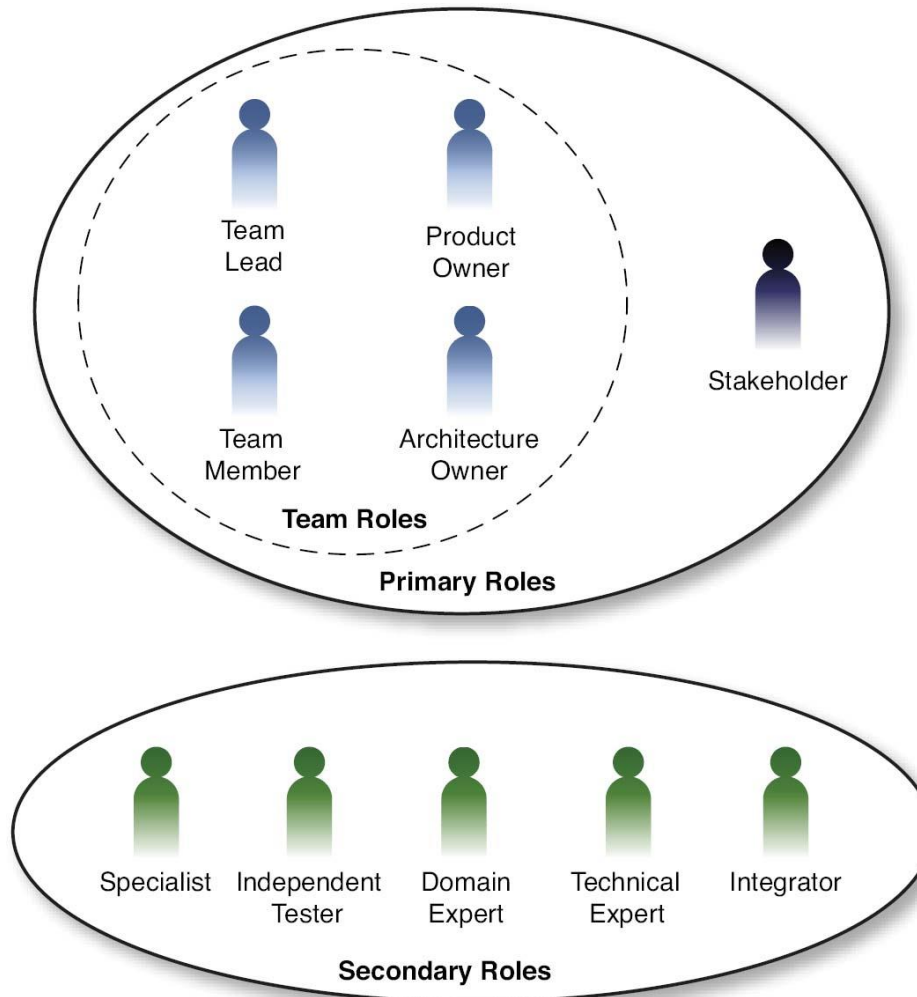
# Agile Team Members

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According to agile expert Scott Ambler, every member in agile team has

- Role
- Rights
- Responsibilities

# Agile Team Roles



# Agile Team Member Rights

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- To be treated with respect.
- To have decisions made in a timely manner.
- To produce and receive quality work.
- To estimate the activities you are involved with
  - and to have those estimates respected by others. These estimates should be as aggressive as possible yet still achievable.
- To be provided adequate resources,
  - including but not limited to time and money, to do the job that's been asked of you.
- To have commitments made to you honored,
  - and in case this is not possible to have alternatives negotiated with you in a timely manner.
- To determine how your resources will be invested.
  - For the people funding the project this is how the funds will be spent, and for the people working on the project (and thereby investing their time), this is what tasks they choose to work on.

# Agile Team Member Rights

- To be given the opportunity to gain the knowledge and skills
  - pertinent to making the project a success. For example, businesspeople will likely need to learn about the underlying technologies/techniques, and technical staff will likely need to learn about the business.
- To work in a "safe environment"
  - where people have the opportunity to make mistakes, and better yet to have those mistakes recognized as valuable learning opportunities.
- To be commended, nurtured, and supported.
- To be provided good-faith information in a timely manner.
  - Sometimes this is just the "best guess" at the time, and that's perfectly all right. This includes but is not limited to business information such as prioritized requirements and detailed domain concepts as well as technical information such as designs and detailed technical concepts.
- To own your organization's software processes,
  - following and actively improving these processes when needed.

# Agile Team Member Responsibilities

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- To produce a solution that best meets your stakeholder needs with the degree of resources they are willing to invest.
- To optimize your organization's resources (time and money) invested in your team/project.
- To be willing to collaborate extensively within your team as well as working with others outside your chosen specialties.
- To share all information, including "work in progress."
- To coach others in your skills and experiences.
- To validate your work to the best of your ability, as early as possible, working with others as needed to do so.



# Agile Team Member Responsibilities

- To actively expand your knowledge and skillset and apply these skills in areas outside your specialty when needed.
- To attend coordination meetings in person if on-site or through other means if not collocated.
- To proactively look for ways to improve your or your team's performance throughout the project (kaizen).
- To avoid accepting work currently outside the current iteration without agreement by the team. Any new work should be prioritized and addressed accordingly, regardless of the source of the work request.

# Project Stakeholder Management

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- **Identify Stakeholders** : The process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.
- **Plan Stakeholder Management** : The process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.
- **Manage Stakeholder Engagement** : The process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.
- **Control Stakeholder Engagement** : The process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders.



# Project Stakeholder Management

## Identify Stakeholders



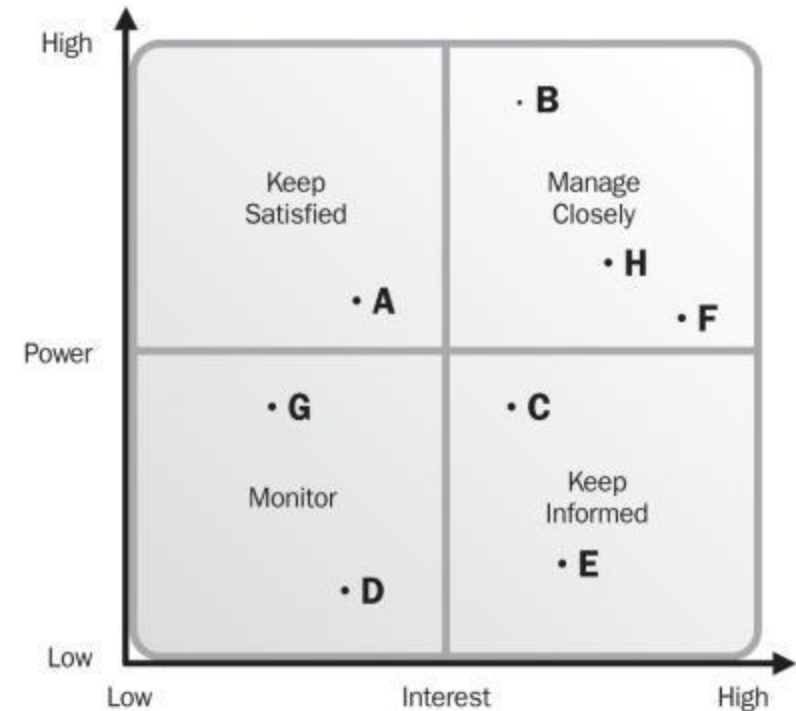
# Project Stakeholder Management

**Power/interest grid**, grouping the stakeholders based on their level of authority (“power”) and their level or concern (“interest”) regarding the project outcomes

**Power/influence grid**, grouping the stakeholders based on their level of authority (“power”) and their active involvement (“influence”) in the project

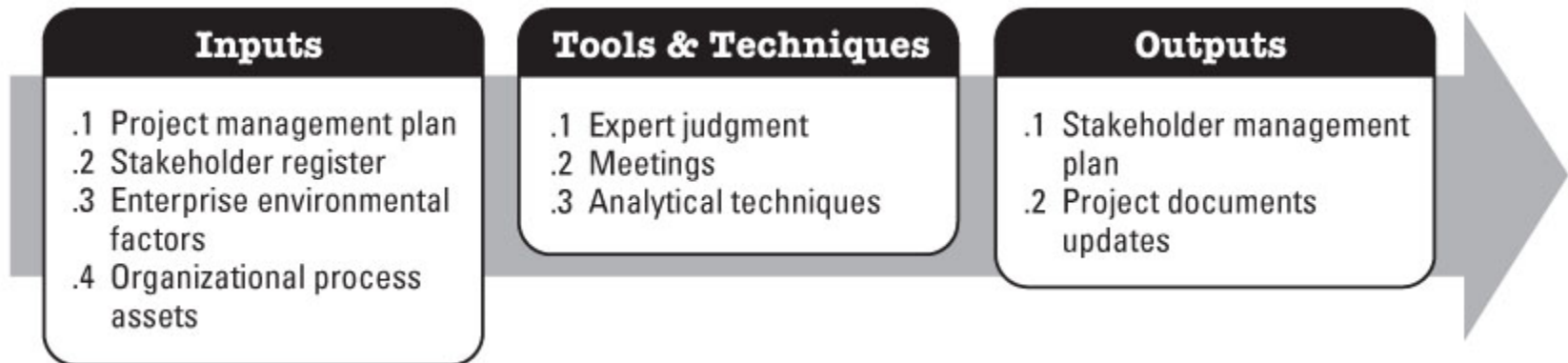
**Influence/impact grid**, grouping the stakeholders based on their active involvement (“influence”) in the project and their ability to effect changes to the project’s planning or execution (“impact”)

**Salience model**, describing classes of stakeholders based on their power (ability to impose their will), urgency (need for immediate attention), and legitimacy (their involvement is appropriate).



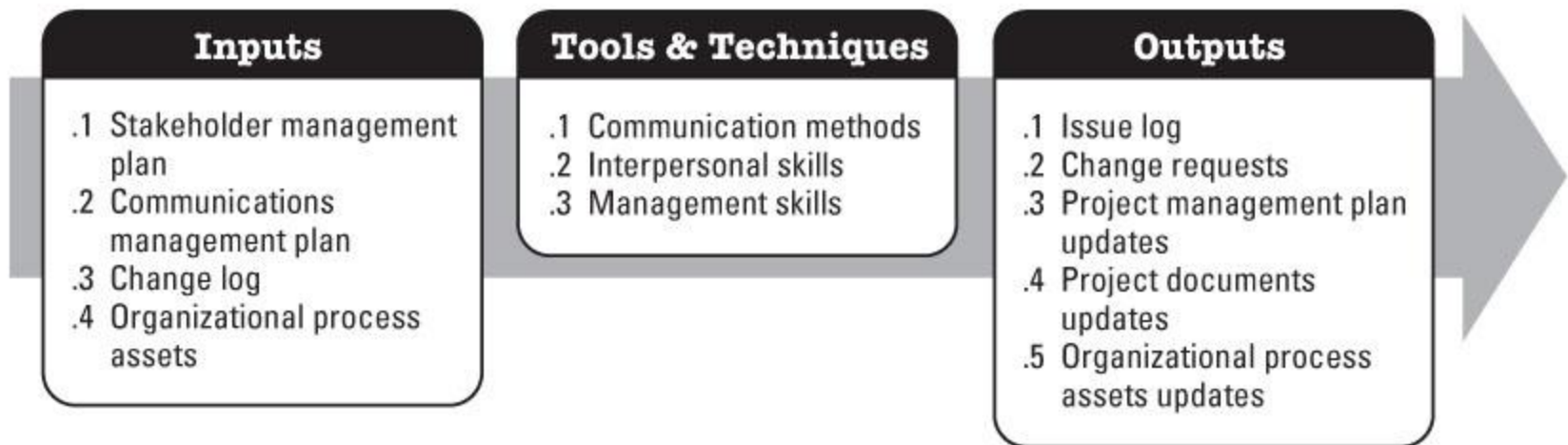
# Project Stakeholder Management

## Plan Stakeholder Management



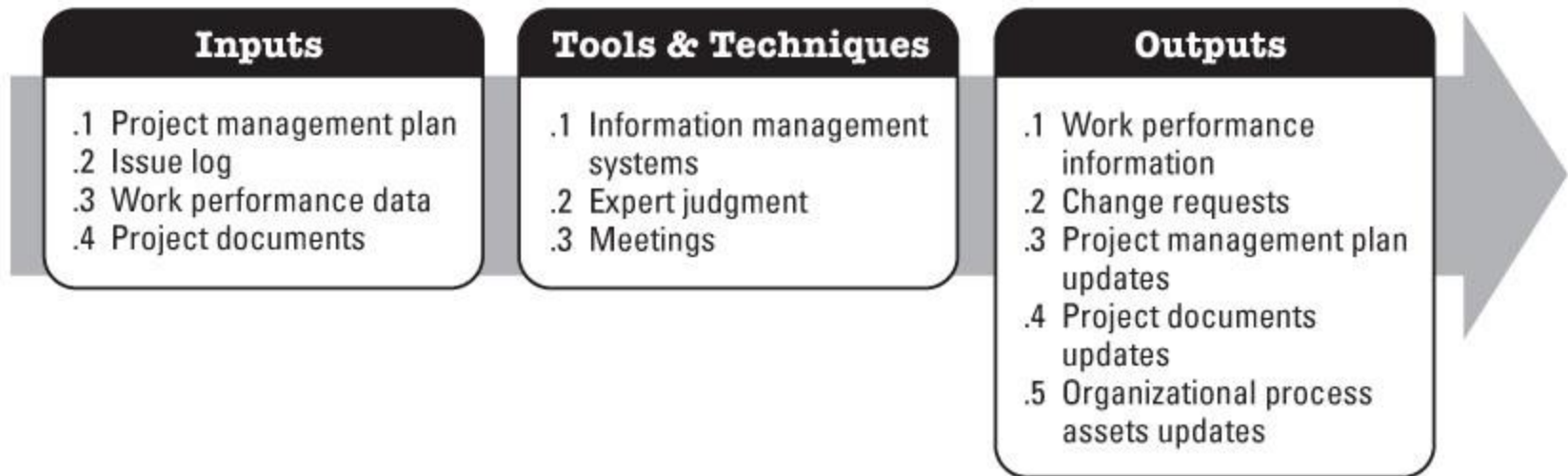
# Project Stakeholder Management

## Manage Stakeholder Engagement



# Project Stakeholder Management

## Control Stakeholder Engagement



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# Thank You

## Any Questions?