

Project Quality Management

Project Quality Management



Quality Definitions from Quality Gurus

1. 'Quality is Predictability' - Deming
2. 'Conformance to requirements' - Crosby
3. 'Fitness for use' - Juran
4. 'Customer's opinion' - Feigenbaum
5. 'The totality of characteristics of an entity that bear on its ability to satisfy stated and implied need' - ISO 8402:1994
6. Conformance to "Valid Requirements".
7. Customers' perception of the value of the suppliers' work output.
8. A perceived degree of excellence with a minimum, usually set forth by the customer.
9. Best value for money.

Quality Gurus

1. **Philip B Corssby**- Popularized concept of Zero Defect. He eliminate defects complete not only reduce it to acceptable quality level
2. **Dr. Eliyahu M Goldratt**- Theory of Constraints. Focus on single element on process chain which can address 99% problems.
3. **Dr. Edward Deming**- Deming Cycle (85% Quality Problems are related to Management)
4. **Dr. Joseph M Juran**- Developed Quality Trilogy (Q-Planning, Q-Improvement, Q-Control)
5. **Dr. Walter Shewhart**- PDCA (Theory of process control or Shewart Transformation Process)
6. **Dr. Genichi Taguchi**- Taguchi Methodology or Designing in Quality (Making a design which is less sensitive to variation rather than control the manufacturing variation)
7. **Dr. Kaoru Ishikawa**- Philosophy of Total Quality, Ishikawa Diagram
8. **Shigeo Shingo**- Developed lean concepts, refined JIT (lean manufacturing)
9. **Taiichi Ohno**- Developed concept of Seven Wastes; this is used to identify non-value-added activity
10. **Armand V Feigenbaum**: Developed Idea of Total Quality Control

Project Quality Management



Definition

Processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken

Project Quality Management

24. Plan Quality Management [PLANNING]

25. Perform Quality Assurance [EXECUTING]

26. Control Quality [M&C]

21. Plan Quality Management



Definition

Identifying quality requirements and/or standards for the project and product, and documenting how the project will demonstrate compliance.

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Plan Quality Management



1. Project Management Plan
2. Stakeholder Register
3. Risk Register
4. Requirement Documentation
5. Enterprise Environmental Factors
6. Organization Process Assets



1. Cost-benefit analysis
2. Cost of Quality
3. Seven basic quality tools
4. Benchmarking
5. Design of experiments
6. Statistical sampling
7. Additional quality planning tools
8. Meetings



1. Quality Management Plan
2. Process Improvement Plan
3. Quality Metrics
4. Quality Checklist
5. Project Documents Updates

Cost of Quality

Cost of Conformance

Prevention Costs

(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

**Money spent during the project
to avoid failures**

Cost of Nonconformance

Internal Failure Costs

(Failures found by the project)

- Rework
- Scrap

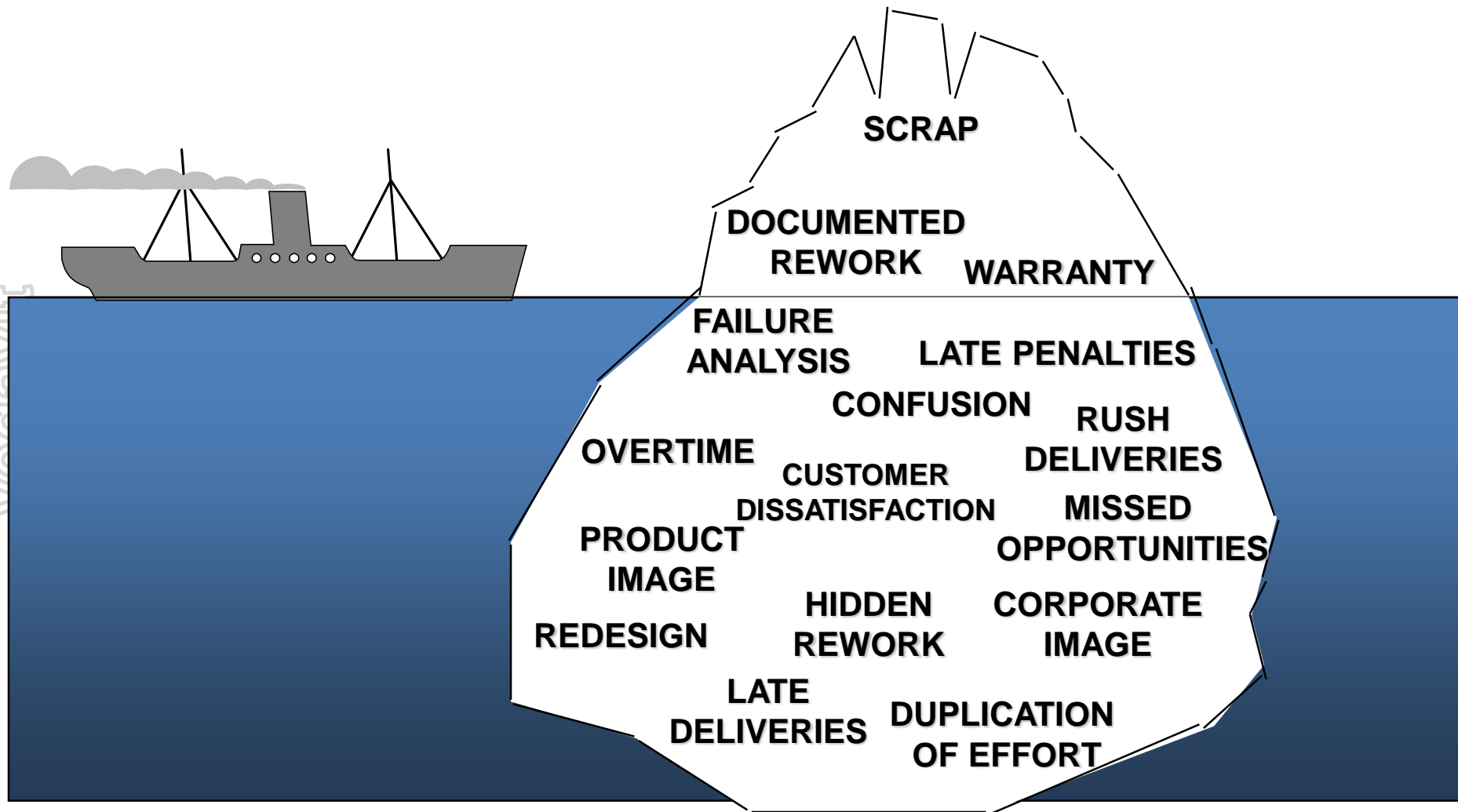
External Failure Costs

(Failures found by the customer)

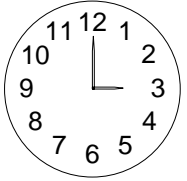
- Liabilities
- Warranty work
- Lost business

**Money spent during and after the project
because of failures**

Cost of Nonconformance- Iceberg



Exercise-21



5 Minutes

- a. Write sections of QMP of your project OR**
- b. Write Quality Metrics for your projects, their goal, and threshold values OR**
- c. Identify the name of checklists used in your project**

22. Perform Quality Assurance



Definition

Auditing quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions are used.

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Perform Quality Assurance



1. Quality Management Plan
2. Process Improvement Plan
3. Quality Metrics
4. Quality Control Measurements
5. Project Documents

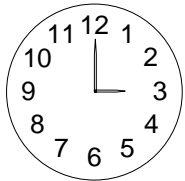


1. Quality Management & Control Tools
2. Quality audits
3. Process analysis



1. Change Requests
2. Organization Process Assets Updates
3. Project Management Plan Updates
4. Project Documents Updates

Exercise-22



5 Minutes

- a. Write the number of NCs were discovered in your project corresponding to the processes**
- b. Who is responsible to close NCs and report their status**
- c. List the corrective or preventive actions suggested by auditors**

23. Control Quality



Definition

Monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

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Control Quality



1. Project Management Plan
2. Quality Metrics
3. Quality Checklist
4. Work Performance Data
5. Approved Change Requests
6. Deliverables
7. Project documents
8. Organization Process Assets



1. Seven basic quality tools
2. Statistical sampling
3. Inspection
4. Approved Change Request Review



1. Quality Control Measurements
2. Validated Changes
3. Validated deliverables
4. Work Performance Information
5. Change Requests
6. Project Management Plan Updates
7. Project Documents Updates
8. Organization Process Assets Updates

7 Basic Quality Tools

1. Cause & Effect Diagram/ Fish Bone Diagram
2. Flowcharts
3. Checksheets
4. Pareto Diagram
5. Histograms
6. Control Charts
7. Scatter Diagrams

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Cause & Effect Diagram

Fishbone Diagram: Root Cause Analysis of Sleeping Problem

```

graph LR
    subgraph Left_Side [ ]
        direction TB
        M1[Materials] --> P1[Petroleum]
        M1 --> G1[Gases]
        M1 --> C1[Colors]
        M1 --> S1[Substance]
        P1 --> D1[Disturbance]
        G1 --> D1
        C1 --> D1
        S1 --> D1
        D1 --> E1[Sleep odor]
        E1 --> P1
    end

    subgraph Right_Side [ ]
        direction TB
        M2[Methods] --> A1[Air pH]
        M2 --> C2[Coal impurities]
        M2 --> O2[Open window]
        A1 --> W1[New window]
        C2 --> W1
        O2 --> W1
        W1 --> S2[Strong odor]
        S2 --> E2[Awake at 3AM Daily & strong odor]
        Man[Manpower] --> W2[Working during classmate]
        W2 --> D2[Disturbed by wind]
        D2 --> E3[People]
        E3 --> P2[People]
        Machine[Machine] --> A2[Animal]
        A2 --> S3[Sound]
        S3 --> F2[Fryed food]
        F2 --> G3[Grass]
        G3 --> T2[Trash]
        T2 --> E4[Environment]
        E4 --> P3[People]
    end
  
```

The diagram illustrates the following causes and effects:

- Materials (Left):** Petroleum, Gases, Colors, Substance → Disturbance → Sleep odor → People
- Methods (Right):** Air pH, Coal impurities, Open window → New window → Strong odor → Awake at 3AM Daily & strong odor
- Manpower (Right):** Working during classmate → Disturbed by wind → People
- Machine (Right):** Animal → Sound → Fryed food → Grass → Trash → Environment → People

Flowcharts

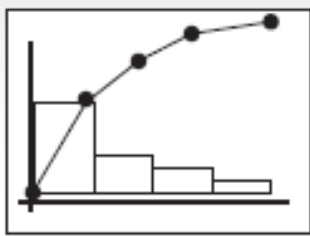
```

graph TD
    Start([Start]) --> 1[1 Project identified]
    1 --> 2[2 Plan developed]
    2 --> 3[3 Project initiated]
    3 --> D1{Project Approved?}
    D1 -- No --> 4[4 Project Rejected]
    D1 -- Yes --> 5[5 Project Approved (on file)]
    4 --> End1([End])
    5 --> 6[6 Change Request for Project]
    6 --> 7[7 Change Request for Approval]
    7 --> D2{Change Request Approved?}
    D2 -- No --> 8[8 Change Request Rejected]
    D2 -- Yes --> 9[9 Change Request Approved (on file)]
    8 --> End1
    9 --> 10[10 Project Approved (on file)]
    10 --> End2([End])
  
```

Checksheets

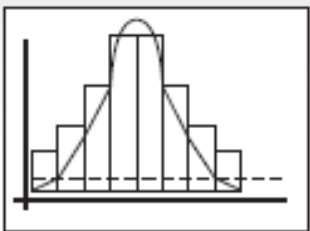
<i>Category</i>	<i>Strokes</i>	<i>Frequency</i>
Attribute 1		
Attribute 2		
Attribute <u> </u>		
Attribute n		

Pareto Diagrams



A Pareto Diagram is a type of bar chart that displays the frequency of different categories of data. The bars are arranged in descending order of frequency. A line graph is overlaid on the bars, connecting the tops of the bars, which represents the cumulative frequency of the data.

Histograms



A histogram with a normal distribution curve overlaid. The histogram has 10 bars of equal width. The curve is bell-shaped and centered over the histogram, illustrating the relationship between the two types of data displays.

Control Charts

X-bar chart for cement time

Y-axis: SAMPLE MEAN (0 to 20)

X-axis: SAMPLE NUMBER (1 to 20)

Control Limits: UCL (Upper Control Limit) at 20, Avg (Average) at 10, LCL (Lower Control Limit) at 0.

Scatter Diagrams

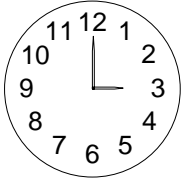
A scatter diagram illustrating the relationship between Temperature in Degrees Celsius (X-axis) and P S II (Y-axis). The X-axis is logarithmic, ranging from 1 to 1000. The Y-axis is also logarithmic, ranging from 10 to 1000. The data points show a strong positive correlation, with a regression line drawn through them. The coefficient of determination is $R^2 = 73$.

Sigma Values

Sigma	Yield	Defects in Millions
+/-2	95.44%	45600
+/-3	99.73%	2700
+/-6	99.9999997%	0.002

Sigma level (with 1.5 sigma shift)	DPMO	Percentage yield
1	691,462	30.8550%
2	308,538	69.1462%
3	66,807	93.3193%
4	6,210	99.3790%
5	233	99.9770%
6	3.4	99.99966%
7	0.019	99.999966%

Exercise-23



5 minutes

- a. Write the Quality control activities on your project
- b. List the values of various quality control measures on your project.
- c. List the validated deliverables

Discussions !

Project Human Resource Management

Project HR Management- Make it Happen

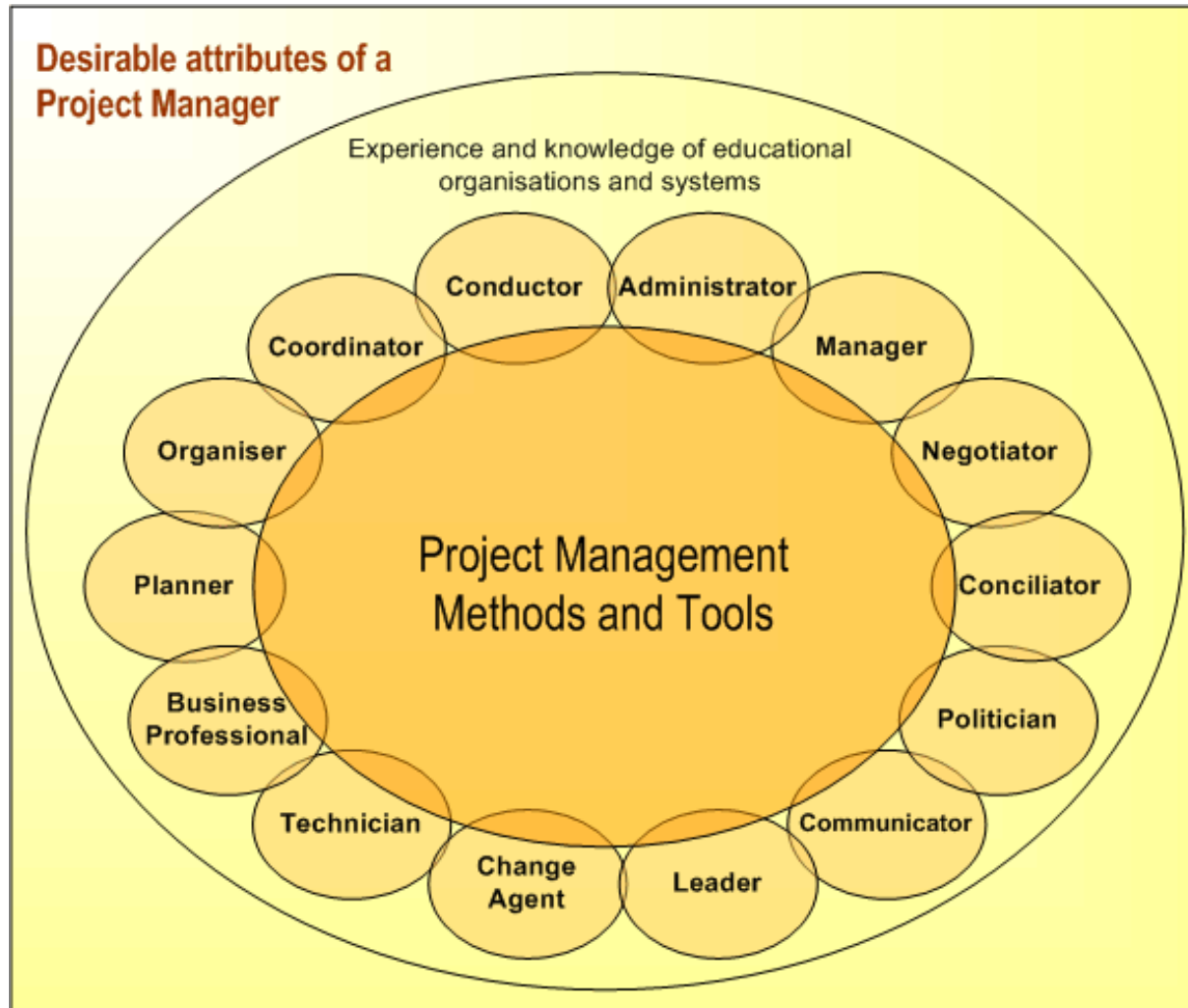


Project HR Management- Balancing All



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Project Management- Soft skills



Project Management- Soft skills are Hard



Mentoring,
Consulting,
Coaching,
Delegation,
Persuasion,
Influence,
Politics,
Negotiation
.....
softskills hard to learn

Project Human Resource Management



Definition

Processes that organize, manage and lead the project team.

Project team is comprised of the people with assigned roles and responsibilities for completing the project.

Project HR Management

27. Plan Human Resource Management [PLANNING]

28. Acquire Project Team [EXECUTING]

29. Develop Project Team [EXECUTING]

30. Manage Project Team [EXECUTING]

27. Plan Human Resource Management



Definition

**Identifying and documenting project roles,
responsibilities and required skills, reporting
relationships and creating a staffing
management plan.**

Plan Human Resource Management



1. Project Management Plan
2. Activity Resource Requirements
3. Enterprise Environmental Factors
4. Organization Process Assets



1. Expert Judgement
2. Organization Charts and position descriptions
3. Networking
4. Organizational Theory
5. Meetings



1. Human Resource Management Plan

Human Resource Management Plan

- Roles & Responsibilities (Role, Authority, Responsibility, Competency)
- Project organization chart
- Staffing management plan
 - Staff acquisition plan: From where and when the people will come, at what location they will come to work, what are the cost associated with each expertise, what kind of assistance is required from HR and functional manager of the resource
 - Resource calendar: When the recruitment should start, resource availability (resource histogram),
 - Staff release plan: When and how to release resources for smooth transition, so that resource cost is not counted in the project
 - Training need
 - Recognition & rewards
 - Complying with union contracts, government regulation or other HR policies

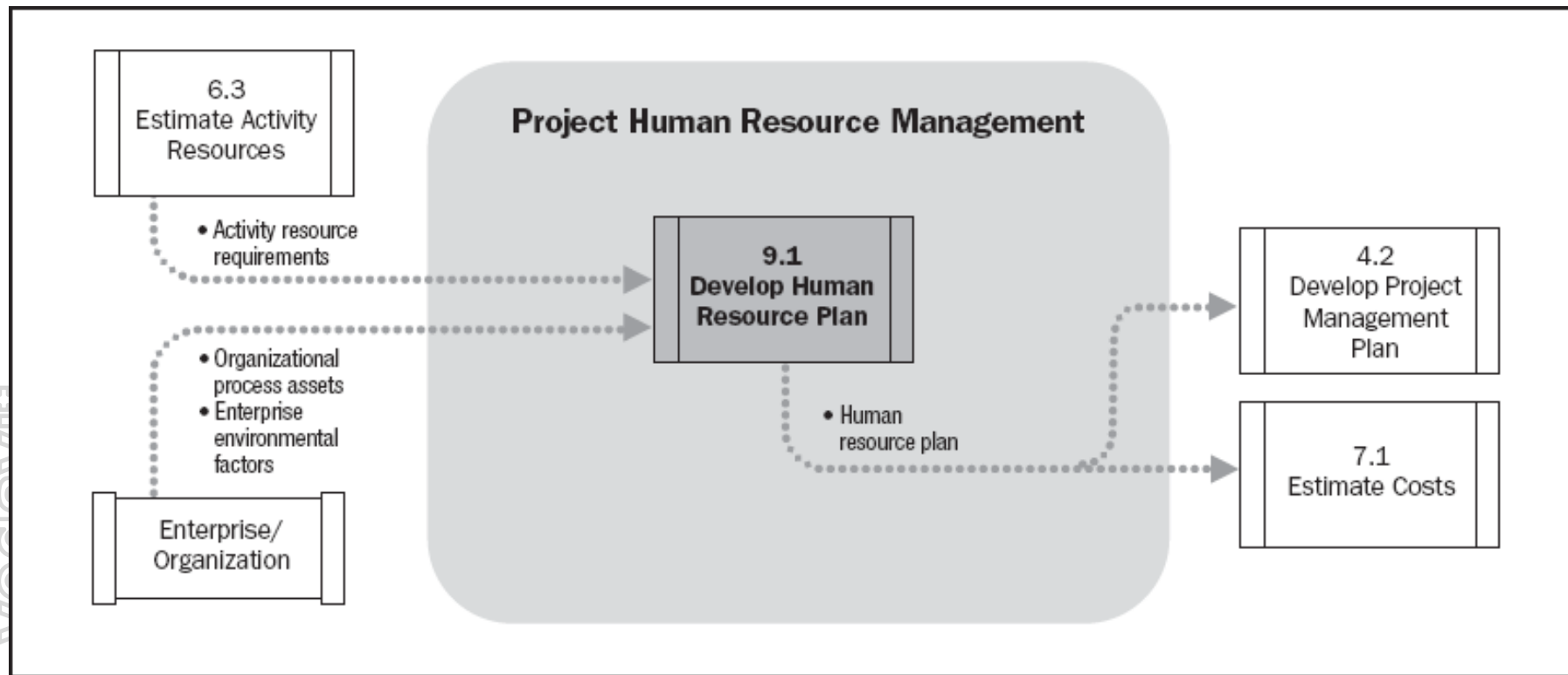


Figure 9-3. Develop Human Resource Plan Data Flow Diagram

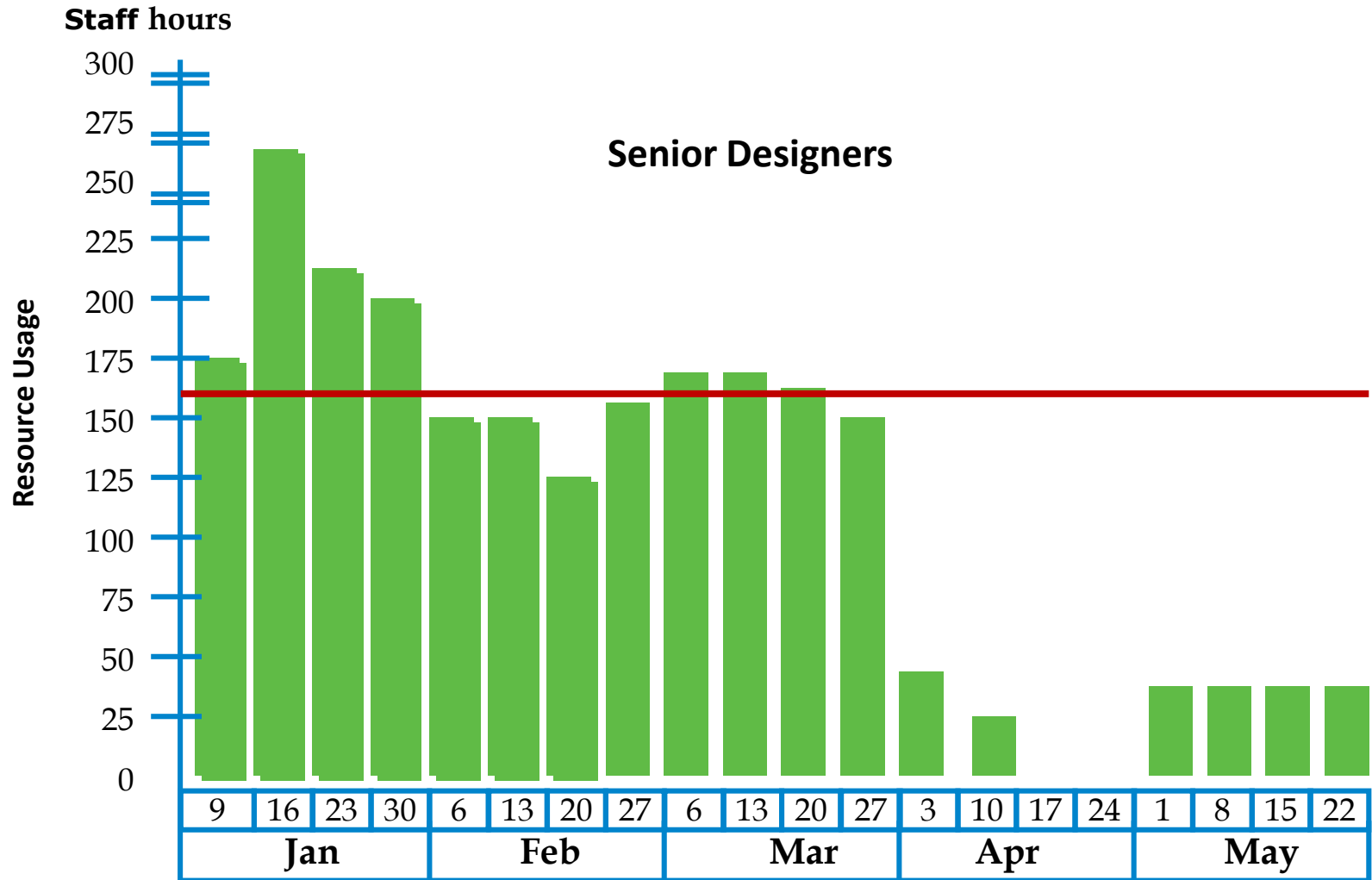
Responsibility Assignment Matrix - RAM

PERSON PHASE	Shiv	Ram	Jim	Karl	Rita	Mohan	...
Requirements	S	R	A	P	P		
Functional	S		A	P		P	
Design	S		R	A	I		P
Development		R	S	A		P	P
Testing			S	P	I	A	P

P = Participant A = Accountable R = Review required

I = input required S = Sign-off required

Resource Histogram



28. Acquire Project Team



Definition

Confirming human resource availability and obtaining the team necessary to complete project assignments

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Acquire Project Team



1. Human Resource Management Plan
2. Enterprise Environmental Factors
3. Organization Process Assets



1. Pre-assignment
2. Negotiation
3. Acquisition
4. Virtual Teams
5. Multi-criteria decision analysis



1. Project Staff Assignments
2. Resource Calendars
3. Project Management Plan Updates

29. Develop Project Team



Definition

Process of improving competencies, team interaction, and the overall team environment to enhance project performance.

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Develop Project Team



1. Human Resource Management Plan
2. Project Staff Assignments
3. Resource Calendars



1. Interpersonal Skills
2. Training
3. Team-building activities
4. Ground Rules
5. Co-location
6. Recognition and Rewards
7. Personnel Assessment Tools



1. Team Performance Assessments
2. Enterprise Environmental Factors Updates

Team Performance Assessment..

- Skills acquired which increased productivity
- Reduced turnover rate
- Perform better within team
- Increased cohesiveness- sharing info/
openness

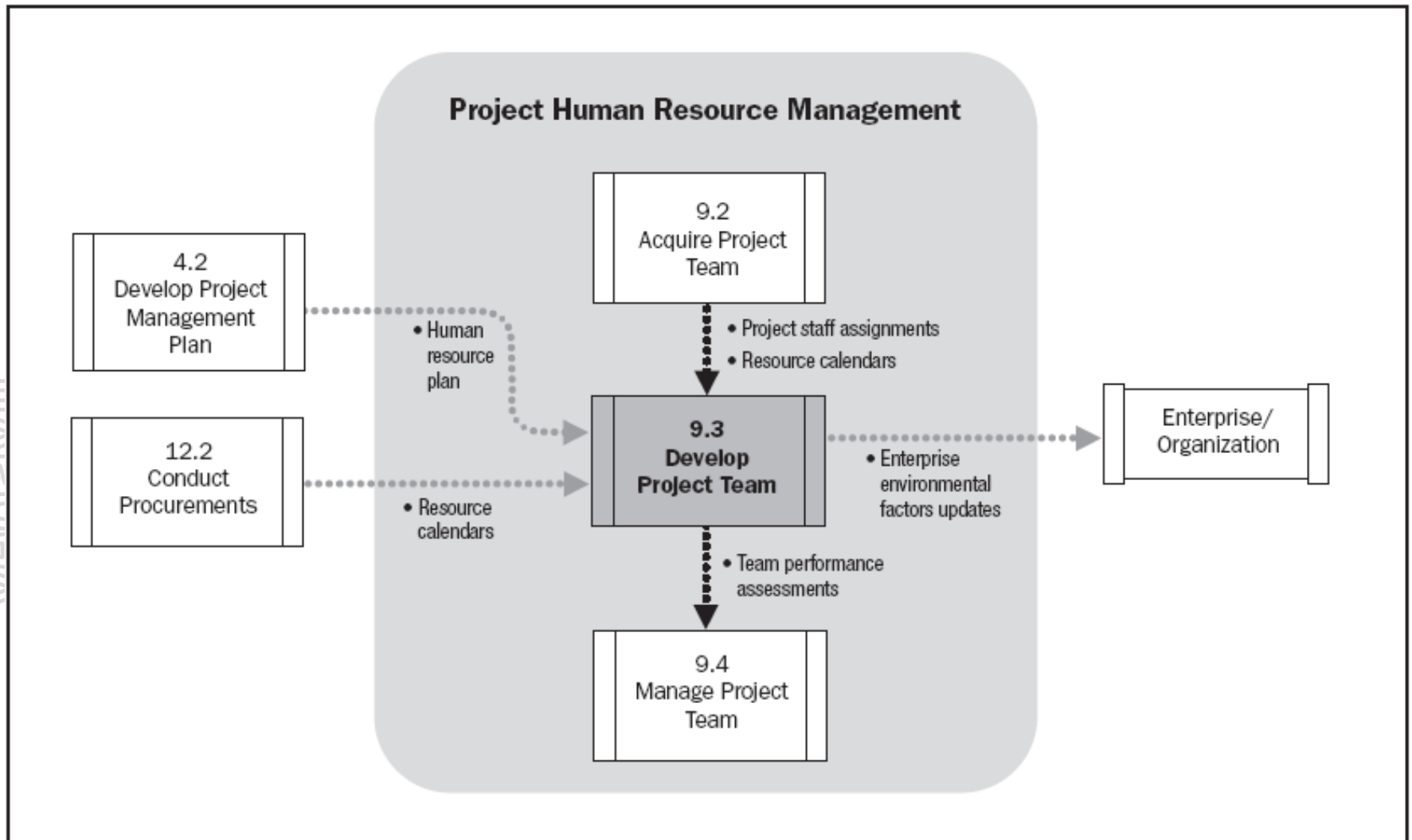


Figure 9-10. Develop Project Team Data Flow Diagram

30. Manage Project Team



Definition

Tracking team member performance, providing feedback, resolving issues and managing changes to optimize project performance.

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Manage Project Team



1. Human Resource Management Plan
2. Project Staff Assignments
3. Team Performance Assessments
4. Issue Log
5. Work Performance Report
6. Organization Process Assets



1. Observation & Conversation
2. Project Performance Appraisals
3. Conflict Management
4. Interpersonal Skills



1. Change Requests
2. Enterprise Environmental Factors Updates
3. Project Management Plan Updates
4. Project Documents Updates
5. Organization Process Assets Updates

Types of Power

- ✓ Formal – positional, granted by organizational/upper mgmt
- ✓ Expert – power earned through a recognized level of knowledge or skill in a specific area
- ✓ Reward – the power to give a positive consequences, like promotions, salary rise etc.
- ✓ Penalty – the power to provide negative consequences, like suspension, termination, reprimands
- ✓ Referent – power gained when team members admire, and willingly follow an individual as a role model

Team Development / Tuckman Model

✓ Five Stages of Team development

- ✓ **Forming** – Members of the group get to know each other and try to set up some ground rules about behavior
- ✓ **Storming** – Conflicts arise as various members of the group try to exert leadership and the methods of operation are being established
- ✓ **Norming** – Conflicts are largely settled and a feeling of group identity emerges
- ✓ **Performing** – Emphasis now is the task at hand
- ✓ **Adjourning** – The group disbands

Sequence is followed for each individual/group

Big Concepts

Conflict Resolution

Motivational Theories

Leadership Styles

Management Theories

Conflict Management

Conflicts - good or bad ???

Traditional view – Conflicts are bad, created by people and to be avoided

Current view – Conflicts are good and need to be confronted in order to bring out real issues and resolve them

Conflict Management

Sources of conflict

- ❖ Schedules
- ❖ Project Priorities
- ❖ Technical Issues
- ❖ Personality Conflict
- ❖ Cost
- ❖ Scarce resources
- ❖ Personal work styles
- ❖ Administrative Procedures

Conflict Management

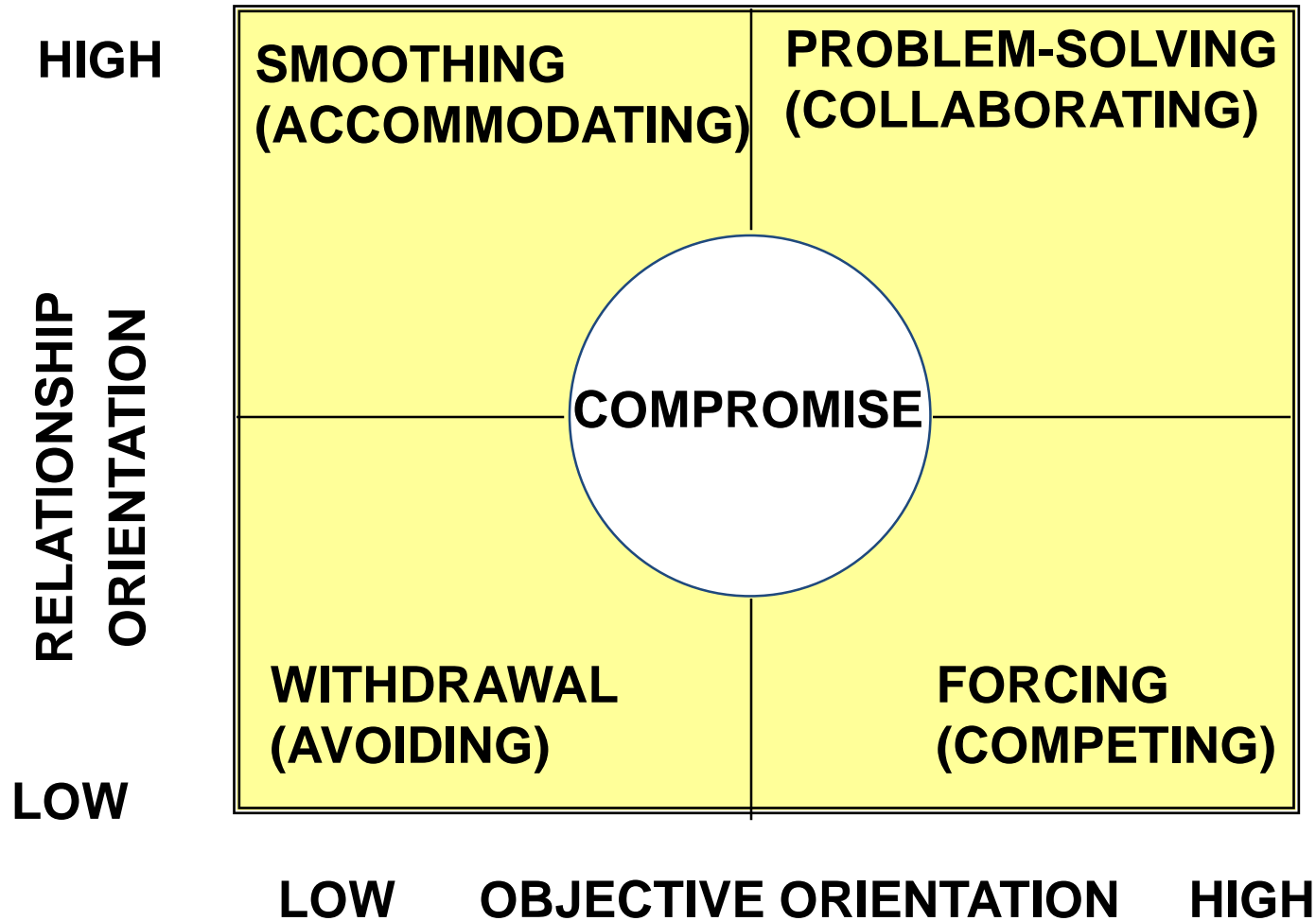
Characteristics of conflict

- ❖ Conflict is natural and forces a search for alternatives
- ❖ Conflict is team issue
- ❖ Openness resolves conflict
- ❖ Conflict resolution should focus on issues, not personalities
- ❖ Conflict resolution should focus on the present not on the past

Conflict Resolution

- ❖ Withdrawal – avoiding, giving up, stop gap, passive reaction, buying time, appropriate for “cooling off” time, no solution. Lose-lose outcome
- ❖ Smoothing – grudging agreement, avoids conflict, appeasing, friendly atmosphere. No lasting solution, lose outcome
- ❖ Compromising – bargaining, acceptable agreement, some satisfaction to each party, not ideal solution, trade off, a form of definitive solution. Lose outcome.
- ❖ Confronting/Problem Solving – approached as an issue to be solved by examining alternatives.
Give and take attitude, open dialog – direct approach, pinpoints problem, develops alternatives, objectively resolves issues, time consuming, ultimate solution, Win-Win outcome
- ❖ Collaborating – leading to consensus and commitment by incorporating multiple viewpoints and insights from differing perspectives.
- ❖ Forcing – Uses power, used as a last resort, ill feeling may result, Win-lose outcome. Win-Lose outcome

Conflict Resolution



Motivational Theories



Motivational Theories

1. Frederick Herzberg's Hygiene & Motivation Factors
2. Abraham Maslow's Hierarchy of Needs
3. Expectancy Theorem of Motivation by Victor Vroom
4. Job characteristics model of Oldham-Hackman
5. Theory X & Y of McGregor

Motivational Theories

Frederick Herzberg

Hygiene Factors and Motivating Agents (1954)

Hygiene factors

- ✓ Supervision
- ✓ Company policy and administrator
- ✓ Positive working Condition
- ✓ Interpersonal relations
- ✓ Job Security
- ✓ Status
- ✓ Compensation
- ✓ Personal life

Presence will not guarantee higher productivity
Absence will result in poor productivity

Motivational Theories

Frederick Herzberg

Hygiene Factors and Motivating Agents (1954)

Motivating factors

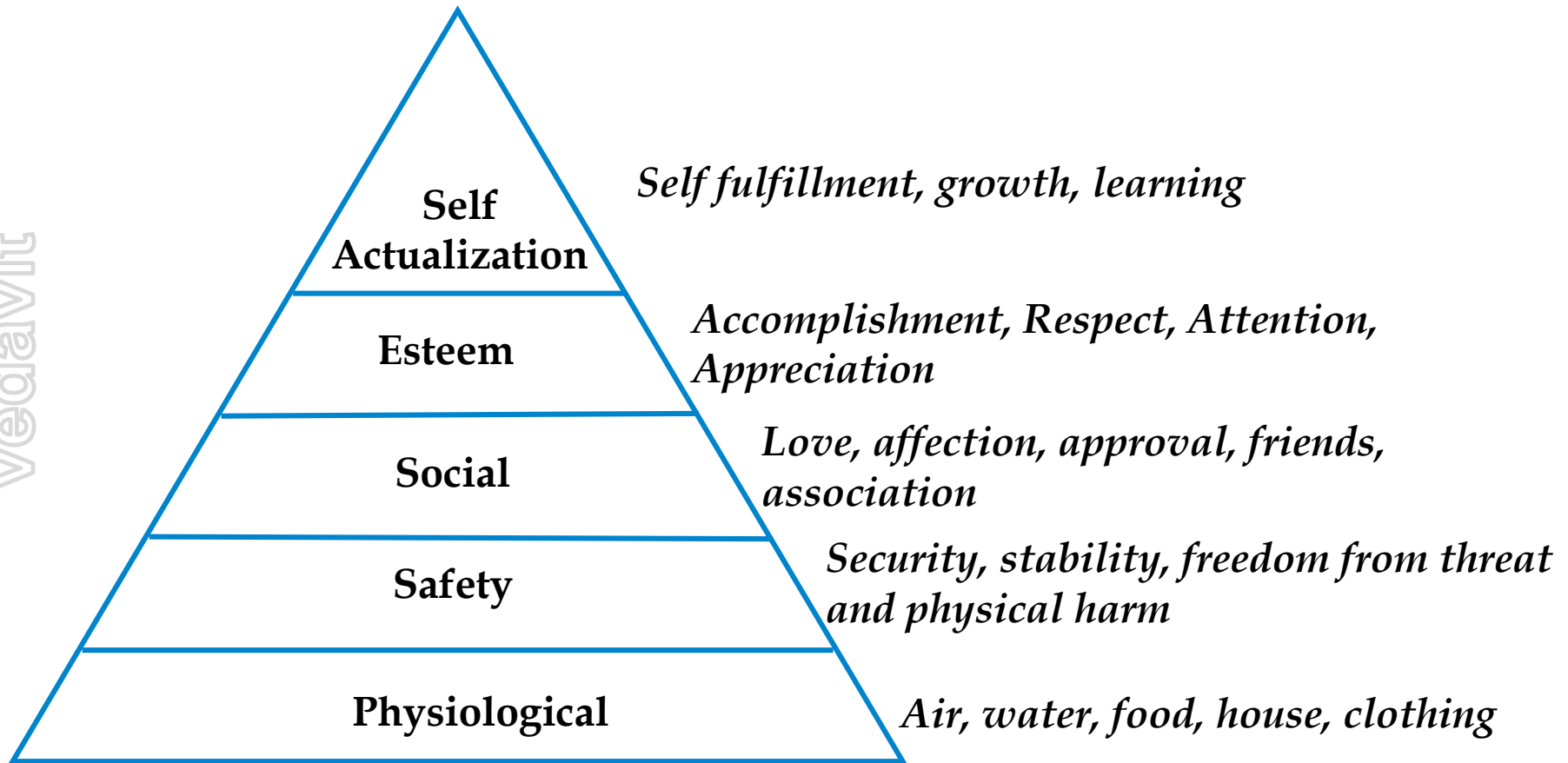
- ✓ Achievements
- ✓ Recognitions
- ✓ Work Itself
- ✓ Responsibility
- ✓ Advancement
- ✓ Possibility for growth

Motivation will not work without Hygiene.

Motivational Theories

Abraham Maslow's Hierarchy of Needs (1954)

(In order of priority)



Motivational Theories

Expectancy Theorem of Motivation by Victor Vroom

The extent to which an individual is motivated...

The level of expectation of their efforts will result in a desired outcome (effort performance linkage)

(Is the work important?)

The expectation that good work will be rewarded (Performance-reward linkage)

(Will I be rewarded?)

Attractiveness of the reward

(What is the value of the reward?)

Motivation will be high when all three factors are high

Motivational Theories

The Oldham-Hackman job characteristics model

- ✓ **Skill Variety** – the number of job skills that the job holder has the opportunity to exercise
- ✓ **Task Identity** – the degree to which your work and its result are identifiable as belonging to you
- ✓ **Task Significance** – the degree to which your job has an influence on others
- ✓ **Autonomy** – the discretion you have about the way that you do the job
- ✓ **Feedback** – the information that you get back about the result of your work

Motivational Theories

McGregor's Theory X

- ✓ The average worker is inherently lazy and needs supervisions
- ✓ The average worker dislikes work and avoids work whenever possible
- ✓ To induce adequate effort, the supervisor must threaten punishment and exercise careful supervision
- ✓ The average worker avoids increased responsibility and seeks to be directed

Theory X relies on Strict Rules, Performance incentives, Rewards, Threats to job security

Motivational Theories

McGregor's Theory Y

- ✓ Workers are willing to do the job without continuous supervision
- ✓ The average worker wants to be active and finds the physical and mental effort on the job satisfying
- ✓ Greatest results come from willing participation which will tend to produce self-direction towards goals without coercion and control
- ✓ The average worker seeks opportunity for personal improvement and self respect

Theory Y relies on worker participation in decisions, cordial manager-worker relationships, worker designed job methodology, worker individualism

Leadership Theories

Leadership Theories

- ✓ Theory Z of William Ouchi
- ✓ Contingency Theory of Fred Fiedler

Leadership Theories

Theory Z Proposed by William Ouchi

According to Theory Z, people who don't fit either Theory X or Theory Y are really a combination of the two.

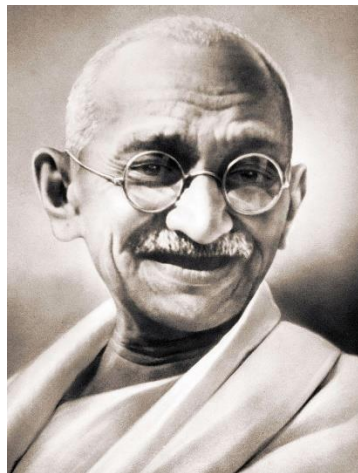
People who develop a leadership style based on Theory Z, use different styles of leadership with different people, depending on the situation.

Leadership Theories

Contingency Theory of Fred Fiedler

- ✓ No theory is best theory. Because best depends upon individual manager and organization.
- ✓ Built on a combination of Theory Y behaviors and the Hygiene Theory
- ✓ People are motivated to achieve level competency and will continue to be motivated by this need even after competency is reached

Leadership



Leadership Style

How leaders lead the group

Leadership Style

1. Transactional Leadership

This style of leadership starts with the premise that team members agree to obey their leader totally when they take a job on.

The “transaction” is usually that the organization pays the team members, in return for their effort and compliance.

Leadership Style

2. Autocratic Leadership

Under the autocratic leadership styles, all decision-making powers are centralized in the leader as shown such leaders are dictators.

Autocratic leadership is an extreme form of transactional leadership, where a leader exerts high levels of power over his or her employees or team members.

Leadership Style

3. Transformational Leadership

Transformational leadership is a leadership style that is defined as leadership that creates valuable and positive change in the followers.

A person with this leadership style is a true leader who inspires his or her team with a shared vision of the future.

Transformational leaders are highly visible, and spend a lot of time communicating.

Leadership Style

4. Servant Leadership

When someone, at any level within an organization, leads simply by virtue of meeting the needs of his or her team, he or she is described as a “servant leader”.

Servant Leadership’s focus was on the leader as a servant, with his or her key role being in developing, enabling and supporting team members, helping them fully develop their potential and deliver their best.

Leadership Style

5. Charismatic Leadership

Charismatic leaders can tend to believe more in themselves than in their teams.

Transformational Leader has a basic focus of transforming the organization and, quite possibly, their followers, the Charismatic Leader may not want to change anything.

Leadership Style

6. Democratic or Participative Leadership

Although a democratic leader will make the final decision, he or she invites other members of the team to contribute to the decision-making process.

Leadership Style

7. Laissez-Faire Leadership

This French phrase means “leave it be”

It is one in which the manager provides little or no direction and gives employees as much freedom as possible.

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Leadership Style

8. Bureaucratic Leadership

This is style of leadership that emphasizes procedures and historical methods regardless of their usefulness in changing environments.

Bureaucratic leaders attempt to solve problems by adding layers of control, and their power comes from controlling the flow of information.

Management Theories

The way managers manage their
work and people

Management Theories

Management styles are characteristic ways of making decisions and relating to subordinates

- ✓ Autocratic – traditional figure of a boss who makes binding decisions regardless of what subordinates think or desire
- ✓ Laissez-Faire – Other extreme of autocratic, the staff can pursue anything they wish, enhances free thinking
- ✓ Democratic – participative, decisions made jointly by management and staff
- ✓ MBWA- Management by Walking around

Key to Successful Team Management

- ✓ Listens to subordinates to diagnose or solve problems
- ✓ Sets goals and develops short- and long- range action plans
- ✓ Gives directions about who is to do which tasks to what standards
- ✓ Provides feedback on task performance
- ✓ Rewards or disciplines task performance and personal characteristics
- ✓ Develops subordinates

Key to Successful Team Management

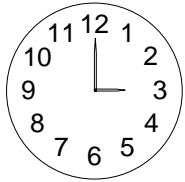
- ✓ Understanding that team is an Integral Unit of Organization
- ✓ A team mission, objective, goals, strategy and role definition
- ✓ A leader and an organizational support system
- ✓ Managers responsive to needs of team members
- ✓ Encourage participation and effective communication
- ✓ Foster an atmosphere of trust among team members
- ✓ Provide feedback effectively
- ✓ A collective culture and style
- ✓ Motivate team members with challenges & rewards

Halo effect

The halo effect is the assumption that because the person is good at a technology they'd also be good at managing a project. (Which may be wrong assumption).

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Exercise-24



5 Minutes

1. Prepare Human Resource Management Plan Including

- **Staffing Management Plan for your project**
- **Project Organization Structure**
- **Ground Rules for working in project**
- **Prepare Project Calendar**
- **Prepare a training plan**
- **Prepare a hiring plan**
- **Appraisal and Feedback Plan**

2. Discuss servant Leadership

Discussions !