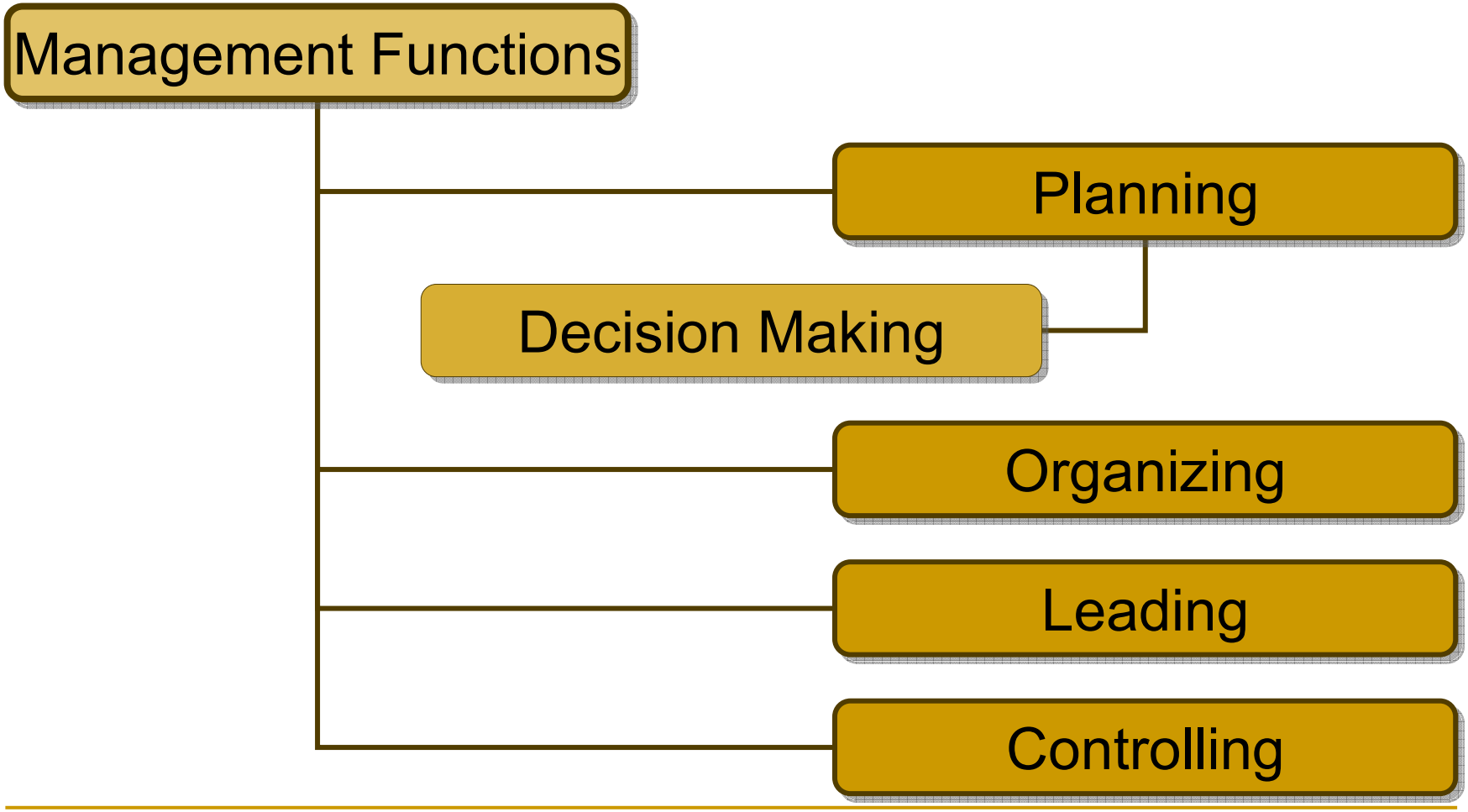
IENG 450
INDUSTRIAL MANAGEMENT

CHAPTER 7
LEADING TECHNICAL PEOPLE

Functions of Management



Leadership

- Harry S. Truman (president who sent atomb bobm to Hiroshima and Nagasaki) defined leadership as

  - “the ability to get men to do what they don’t want to do and like it.”

Leadership and Management

- Leadership:
  - A relationship between the leader and the led and management as a function.
  - The leader uses passion and emotion, the manager uses a more formal, rational method.
  - Managers are quite often experienced in their field and worked their way up within the company.
  - A leader may be a new arrival to the company, with fresh ideas.
  - Often companies do not distinguish between the two positions and as a result many place a manager into a leadership role.

Nature of Leadership

- Leadership is the process of getting the cooperation of others in accomplishing a desired goal.
- People become leaders by appointment or through emergence.
  - *Formal* leaders are appointed branch manager or committee chari or team captain and have the advantage of formal authority (including popwer to reward and punish).
  - *Emergent* (informal) leader evolve from their expertise or referrent power as it is expressed in the porcess of group activity.

Leadership Traits

- Physical Traits
  - Health,
  - Vitality,
  - Endurance.

- Personal Attributes
  - Personal magnetism,
  - Cooperativeness,
  - Enthusiams,
  - Ability to inspire,
  - Persuasiveness,
  - Forcefullness,
  - Tact.

Leadership Traits

- Character Atributes
  - Integrity,
  - Humanism,
  - Self-discipline,
  - Stability,
  - Industry.
- Intellectual qualities
  - Mental capacity,
  - Ability to teach others,
  - Scientific approach to problems.

Myers-Briggs Preferences

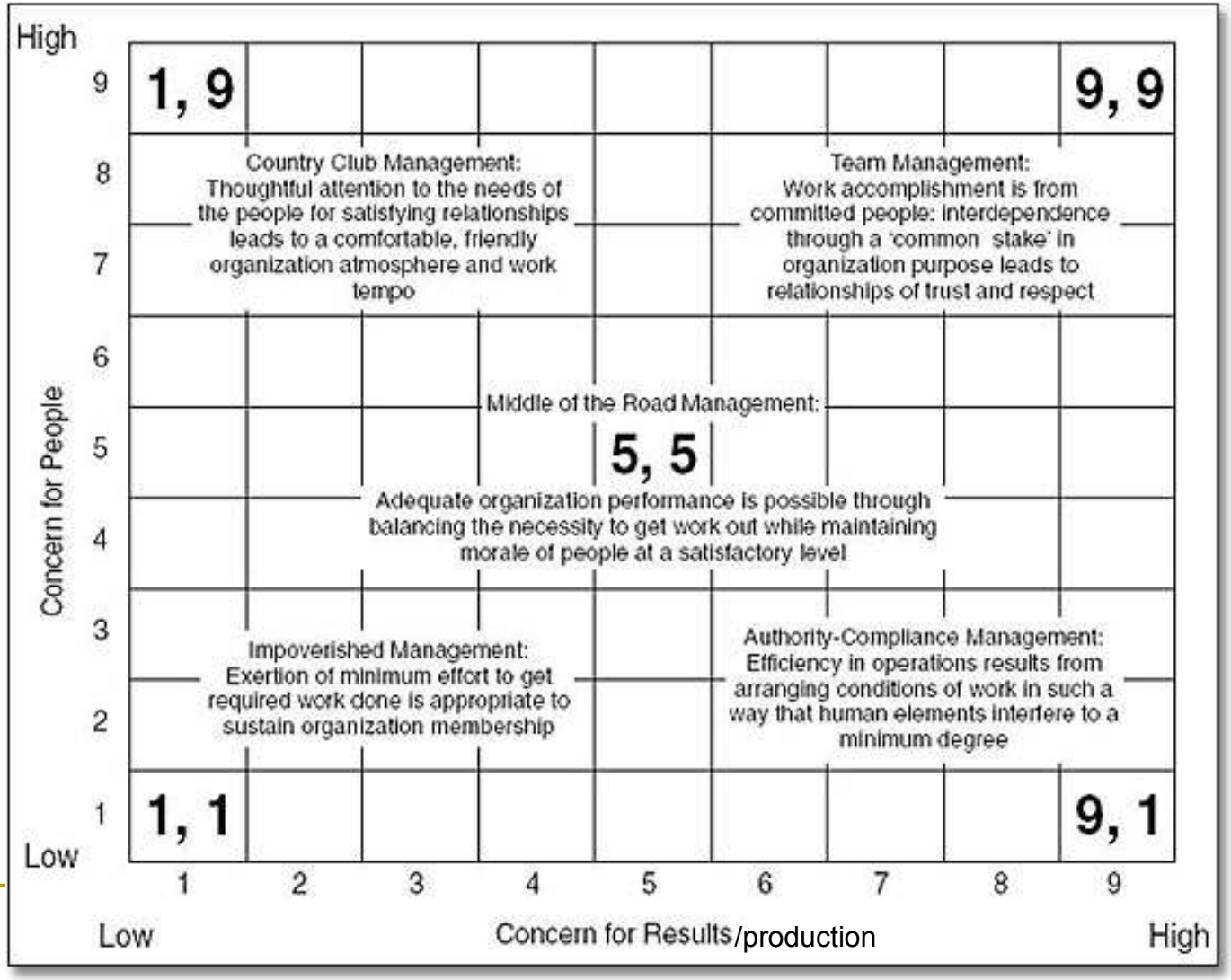
- *The Myers-Briggs Type Indicator (MBTI)* measures personal preferences on four scales, each made up of two opposite preferences:

1. *Extraversion* **E**: focused on the outer world of people and things.
   Introversion **I**: focused on the inner world of ideas and impressions.
2. *Intuition* **N**: focused on the future, with a toward patterns and responsibilities.
   Sensing **S**: focused on the present and on concrete information and gained from the senses.
3. *Thinking* **T**: basing decisions on logic and on objective analysis of cause and effect.
   Feeling **F**: basing decisions on values and on subjective evaluation of person-centered concerns.
4. *Judging* **J**: preferring to have things settled – a planned and organized approach to life.
   Perceiving **P**: preferring to keep your options open – a flexible and spontaneous approach to life.

Myers-Briggs Preferences

- Engineers and scientists are evaluated as *ENTJ* or *INTJ*.
- Successful engineering managers often are *ENTJ*.
- Researchers in technical areas are *INTJ*.

People/Task Matrix Approaches: Leadership Grid

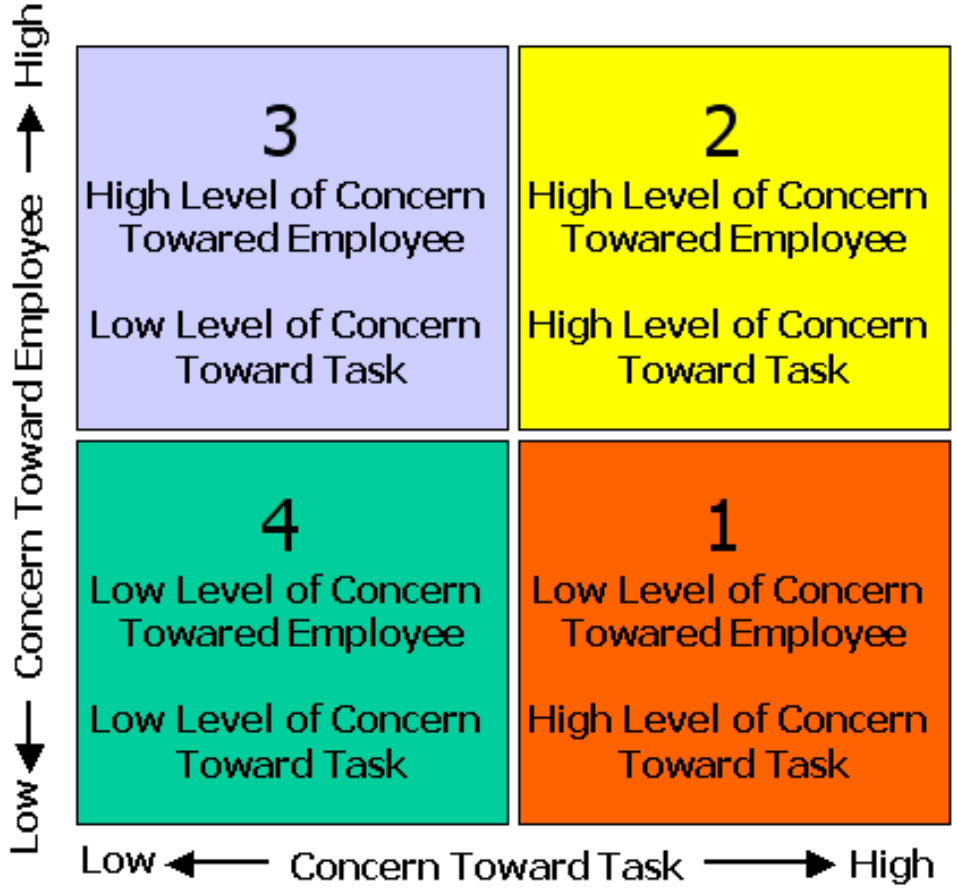


People/Task Matrix Approaches: Michigan and Ohio State Studies

- The Institute of Social Research at the University of Michigan conducted a series of studies comparing the effectiveness of
  - The job-centered supervision: emphasizes the work to be performed,
  - The employee-centered supervision: emphasizes development of effecive work groups.

People/Task Matrix Approaches: Michigan and Ohio State Studies

- Ohio State University studied the four possible combinations of leadership styles



Leadership Continuum

1. Autocratic (“Telling”)
   - Manager makes decision with little or no involvement of non-managers.
2. Diplomatic (“Selling”)
   - Manager makes decisions without consultation but tries to persuade non-managers to accept them.
3. Consultative (“Consulting”)
   - Manager obtains non-managers’ ideas and uses them in decision making.
4. Participative (“Joining”)
   - Manager involves non-managers heavily in the decision.

Three types of forces that a manager should consider before deciding

1. Forces in the manager
   - His value system regarding leadership and his own leadership inclinations, his confidence in the non-managers, and feeling of security in an uncertain situation.

2. Forces in the subordinate (non-manager)
   - Greater delegation can be provided when non-managers have a need for independence, are interested in the problem, understand and relate the goals of the organization, have the necessary knowledge and experience.

3. Forces in the situation
   - The type of organization and the amount of delegation common in it, the experience and success the non-managers have had in working together as a group, the nature and complexity of the problem, and the pressure of time.

Motivation

- To have an effective technical organization, one needs to understand the nature of motivation, which is important part of leadership.
  - **Motivate:** an inner state that energizes, activates or moves (hence 'motivation'), and that directs or channels behavior towards goals.
  - **Motivation**: the willingness to exert high levels of effort to reach organizational goals, conditioned by the effort's ability to satisfy some individual need.

Motivation

- Motivation in terms of three measures of the resulting behavior:
  1. The *direction* of an individual's behavior (measured by the choice made when several alternatives are available)
  2. The *strength* of that behavior once a choice is made
  3. The *persistence* of that behavior.

- There is only one way to get anybody to do anything, and that is by making the other person want to do it.
- Therefore, we need to learn why people want to do things and how they can be persuaded (or motivated) to do those things that will enhance organizational goals.

Motivating and Leading Technical Professionals

- General Nature of Technical Professionals:
  - Having a *high need for achievement* and deriving their motivation primarily from the work itself.
  - Desiring *autonomy* (independence) over the conditions, pace and content of their work.
  - Tending to identify first with their profession and secondarily with their company.
  - Seeking to *maintain their expertise*, gained through long and arduous study, and prevent obsoloscence through continuing education, reading the literature, professional society activity, and especially through work assignments.

Differences Among Technical Professionals

- Scientists versus Engineers
  - Science students place higher value on independence and learning for its own sake; engineers are more concerned with professional preparation, success and family life.
  - The “true scientist” is commonly assumed to have a doctorate; the typical engineer generally begins professional practice with B.S. Degree and earns master’s degree later.
  - The scientist puts a high value on professional autonomy and publication of results; the engineer is a team worker and places little value on publication.
  - The scientist depends heavily on reputation with peers outside the company; the engineer’s advancement is tied more to activities within the company.
  - Science grows through evolutionary additions to the literature, to which the scientist wants to be free to add; the engineer is more likely to be working with the developments that are considered proprietary information by the organization and this has less opportunity to pubish results.

Leading Technical Leadership

- Dimensions of Technical Leadership
  1. Coach for peak performance
     - Act as a sounding board and supportive critic, help the professional manage change.
  2. Run organizational interference
     - Obtain resources, act as advocate for the professional and minimize the bureaucracy.
  3. Orchestrate professional development
     - Facilitate career development through challenging assignments, foster a business perspective in professionals, find sources where new areas of knowledge are required.
  4. Expand individual productivity through teamwork
     - Make sure teams are well oriented regarding goals and roles, and that they get the resources and support they need.
  5. Facilitate self-management
     - Assure that technial professionals are empowered to make their ow decisions by encouraging free two-way information flow, delegating enough authority and providing material and psychological support.