

# Module 3

## Knowledge Management

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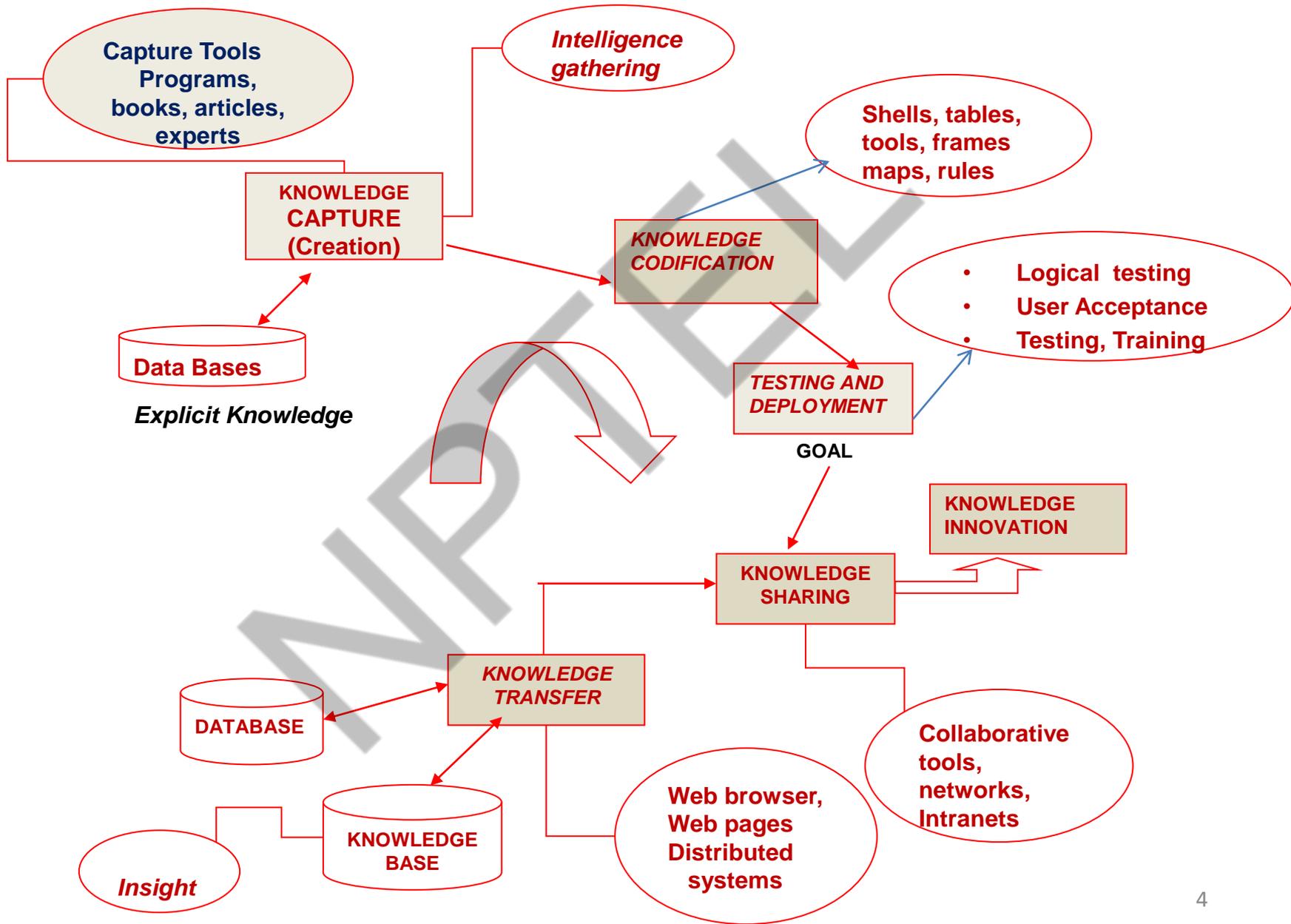
# Topics

- **Knowledge codification**
- **system development: system testing and deployment**
- **knowledge transfer and knowledge sharing**

# What Is Knowledge Codification?

- Organizing and representing knowledge before it is accessed by authorized personnel
- The organizing part is usually in the form of a decision tree, a decision table, or a frame
- Converting tacit knowledge to explicit knowledge in a usable form
- Converting undocumented to documented information
- Making corporate-specific knowledge visible, accessible, and usable for decision making

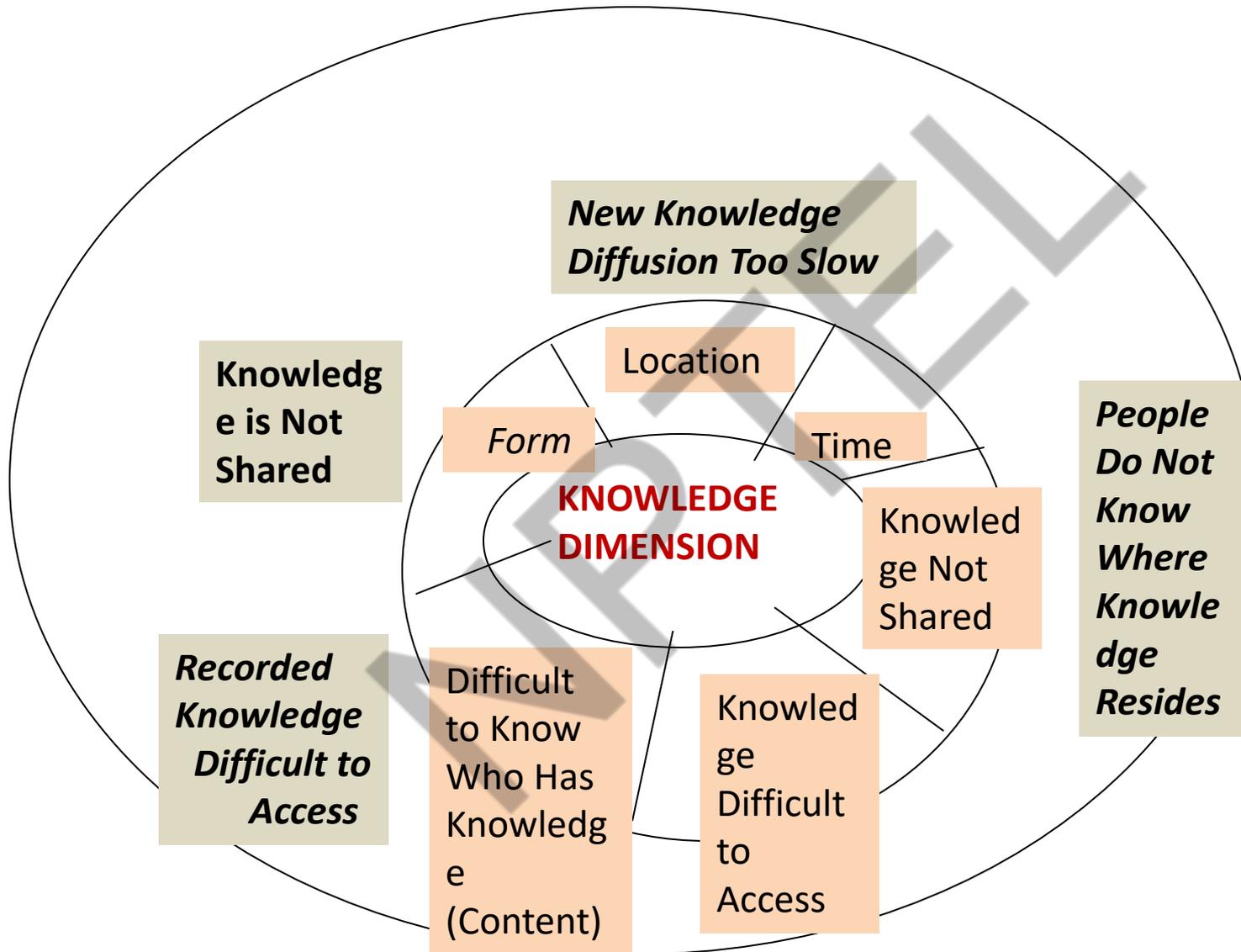
# Knowledge Codification in the KM System Life Cycle



# Why Codify Knowledge?

- **Diagnosis**—KM system is given identifiable information through the users observation or experience. Addressing identifiable symptoms of specific causal factors
- **Instruction/training**: promote training among junior staff based on captured knowledge of senior staff
- Interpretation— Interpretive codified knowledge system compare aspects of an operation to present standards.
- Planning/scheduling—mapping out an entire course of action before any steps are taken
- Prediction—inferring the likely outcome of a given situation and flashing a proper warning or suggestion for corrective action

# Knowledge Dimensions and Bottlenecks



Source: Awad, E.M & Ghaziri, H (2007). Knowledge Management

# Modes of Conversion

- Tacit to tacit knowledge—produces socialization. Observation and practice are two knowledge capture tools
- Tacit to explicit knowledge— externalizing via analogies or metaphors. Resulting explicit knowledge can then be stored in repositories
- Explicit to tacit knowledge—internalizing explicit knowledge into tacit knowledge
- Explicit to explicit knowledge—combining or sorting different bodies of explicit knowledge to lead to new knowledge

# Things To Consider

- What organizational goals will codified knowledge serve?
- What knowledge exists in the organization that addresses these goals?
- How useful is existing knowledge for codification?
- How would one codify knowledge?

# Problems With Codifying Tacit Knowledge

- Distinctive style of the expert
- Special knowledge capture skills to codify tacit knowledge effectively
- Certain knowledge is more of an art than a science and art is difficult to codify into rules
- Dealing with experts is not easy
- Many firms lack the transparency of company-wide knowledge
- Critical knowledge is often available, but no one knows where to find it

# Tools and Procedures— Knowledge Maps

- A guiding function
- Identify strengths to exploit and missing knowledge gaps to fill
- Visual representation of knowledge, not a repository
- A straightforward directory that points to people, documents, and repositories
- Direct people where to go when they need certain expertise
- Recognize explicit and tacit knowledge captured in documents and in experts' heads

# How Knowledge Maps Work

- The map depicts visually the business issue or problem at hand
- Pace of the group's collaborative discussions guided by questions to create shared knowledge
- Facts presented to the group to focus on realities of the problem
- Nature of the collaborative discussion among peers should be an open environment, facilitated by a coach
- Post session follow-up activities are reviewed, and conclusions are drawn

# The Building Cycle

- Once you know where knowledge resides, you simply point to it and add instructions on how to get there
- A company's intranet is a common medium for publishing knowledge maps
- Building criteria: clarity of purpose, ease of use, accuracy of content

# Building Cycle (cont'd)

- First building step: Develop a structure of the knowledge requirements
- Second building step: Define the knowledge required of specific jobs
- Third building step: Rate employee performance by knowledge competency
- Fourth building step: Link knowledge map to a training program for career development and job advancement

# Decision Tables

- More like a spreadsheet—divided into a list of conditions and their respective values and a list of conclusions
- Conditions are matched against conclusions

# Table: Decision Table

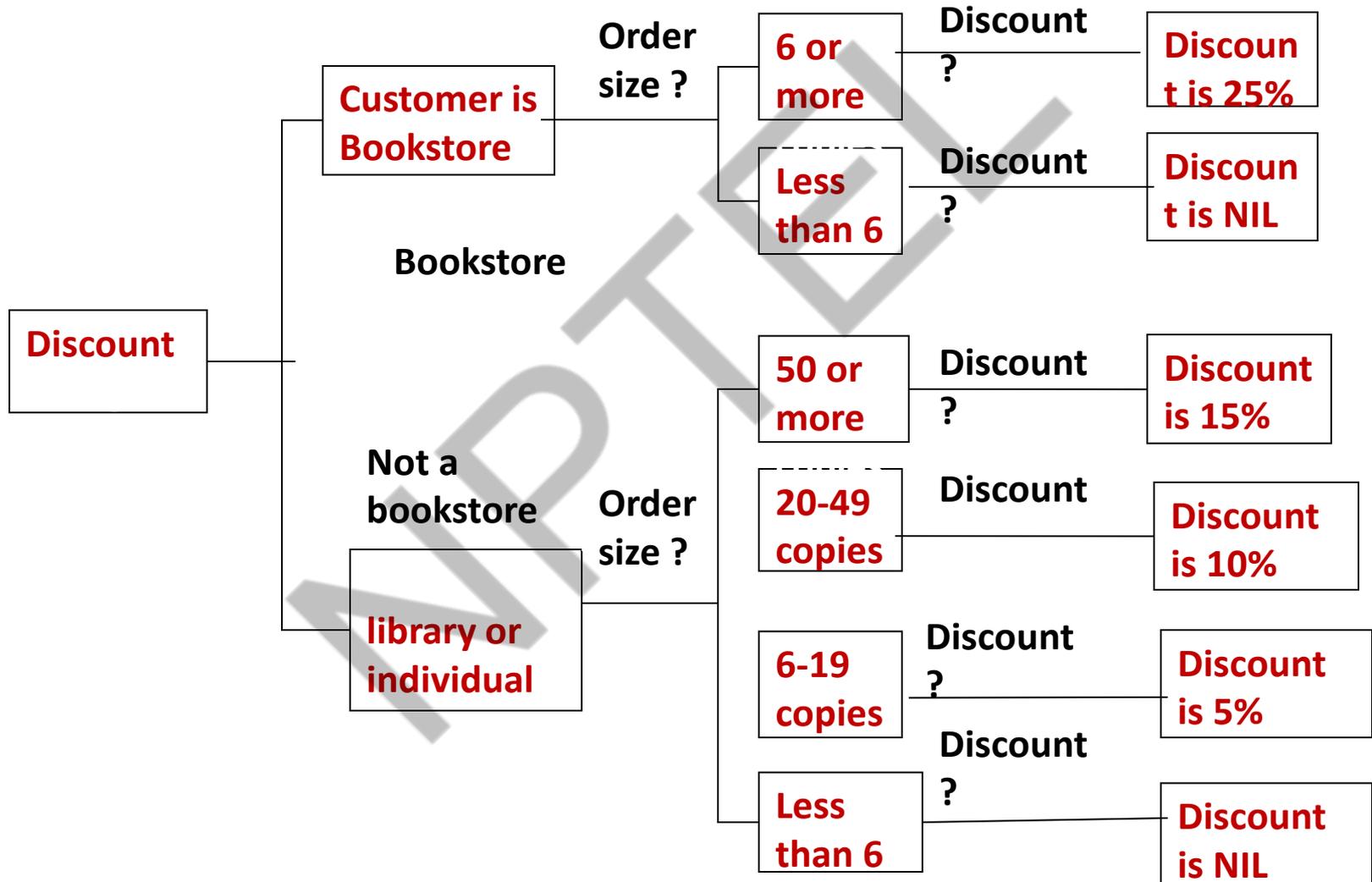
		<b>Condition Stub</b>		<b>Condition Entry</b>					
				1	2	3	4	5	6
<b>IF</b> <b>(condition)</b>		Customer is bookstore	Y	Y	N	N	N	N	
		Order size > 6 copies	Y	N	N	N	N	N	
		Customer is librarian/individual			Y	Y	Y	Y	
		Order size 50 copies or more			Y	N	N	N	
		Order size 20-49 copies				Y	N	N	
		Order size 6-19 copies					Y	N	
<b>THEN</b> <b>(action)</b>		Allow 25% discount	X						
		Allow 15% discount			X				
		Allow 10% discount				X			
		Allow 5% discount					X		
		Allow no discount		X				X	
		<b>Action Stub</b>	<b>Action Entry</b>						

Source: Awad, E.M & Ghaziri , H (2007). Knowledge Management

# Decision Trees

- A hierarchically arranged semantic network
- Composed of nodes representing goals and links representing decisions or outcomes.
- Read from left to right, with the root being on the left
- All nodes except the root node are instances of the primary goal. See Figure 7.7 next
- First step before actual codification
- Ability to verify logic graphically in problems involving complex situations that result in a limited number of actions

# Decision Tree



# Frames

- Represent knowledge about a particular idea in one place
- Handle a combination of declarative and operational knowledge, which make it easier to understand the problem domain
- Have a slot (a specific object or an attribute of an entity) and a facet (the value of an object or a slot)
- When all the slots are filled with values, the frame is considered instantiated

# Production Rules

- Form of tacit knowledge codification in the form of premise-action pairs
- Rules are conditional statement that specify an action to be taken if a certain condition is true
- The form is *IF... THEN*, or *IF...THEN...ELSE*
- *Premise*: A Boolean expression that must be evaluated as true for the rule to be applied
- *Action*: Second component, separated from the premise by THEN; executed if the premise is true

# Role of Planning (cont'd)

- Arranging for the verification and validation of the system
- Developing user interface and consultation facilities
- Promoting clarity and flexibility
- Reducing unnecessary risks
- Making rules easier to review and understand

# Inferencing and Reasoning

- Inferencing is deriving a conclusion based on statements that only imply that conclusion
- Reasoning is applying knowledge to arrive at solutions
- To reason is to think clearly and logically, to draw reasonable inferences or conclusions from known or assumed facts

# Case-Based Reasoning (CBR)

- CBR is reasoning from relevant past cases in a manner similar to humans' use of past experiences to arrive at conclusions
- Goal is to bring up the most similar historical cases that match the current case
- More time savings than rule-based systems
- Requires rigorous initial planning of all possible variables

# Requirements for Knowledge Development Work

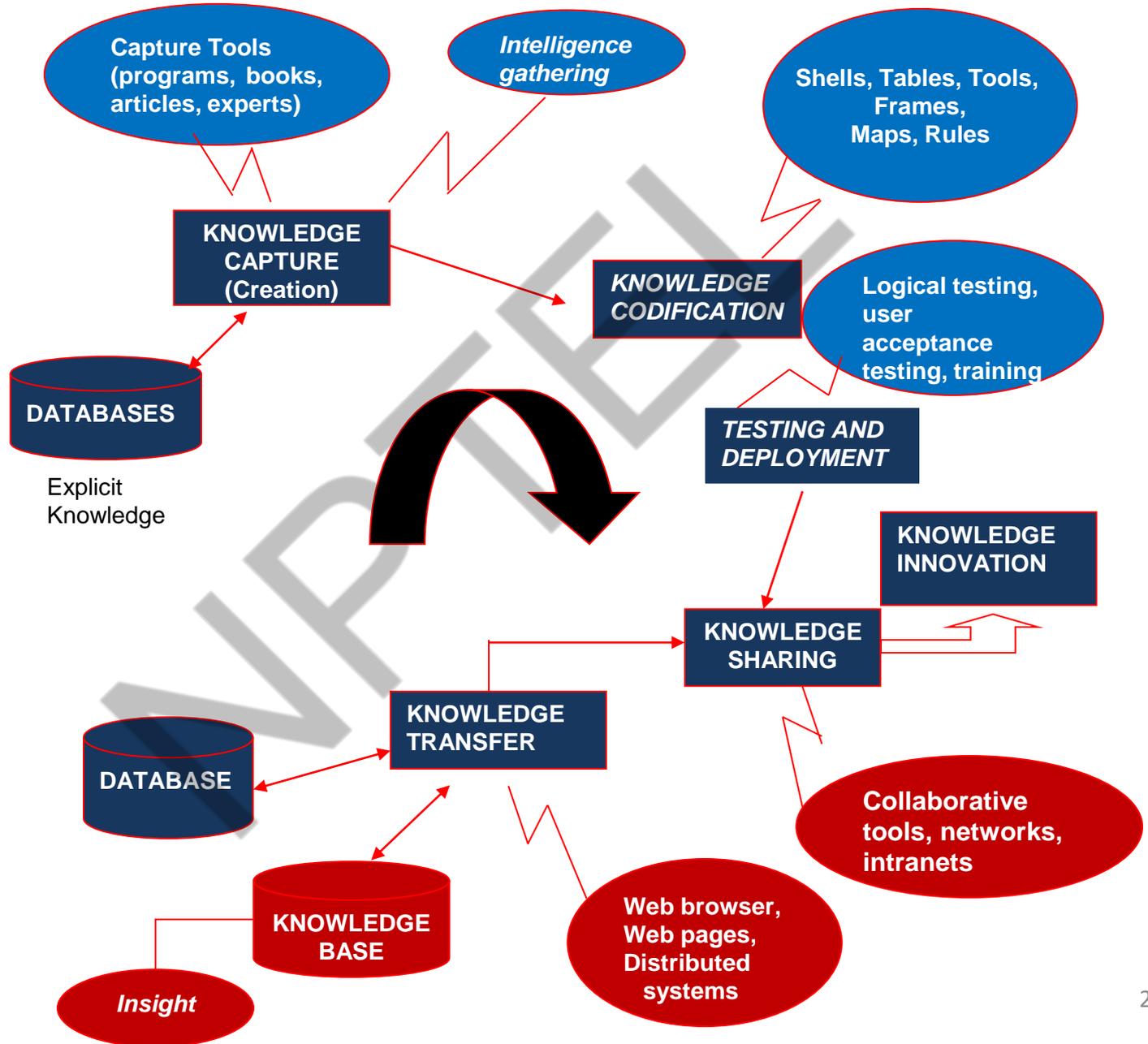
- Computer technology
- Domain-specific knowledge
- Knowledge repositories and data mining
- Cognitive psychology

# Skills Requirements of Knowledge Development

- Interpersonal communication
- Ability to articulate project's rationale
- Rapid prototyping skills
- Personality attributes such as intelligence, creativity, persistence, and a good sense of humor

# **System development: System testing and deployment**

# Figure : Knowledge Testing and Deployment



# Key Definitions

- building the system right?”
- User acceptance testing checks the system’s behavior in a realistic environment. Answers the question, “Have we built the right system?”
- Deployment refers to the physical transfer of the technology to the organization’s operating unit

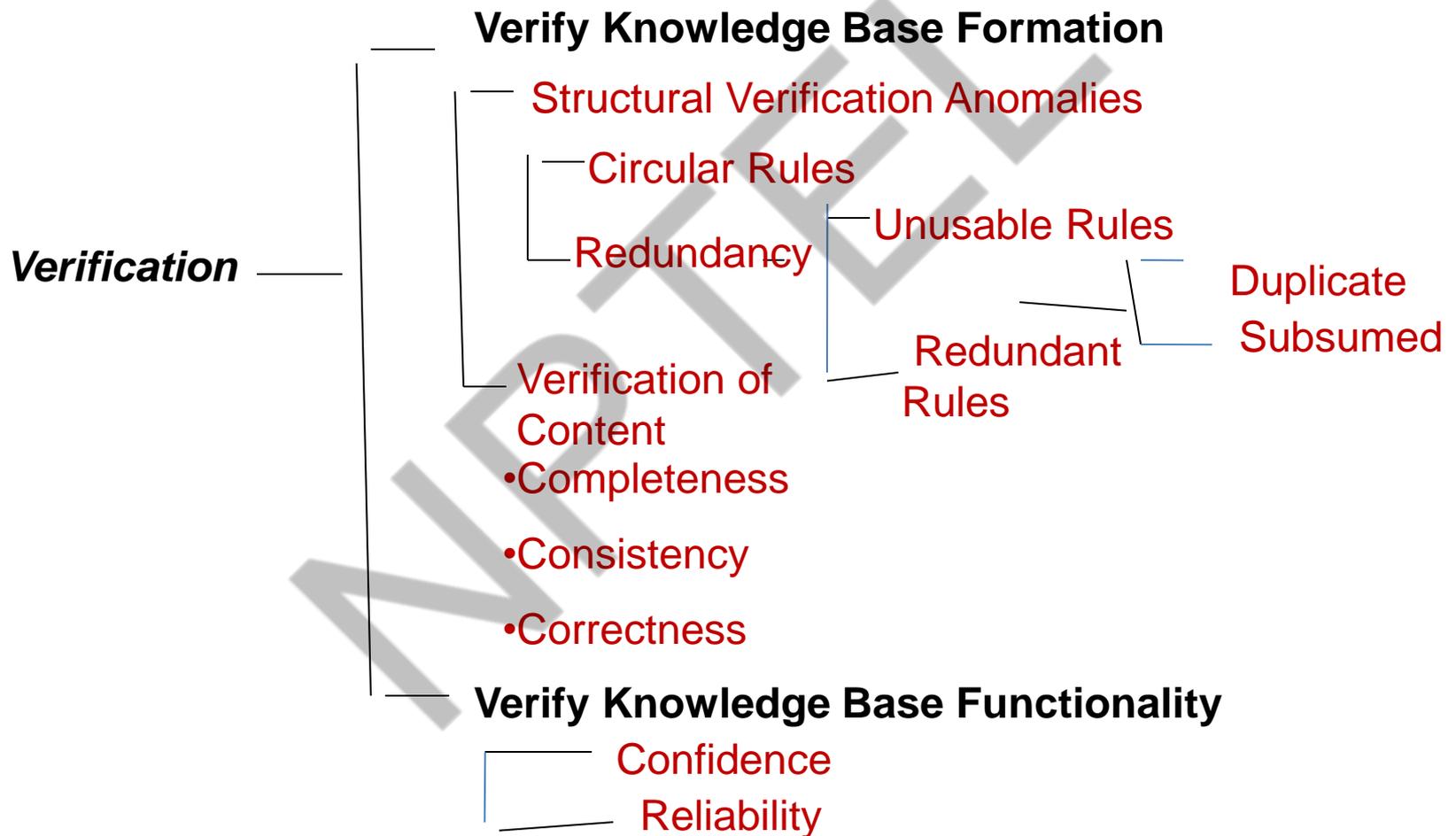
# Issues to Consider in Testing

- Subjective nature of tacit knowledge. Intelligence difficult to measure
- Lack of reliable specifications make knowledge-based testing arbitrary
- Problem of establishing consistency and correctness
- Negligence in testing
- Lack of time for system testing
- Complexity of user interfaces

# Attributes in Logical Testing

- Circular
- Completeness
- Confidence
- Correctness
- Consistency/inconsistency
- Redundancy
- Reliability
- Subsumption error

# Approaches to Logical Testing



# Key Testing Errors

- Circular errors tend to be contradictory in meaning or logic
- Redundancy errors offer different approaches to the same problem; duplication of knowledge
- Unusable knowledge is knowledge that comes up if the conditions succeed or fail
- Subsumption errors in rules, if one rule is true, one knows the second rule is always true
- Inconsistent knowledge, where the same inputs yield different results

# Steps in User Acceptance Testing

- Select a person or a team for testing
- Decide on user acceptance test criteria
- Develop a set of test cases unique to the system
- Maintain a log on various versions of the tests and test results
- Field-test the system

# Select Criteria for User Acceptance Testing

- Accuracy and correctness of outcome
- Adaptability to changing situations
- Adequacy of the solutions
- Appeal and usability of the system
- Ease of use
- Face validity or credibility
- Performance based on expectations
- Robustness
- Technical/operational test

# Managing the Testing Phase

- Decide when, what, how, and where to evaluate the knowledge base
- Decide who should do the logical and user acceptance testing
- Draft a set of evaluation criteria in advance
- Decide what should be recorded during the test
- Review training cases, whether they are provided by the expert, the knowledge developer, or the user
- Test all rules for Type I and Type II errors

# Issues Related to Deployment

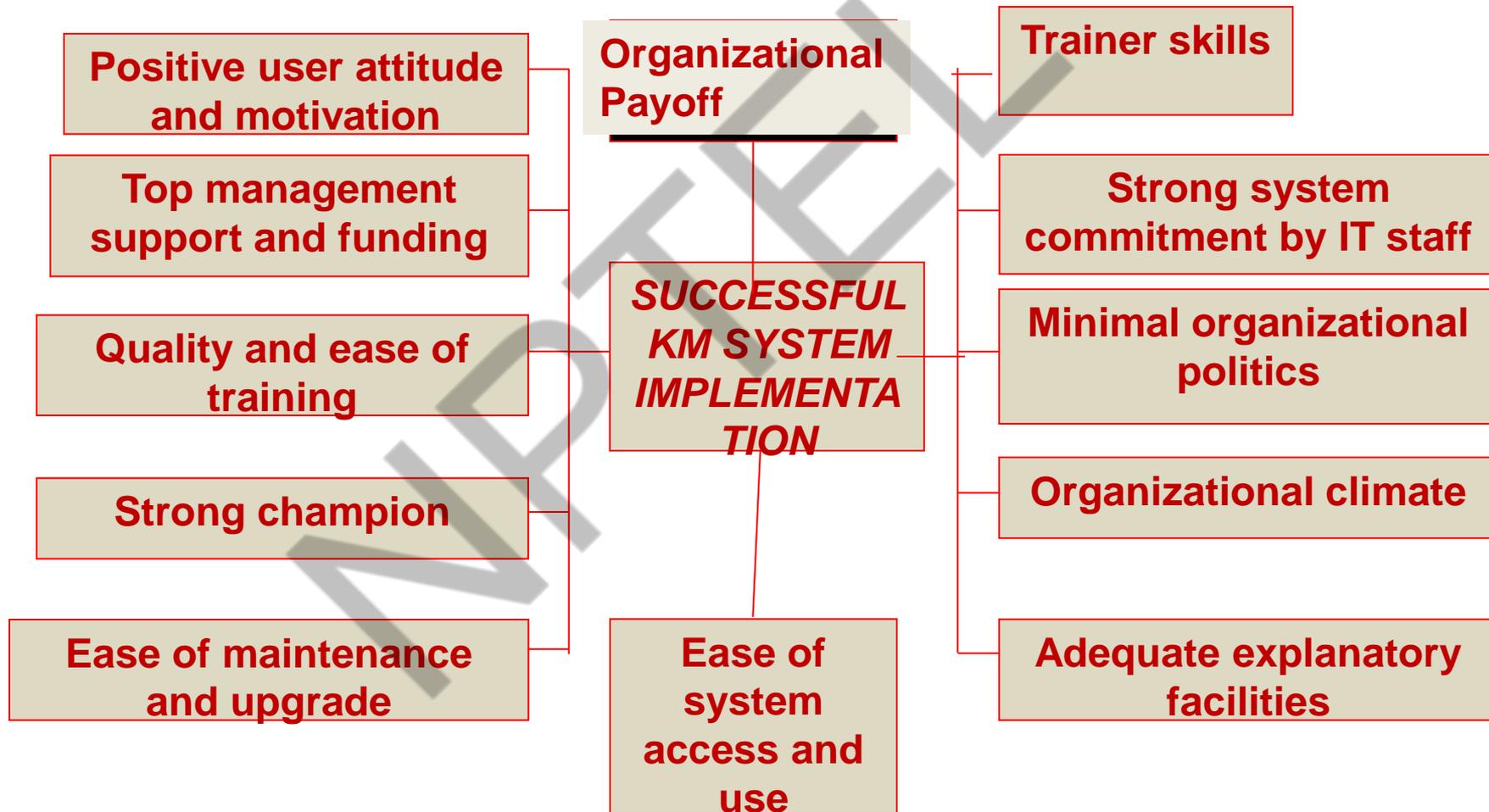
- Selection of the knowledge base problem
- Ease of understanding the KM System
- Knowledge transfer
- Integration alternatives
- The issue of maintenance
- Organizational factors

# Selection of the Knowledge Base Problem

System success may be assured if:

- User has prior experience with computer applications
- User has been involved in the building of the KM system
- Payoff from the KM system is high and measurable
- KM system can be implemented without much difficulty
- Champion has been supporting the system all along

# Success Factors in KM System Development



# Integration Alternatives

- Technical integration through the company's LAN or existing information system infrastructure
- Knowledge-sharing integration when the KM system is usable company-wide
- Decision-making flow integration when the system matches the user's style of thinking
- Workflow reengineering when the KM system triggers changes in the workplace

# Organizational Factors

- Top management support
- Support of the work of the champion
- Ensure a clean and supportive organizational climate
- De-emphasize role of politics
- Knowledge developer should remain neutral within the political arena
- Return on investment

# User Training and Deployment

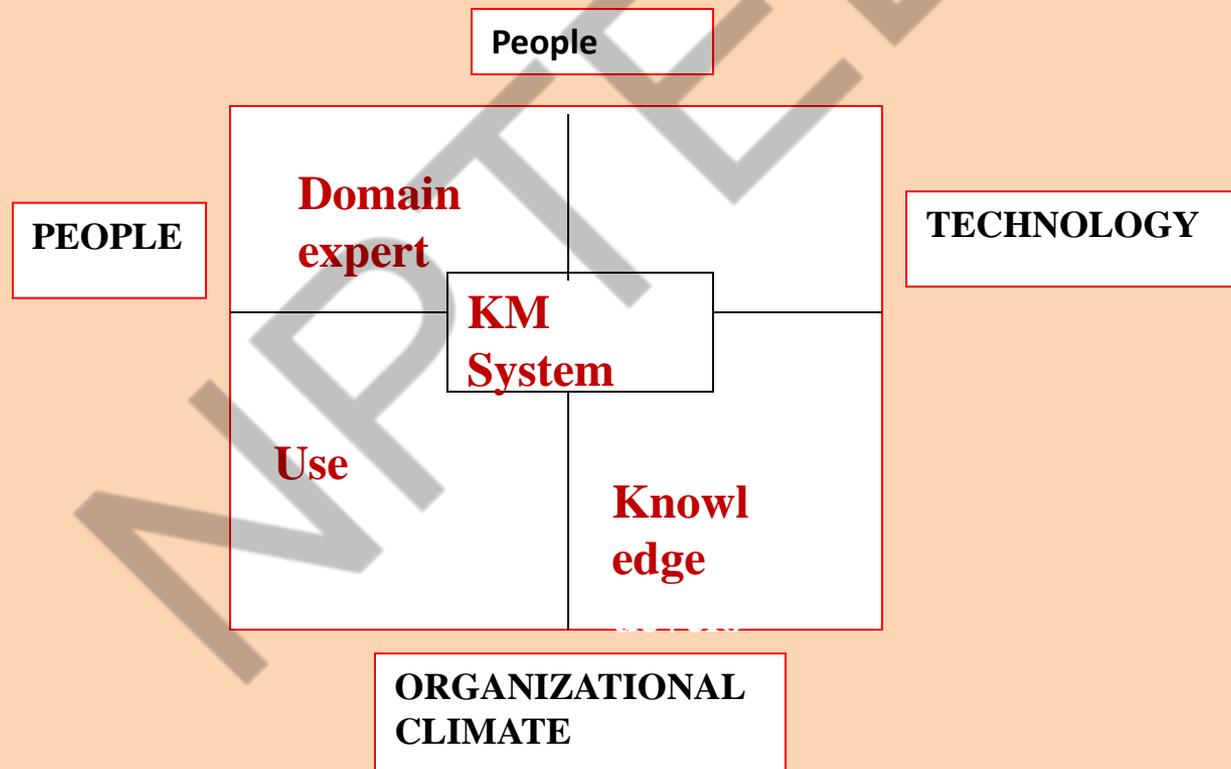
- Preparing for KM system training via advance demos and easy to follow training
- Combating resistance to change
- Watch for knowledge hoarders
- Watch for troublemakers and narrow-minded “superstars”
- Look for resistance via projection, avoidance, and aggression

# Post-implementation Review

- Watch for quality of decision making
- Reassess attitude of end users
- Review cost of knowledge processing
- Revisit change in accuracy and timeliness of decision making

# Internal and External Factors Affecting Knowledge-Based System Quality

## Framework



**knowledge transfer and knowledge  
sharing**

NPTEL

# Factors In Knowledge Transfer

- Where knowledge is transferred from
- Media used in knowledge transfer
- Where knowledge is transferred to

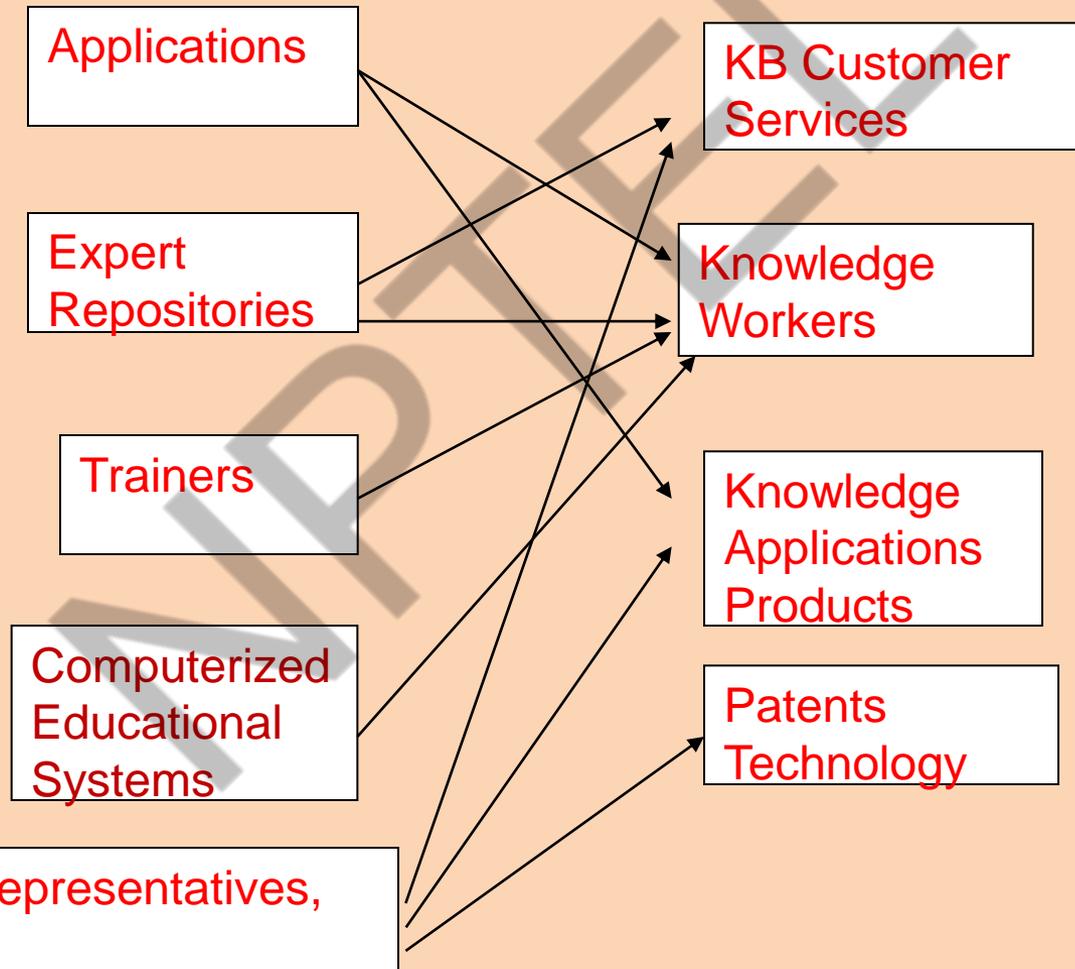
## ***Remember:***

- Only a limited amount of expertise can be captured as explicit knowledge
- Knowledge transfer facilitates knowledge sharing

# Fig :A partial View of a KM System For Knowledge Transfer

## Knowledge Transfer

## Knowledge Application



# Prerequisites for Knowledge Transfer

- Knowledge sharing recognizes personal nature of people's knowledge gained from experience
- The myth that “once you build it, they will use it” does not work that well
- For knowledge transfer to work, it takes change in culture, politics, and attitude

# Prerequisites for Transfer (cont'd)

- Instill an atmosphere of **trust** in the organization
- Fix **culture** to accommodate change
- Push **reasoning** before process
- **Doing** is far better than talking
- **Know how** the firm handles mistakes

# Dimensions of Values and Beliefs

- **Authority**
- **Collaboration**
- **Commitment**
- **Compensation**
- **Competence**
- **Conflict resolution**
- **Consistency**
- **Cooperation**
- **Creativity**
- **Empowerment**
- **Innovation**
- **Fairness**
- **Motivation**
- **Mistake tolerance**
- **Participation**
- **Partnering**
- **Teams**
- **Truth, openness**
- **Self-management**
- **Risk tolerance**
- **Change**
- **Focus**

# Leadership

- Understanding company mission
- Culturally internalized management practices
- Culturally internalized operational practices
- Culturally driven forces

# Factors That Retard Cultural Values

- Culturally driven forces
- Understanding company priorities
- Questionable values
- Questionable beliefs
- Lack of trust in the approach or process

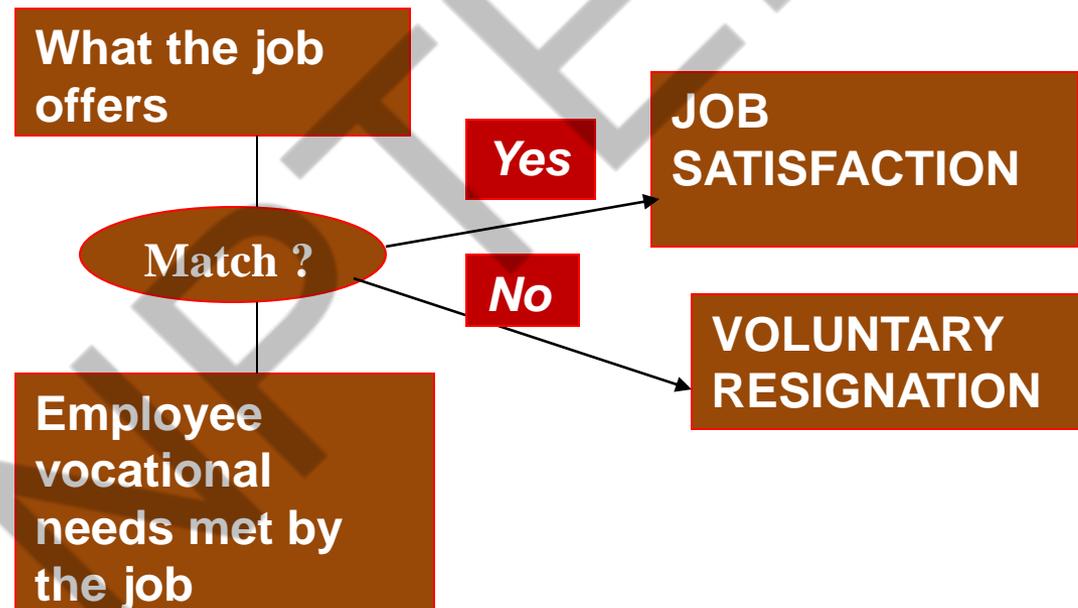
# Employee Job Satisfaction and Stability of Workplace

- Job satisfaction determined by the match between an employee's vocational needs and job requirements
- Success of knowledge transfer and sharing depends on how satisfied employees are on the job

# Major Known Vocational Needs

- Ability utilization
- Achievement
- Activity
- Advancement
- Authority
- Compensation
- Creativity
- Independence
- Moral values
- Recognition
- Responsibility
- Security
- Status
- Supervision—human relations
- Supervision--technical
- Variety
- Working conditions

# A Conceptual Job Adjustment Model

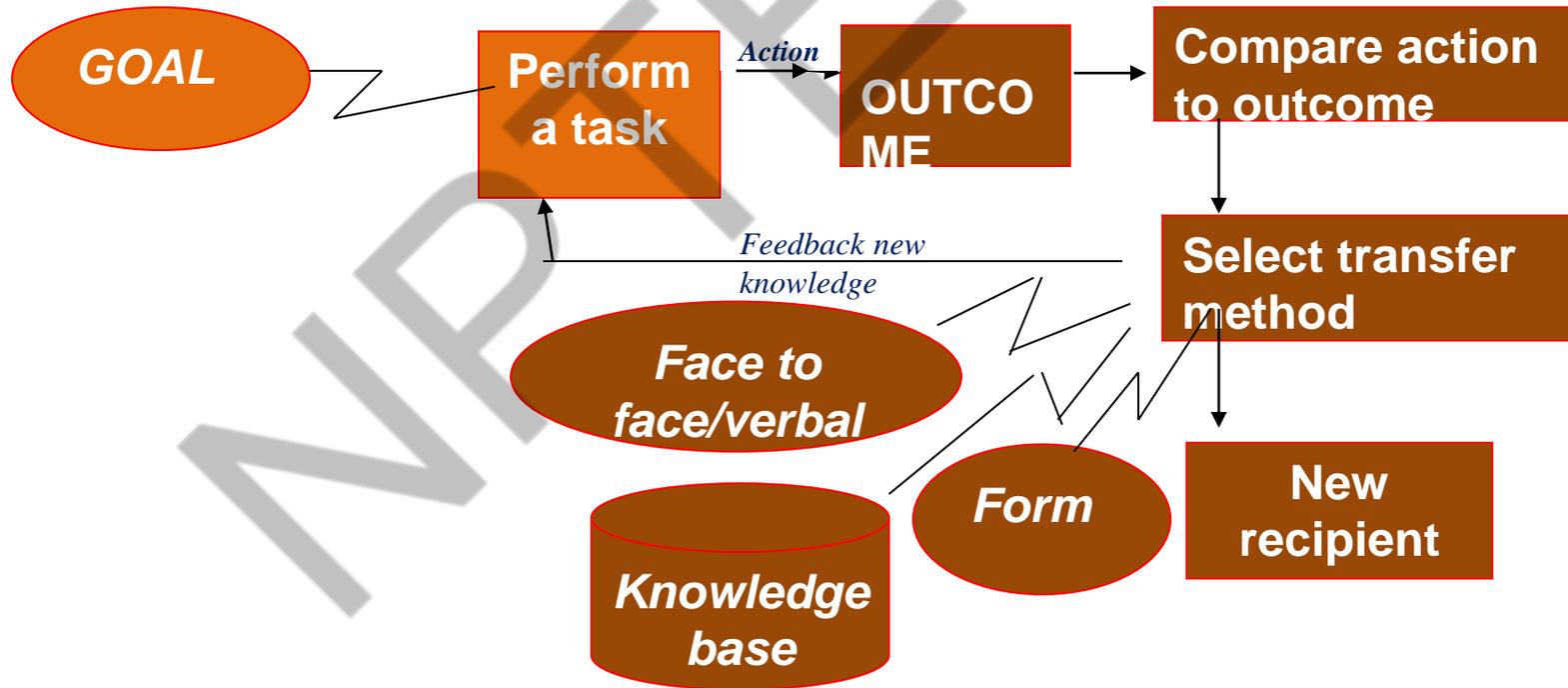


Source: Awad, E.M & Ghaziri , H (2007). Knowledge Management

# Transfer Methods

- A team sets out to perform a specific task
- Team outcome captured and fed back to same team or another team
- New knowledge reinforces or improves performance of the team next time round
- New knowledge also transferred to a knowledge base for others to follow

# Converting Experience Into Knowledge



Source: Awad, E.M & Ghaziri , H (2007). Knowledge Management

# Transfer Strategies

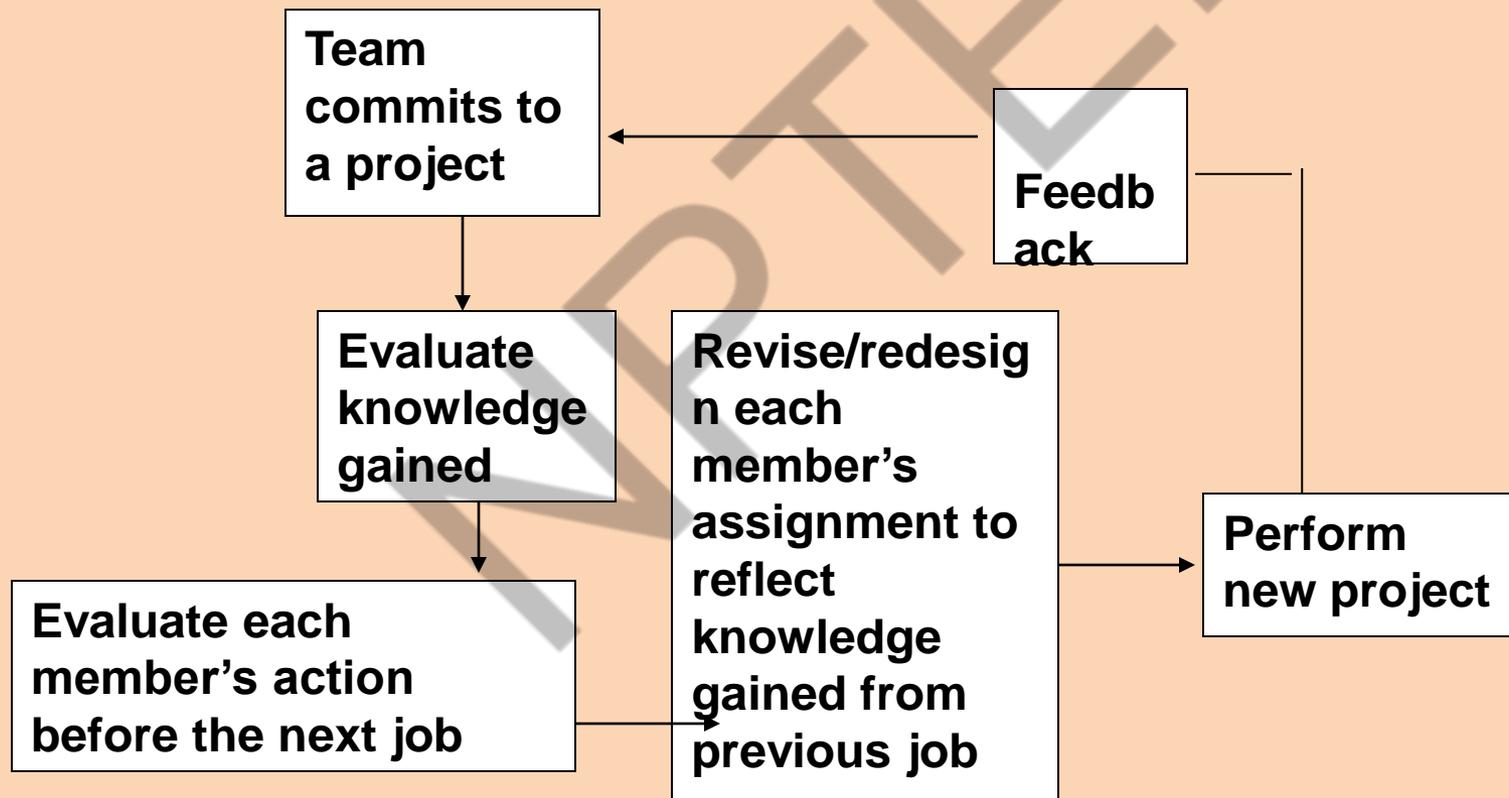
- Devoting specialized focus on on-site learning
- Absorbing the heuristics as they occur
- Adopting the organization's culture to facilitate knowledge transfer and knowledge sharing

# Inhibitors of Knowledge Transfer

- Lack of trust
- Lack of time and conference places
- Status of the knower
- Quality and speed of transfer

# How Knowledge Is Transferred

- Collective sequential transfer—specialized team performs same function in other sites



# How Knowledge Is Transferred (cont'd)

Unique features of collaborate sequential knowledge transfer:

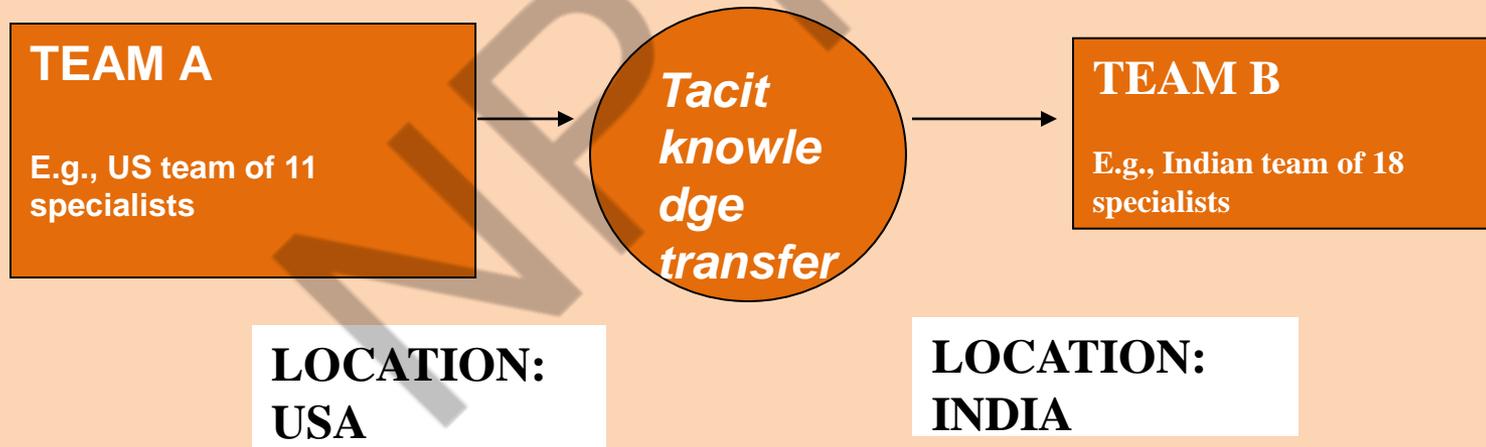
- Team meetings are usually brief, but held regularly as time permits
- Meetings held with all participants being equal
- What takes place in meetings kept within the team
- Focus on the project, not the person or personality

# Meetings in Collective Sequential Transfer

- Set agenda
- Keep it small
- Invite the right people
- Facilitate the process
- Take breaks
- Socialize
- Show accomplishments

# How Knowledge Is Transferred (cont'd)

Tacit knowledge transfer—unique in complex, nonalgorithmic projects, where knowledge is mentally stored



Source: Awad, E.M & Ghaziri , H (2007). Knowledge Management

# Role of Internet in Knowledge Transfer

- Accommodates knowledge exchange and communication
- Allows sending messages to multiple persons simultaneously
- Offers a variety of services
- Integrates systems and networks

# Benefits of the Internet

- Doing business fast
- Gathering opinions and trying out new ideas
- Leveling the playing field
- Providing a superior customer service and support resource
- Supporting managerial functions, spreading ideas

# Limitations of the Internet

- Security and privacy vulnerability
- Exposure to fakes and forgeries
- Hackers threatening the integrity of files and transactions