Module 5
Knowledge Management

KM system : Analysis, design, and development

KBL Srivastava

Topics Covered

- Develop the knowledge management architecture.
- Understand and select the architectural components.
- Design for high levels of interoperability.
- Optimize for performance and scalability.
- Understand repository life-cycle management.
- Understand and incorporate requisite user interface considerations.
- Position and scope of the knowledge management system.
- Build-or-buy decision and understand the tradeoffs.
- Future-proof the knowledge management system.

KM Blueprint

- knowledge management blueprint provides a roadmap for building and incrementally improving a knowledge management system

Analyzing Lost Opportunities

- *How companies lose potential opportunities by trying to explicate the wrong types of knowledge while failing to explicate the right types*
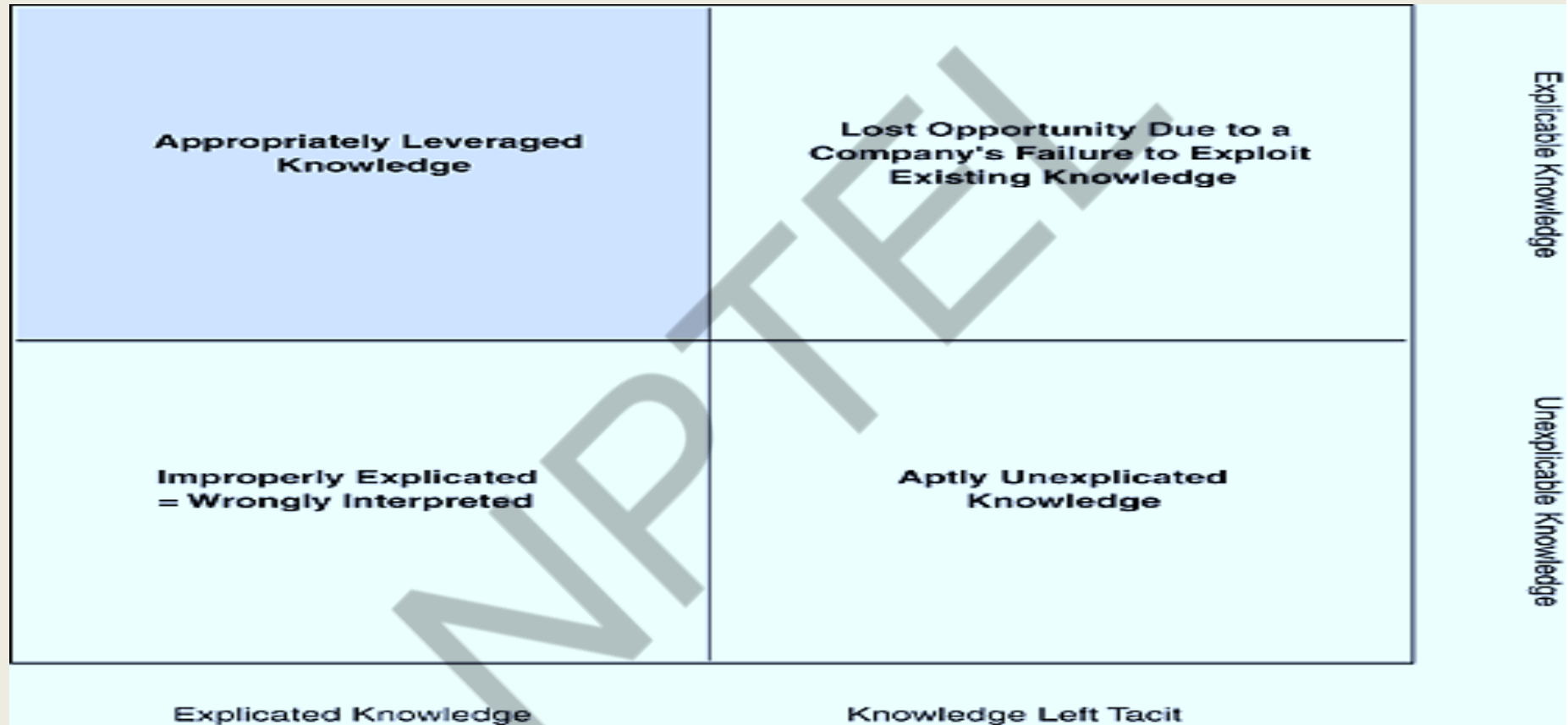

Knowledge that could have been explicated, shared, distributed, and applied, but was never articulated, represents a lost opportunity due to the failure to leverage this asset

The shaded box indicates the correct positioning of a knowledge management system and knowledge management strategy.

The KM Architecture

- IT is a great enabler for sharing, application, validation, and distribution of explicit knowledge.

- Its weakness become apparent when companies try to use the same techniques and systems to leverage tacit knowledge.

- With that in mind, the KM architecture should be seen as an enabler for KM and not a complete solution: a means and not an end in itself.

(Source: Designing the KM Blueprint form Tiwana, A.: Knowledge Management Toolkit, 2002)
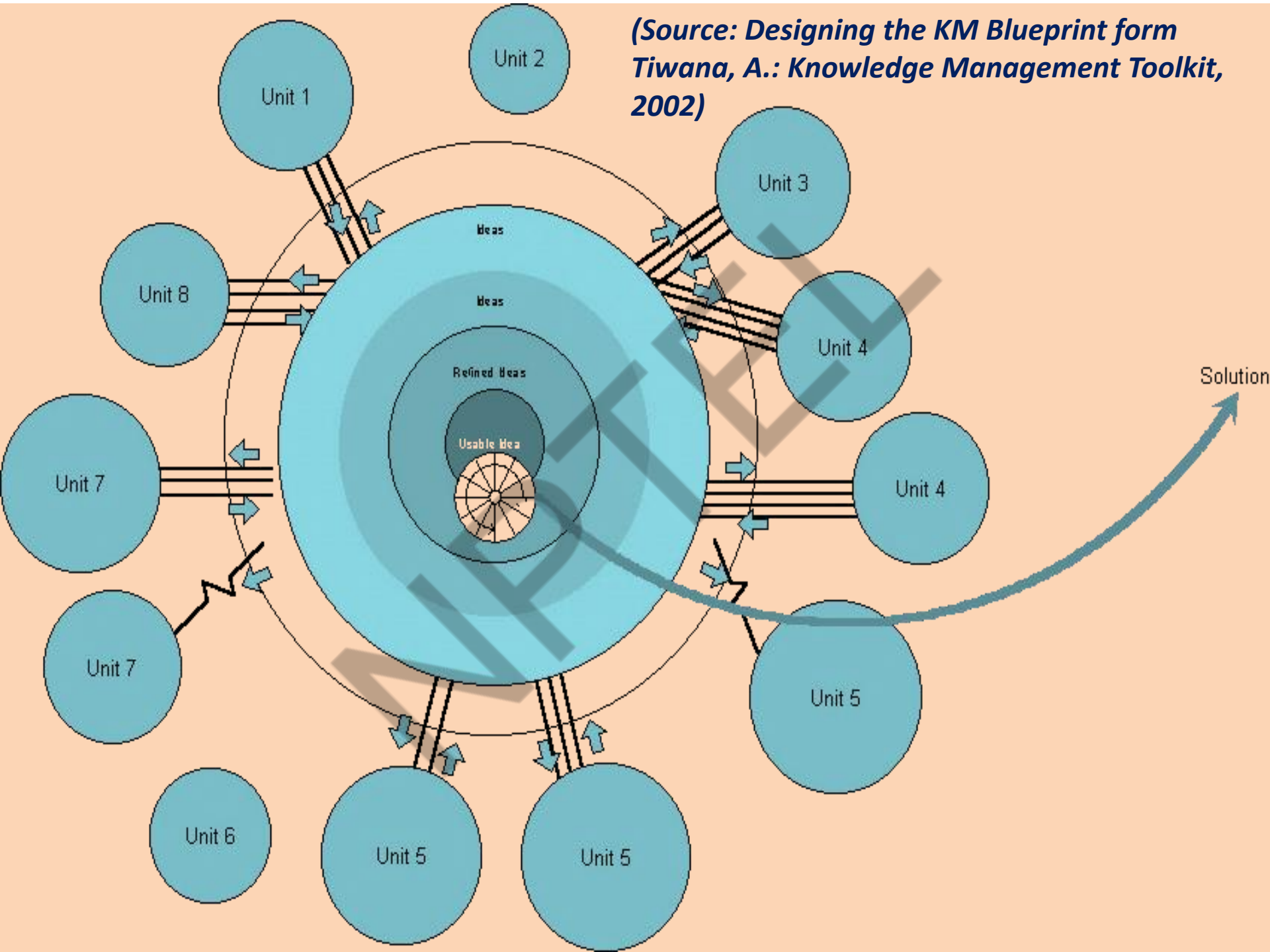
Components of A KM System

- A KM system, in it's initial stages, can be broken into several subcomponents:

1. **Repositories**: *Hold explicated formal and informal knowledge and the rules associated with them for accumulation, refining, managing, validating, maintaining, annotating (adding context), and distributing content.*

2. **Collaborative platforms**: *Support distributed work and incorporate pointers, skills databases, expert locators, and informal communications channels*

3. **Networks**: *Support communications and conversation* include hard networks and your intranet, your extranets, and soft networks such as shared spaces, industry-wide firm collaborations, trade nets, industry forums, and exchanges

4. **Culture:** *Enablers to encourage sharing and use of the above*

The Knowledge Repository

- An information repository differs from a knowledge repository in the sense that the context of the knowledge object needs to be stored, along with the content itself.

- A knowledge platform may consist of several repositories, each with a structure that is appropriate for the particular type of knowledge or content that is stored.

The Knowledge Repositories

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

9
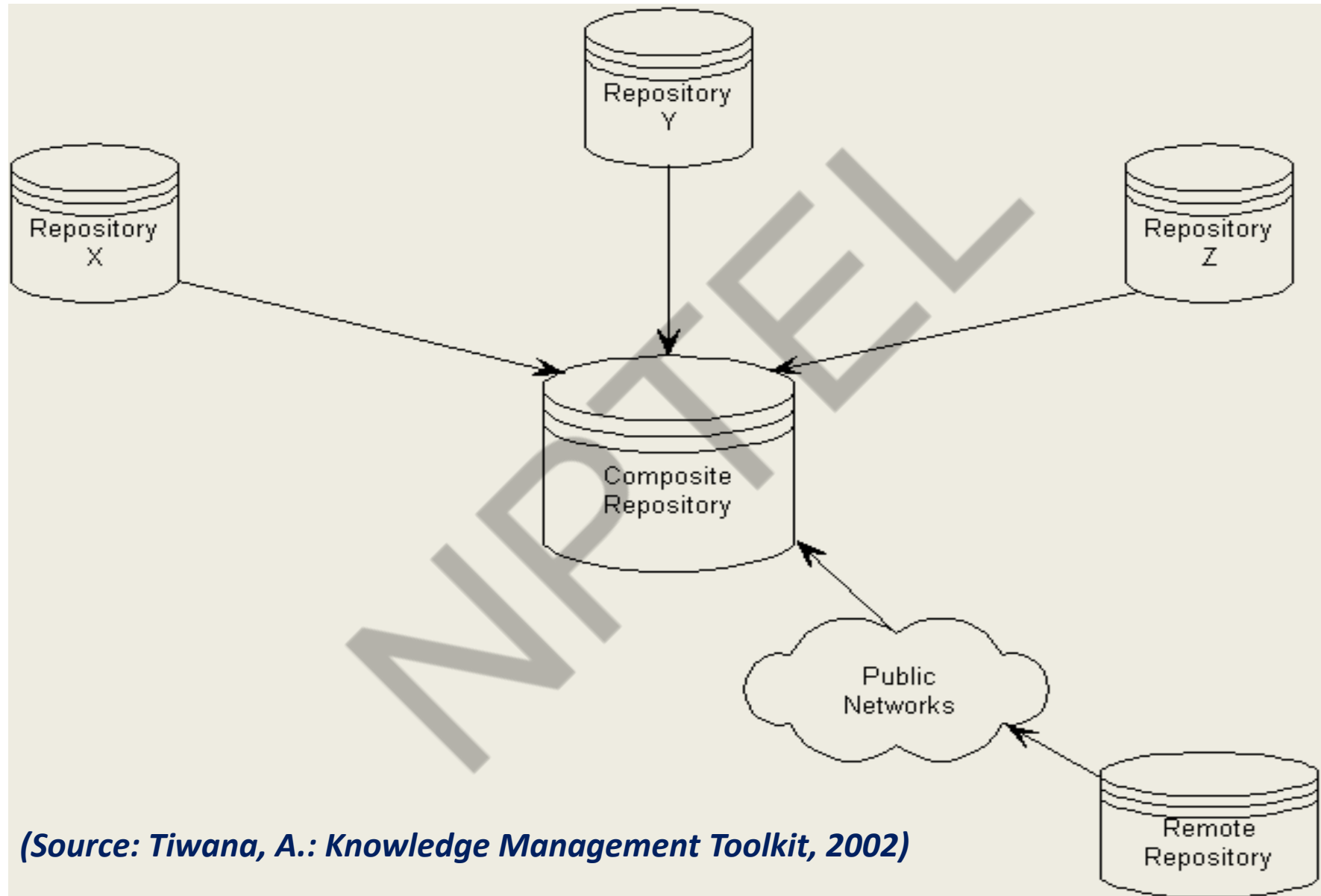
Elements of knowledge content recorded by the Repositories

Declarative knowledge such as significant and meaningful concepts, categories, definitions, and assumptions

• *Procedural knowledge* such as processes, sequences of events and activities, and actions

• *Causal knowledge* such as rationale for decisions, rationale for rejected decisions or alternatives, eventual outcomes of activities, and associated informal pieces

• *Context* of the decision circumstances, assumptions, results of those assumptions, and informal knowledge such as video clips, annotations, notes, and conversations

The Hazards/Liabilities of having Integrative Repositories

- Having integrative repositories might seem like a good idea to begin with, they can be the victims of their own success.
  - Once users start adding content to multiple repositories, without a clear-cut validation or expiration mechanism, it might result in a situation similar to an information overload.

- *Example: Arthur Andersen Consulting group's KnowledgeSpace™: With the extensive use of the Lotus Notes–based repositories, the extant content has grown into almost 3,000 repositories of Notes discussion databases. Many of them becoming redundant*

Content Centers

- When one is trying to integrate multiple function- or department- specific repositories into one central repository, one should pay close attention to content centers that are typically good candidates for integration.

- Examples of content centers include

- *Production department*

- *Customer services*

- *Market intelligence and competitive planning*

- *Employee resources and the human resources department*

- *Administrative department*

- *Sales and marketing*

- *Finance*

- *Business partners and suppliers*

A sample checklist for competitive knowledge

1. **What others are talking about your competition?**
   - Public
     - Case studies, articles, newspapers, consultants, employee search firms and consumer groups.
   - Trade and professional organizations
     - trade publications, industry news, customers, users, venders, suppliers, and professional ORG.
   - Investors and government agencies
     - Securities analysts, industry data, government agencies and litigation information source.

2. **What your competition is talking about themselves?**
   - Public
     - Advertising, promotional material, articles, employment advertisements and press release.
   - Trade and professional organizations
     - Licenses, manuals, patents, and trade shows.
   - Investors and government agencies
     - Annual reports, stock issues, and annual meetings

Open and Distributed Systems

- The use of open systems ensures that employees can obtain information they need from any place and at any time.

- Adherence to industry standards ranging from HTML, XML, TCP/IP protocols, and ODBC may help you to implement the KM system quickly, and easily extend and customize it in the future.

- Content might be distributed across multiple platforms, devices, servers, and locations, the ability of the knowledge management system to build upon this characteristic is crucial.

Knowledge Aggregation and Mining

- Anyone who has used a search engine on the Internet can tell you, simple keyword searches often result in a meaninglessly large number of hits.

- To save users from this, a well-designed KM system should include a mechanism to cluster search results appropriately in different prespecified content categories.

From Skills Databases to Knowledge Directories

- Skills databases Help to locate subject mater experts both within and outside their organizational bounds. While such a mechanism is useful, it needs to be kept up to date. Example- Microsoft

- A knowledge directory takes the concept underlying skills databases one step further by linking people to their skills, experiences, know-how, insights, and contributions to discussions and debates within the knowledge management system.

Automated Categorization

- Categorization need not be a manual procedure and often can be accomplished, in part, by knowing the nature of the contribution, such as its context, source, and originator.

- GrapeVine (www.grapevine.com) is an excellent commercial tool that can help with such categorization.

- With the availability of context, some meta data can be tagged automatically

Personalized Content Filtering and Push Delivery

- Personalized content filtering refers to the process of categorizing items by their content:
  - Images.
  - Video.
  - Sound.
  - Text and etc.
- A user profile defines the content types that are relevant to each user.

The Collaborative Platform

- Provides the pipeline to enable the flow of explicated knowledge, its context, and the medium for conversations
- Provides a surrogate channel for defining , storing, moving and linking digital objects, such as conversation threads that correspond to knowledge units
- Enables the content of the KM system with a high degree of flexibility to make it meaningful, useful, and applicable across the many possible contexts of use (and abuse).
- Empowers the users.
- The user can either search for content or subscribe to content

Collaborative Filtering

1. Active filtering:
   – Users manually define filters and pointers to interesting content and share them across their work group.

2. Automated filtering:
   – Statistical algorithms make recommendations based on correlations between the user's personal preferences and content ratings.

- Firefly, GroupLens, GrapeVine, and Tapestry are some better-known examples of such collaborative filtering tools.

Community-Centered Collaborative Filtering

- The network of existing social relationships between employees can be a valuable basis for improving the collaborative filtering process.

- Reputation, trust and reciprocity come into the picture of collaborative process enhancers when contributions are (optionally) signed.

Meta Knowledge

- Meta knowledge implies knowing what you know.

- Creation of meta knowledge is often extremely context dependent and requires the use of pattern recognition or analogical reasoning.

- In order to extract meta knowledge from knowledge having a KM system is a necessary condition.

Accommodating Multiple Degrees of Context

- The significance of rich communications channels and a high degree of interactivity cannot be overemphasized.

- If loose social bonding exists between potential users of the system, ensure that rich communications are built into your KM system as an integrated feature, not as a separate add-on component.

Technology Choices

- It is vital to consider whether that technology or that vendor will be around for the entire life of the system.
- Will the vendor's technology capture enough of the market to ensure the ancillary products and services remain available?
- Can the technology deliver the consistency that the application requires?
- Can the technology provide the quality that the market and your customs demand?

Example: *Web provides the capability required to build a collaborative platform on which a rich multimedia repository for explicit knowledge and an informal communications channel for conversation making*

Integrative and Interactive Knowledge Applications

- The integrative ability supports the collation of distributed knowledge repositories containing explicated or explicitly captured content.

- Support for interactivity is required to allow the integration and possible capture, analysis or even explication of tactic knowledge of the system's users.
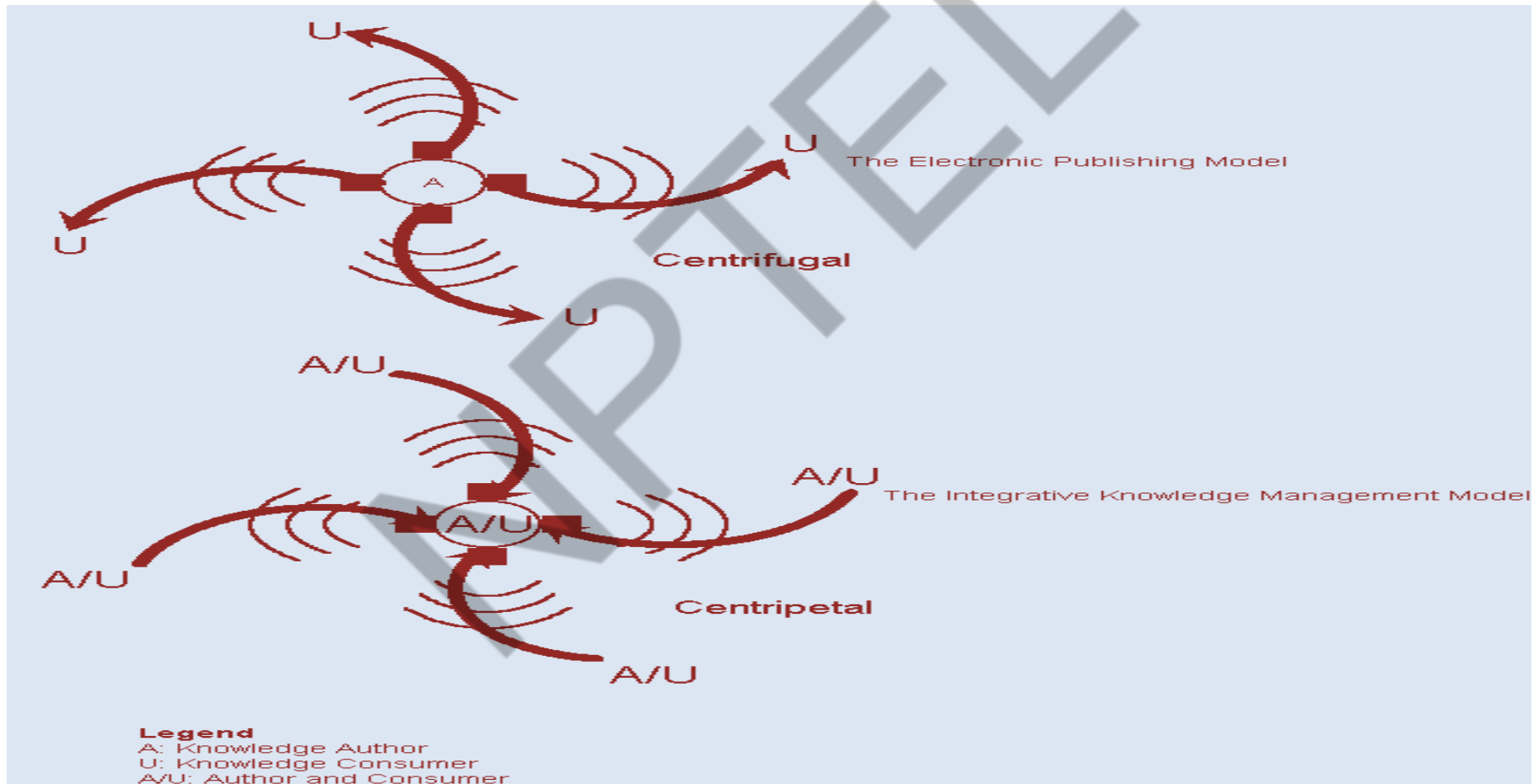
Integrative and Interactive Knowledge Applications
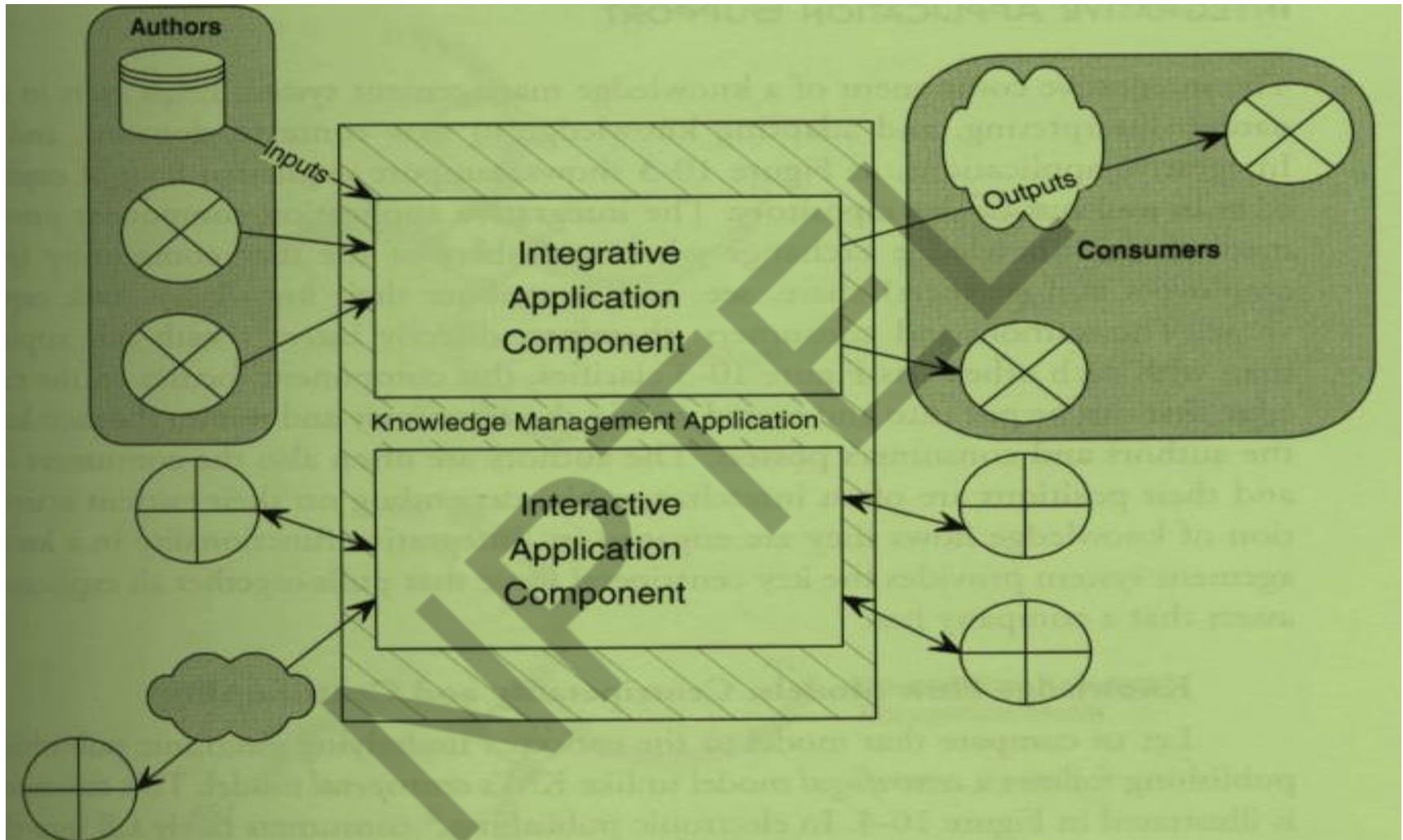
The integrative component of a KM system helps users in critically evaluating, interpreting, and adapting knowledge to new context, domains, and applications

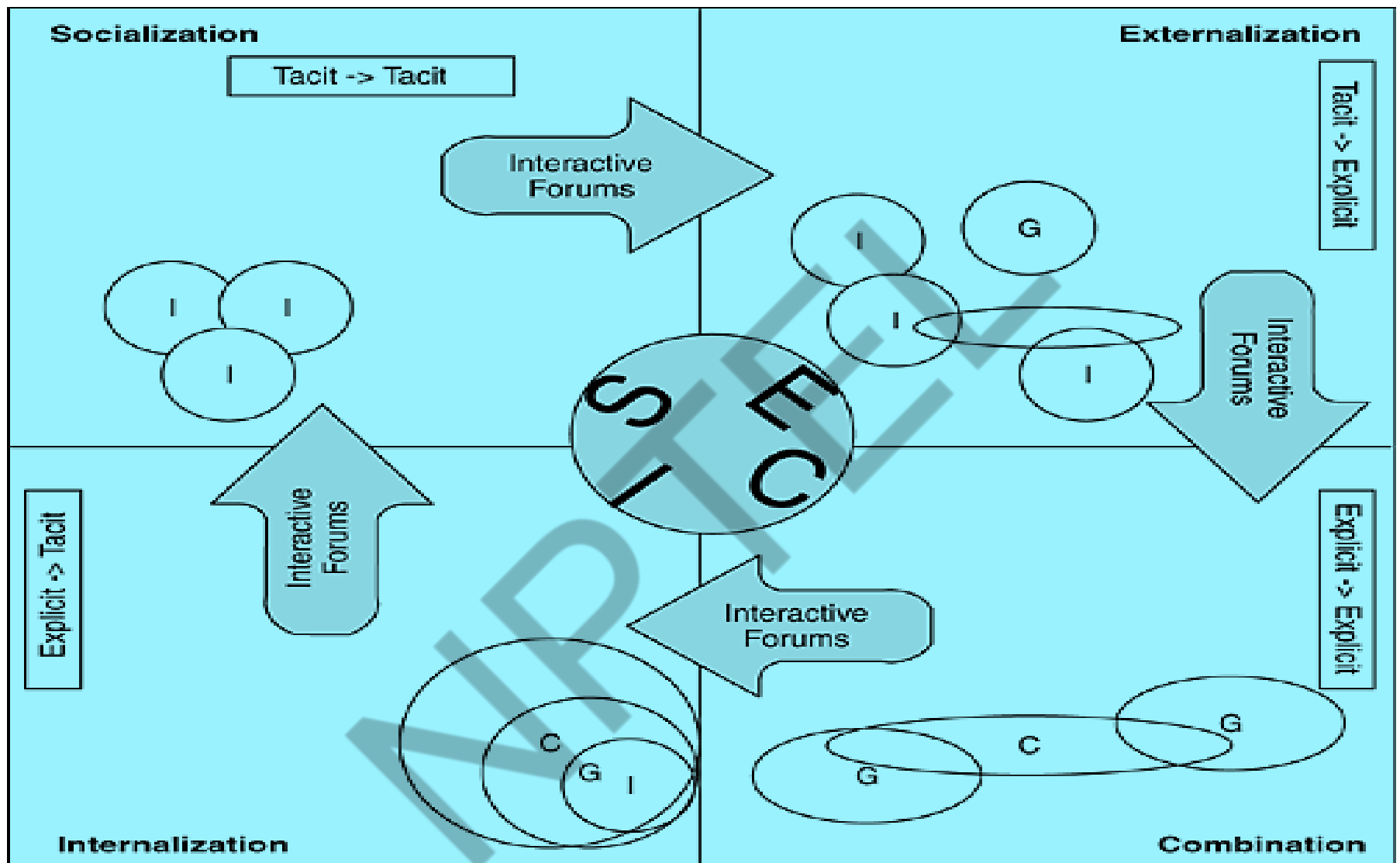# Knowledge Flow Models: Centripetality and Centrifugality

Electronic publishing follows a centrifugal model unlike KM's centripetal model. In electronic publishing, consumers rarely fall into the same community of practice or work group as the authors

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

The Interactive Application Component

- The integrative components of a KM system primarily support codified and explicitly captured knowledge.

- The interactive component therefore focused on enabling interaction among people and providing a basic channel for sharing tacit knowledge.
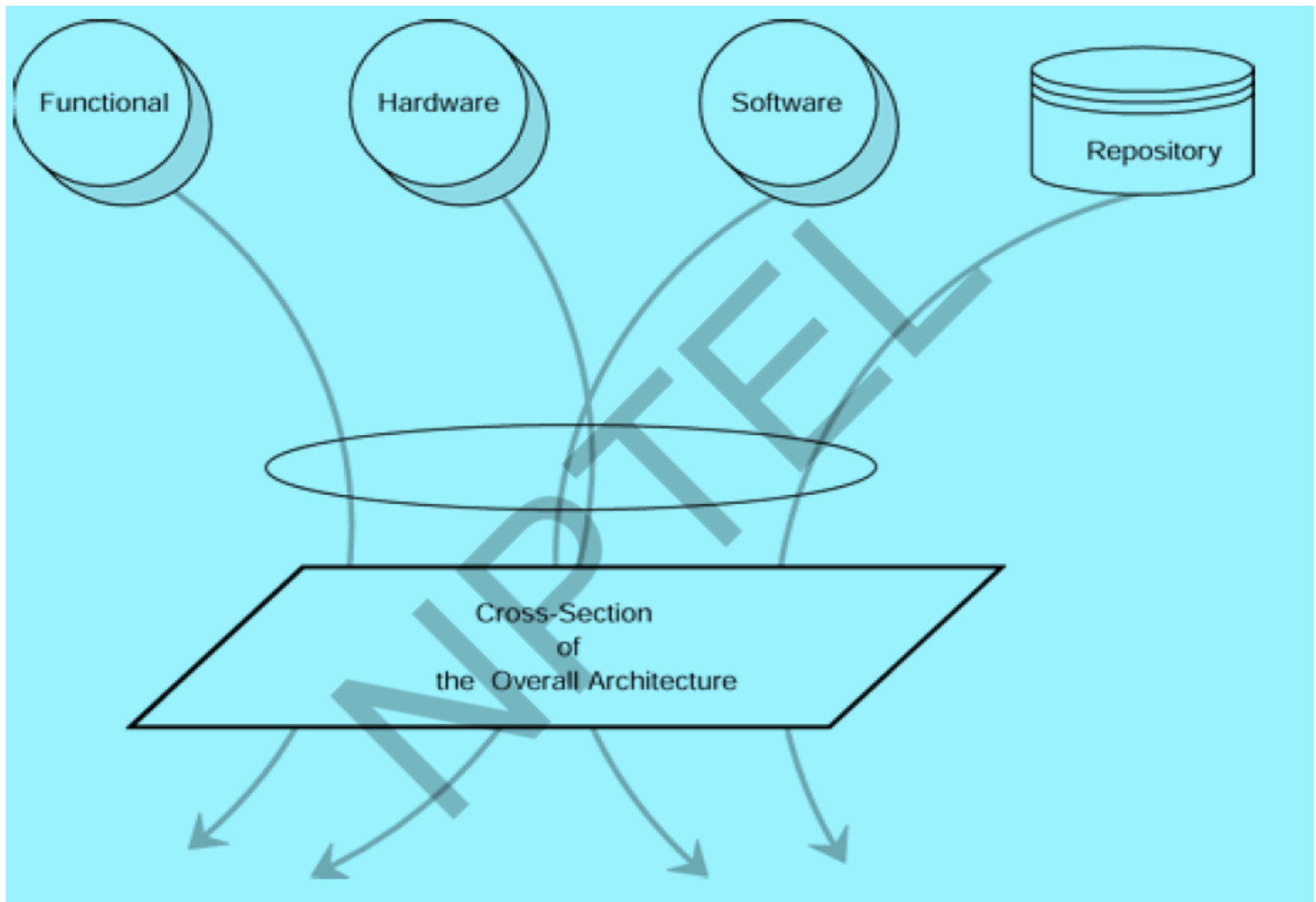
(Based on Nonaka and Takeuchi.: Knowledge creating Companies, 1995)

Architectural components (shown shaded) to be modified or expanded to integrate the KM system with the existing architecture
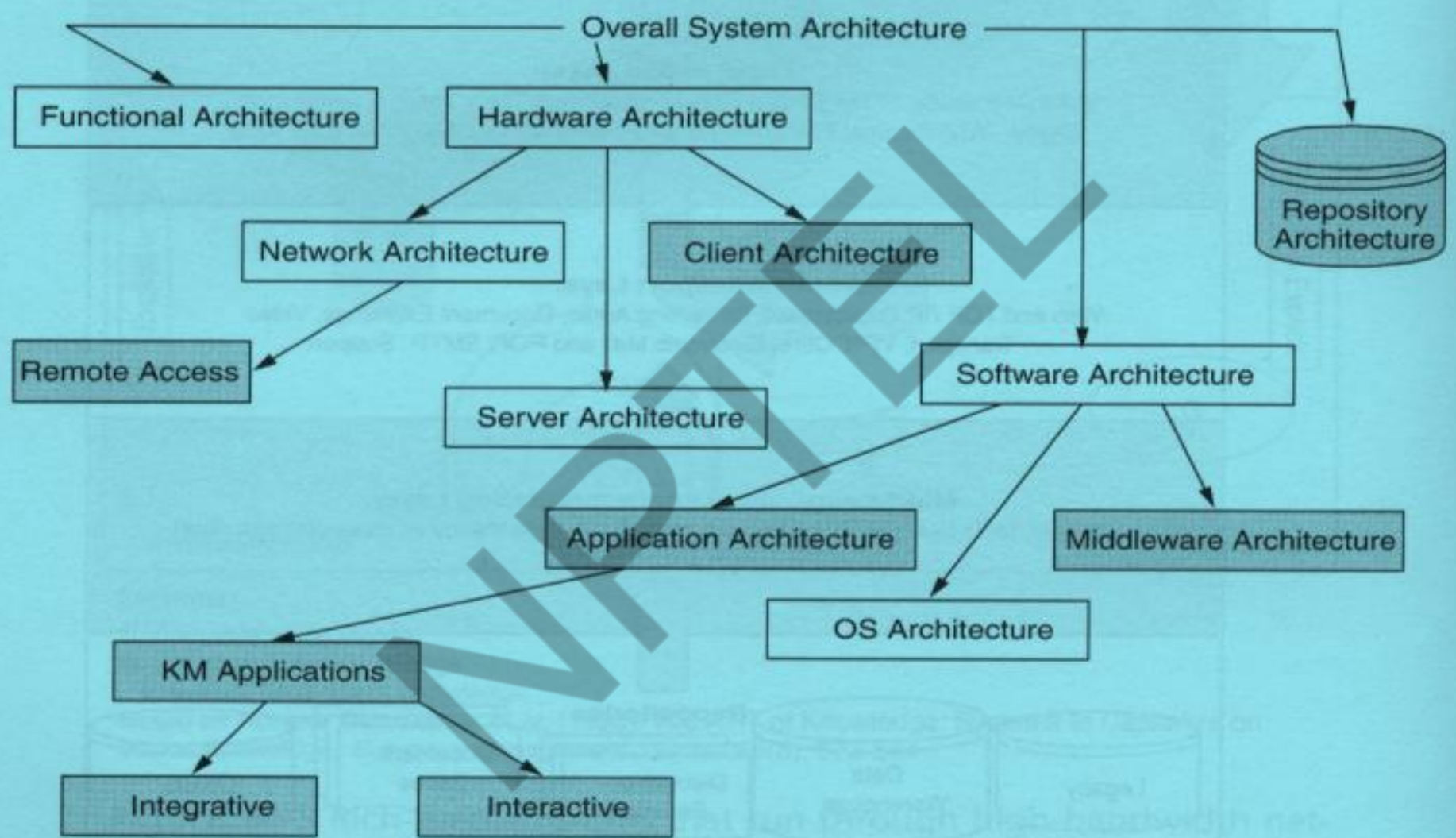
(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Workflow Servers

Application Servers

Operational Db Server

Integrative Knowledge Application

Transaction Server

TCP/IP network

Web/ FTP

"Anywhere" Client

"Anywhere" Client

"Anywhere" Client

"Anywhere" Client

"Anywhere" Client

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)
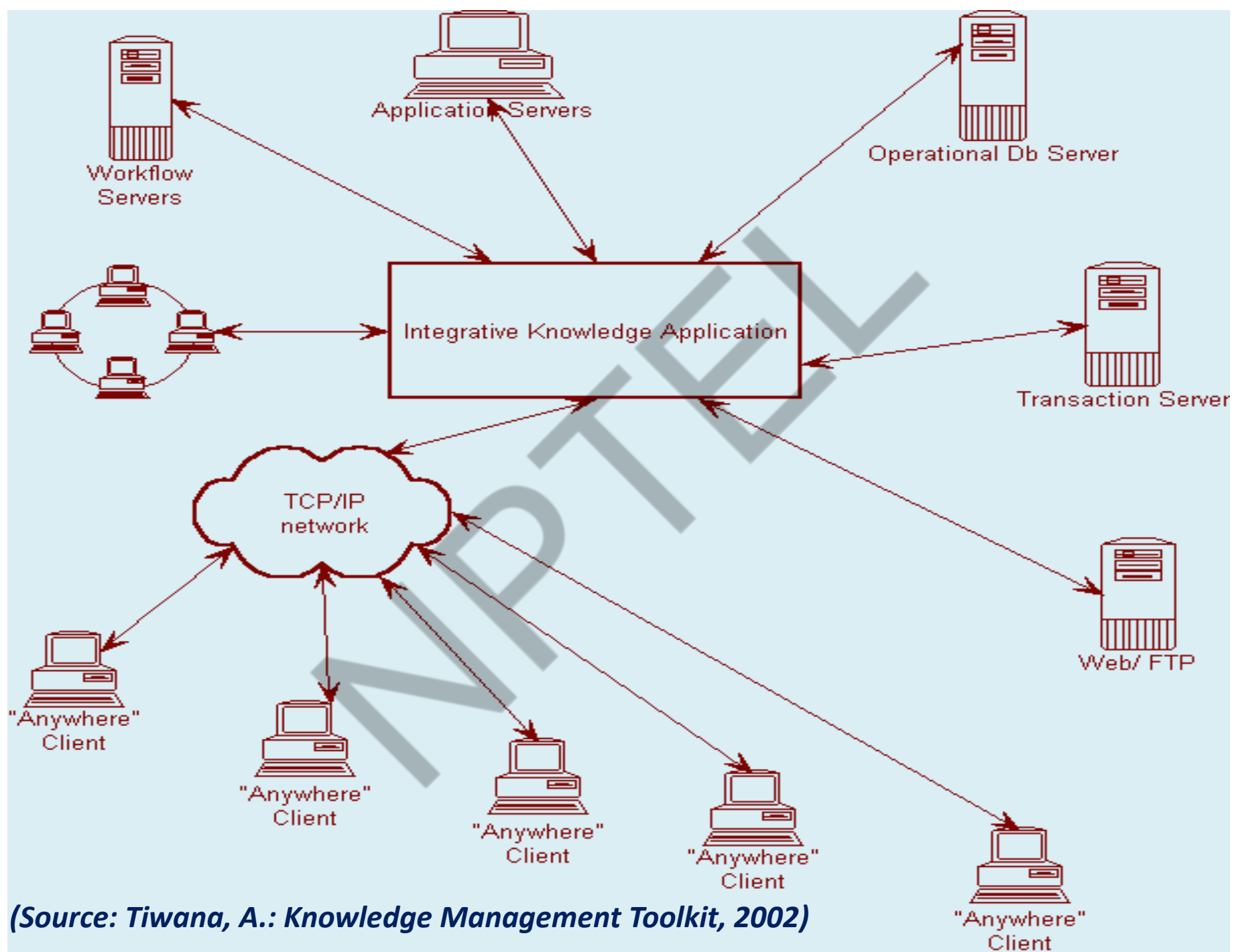
Build or Buy?

- When you begin development, your choices are:
  - To build a system in-house, using team members from the internal IT department and the end-user community of knowledge workers form whom the system is being built.
  - To add external consultants to strengthen the weaker expertise areas for the option described above.
  - To develop the system from scratch (not recommended).

Build or Buy?

- To buy an off-the-shelf, shrink-wrapped solution such as Lotus Notes and customize its installation.
- To buy an off-the-shelf solution sold by a consulting group and modify it to meet your needs.
- To buy and combine an off-the-shelf set of application and customize it to fit your needs.
- To build in part, and buy in part
- To combination of the above approaches.

Making a build or buy decisions

Option	Upfront Cost	Quality of Solution	Time to develop	Flexi-bility	Customi-zability	Notes
Customized in-house develop-ment	High	Depends	High	High	High	Quality can vary. Depends on the expertise available within the company.
Customized in-house develop-ment with consulting support	High	Depends; better than above	Medium	High	High	Quality can vary. The skills of the consultant can influence the pro-ject. Costs will be higher. There is a risk that the same consul-tant may develop a similar system for a competitor. Contractual agree-ments are needed to prevent this.
Customized solution provided by a consulting company	Medium	Average	Low	Medium	Medium	Your competitors might already have the same systems!

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Making a build or buy decisions

| Option	Upfront Cost	Quality of Solution	Time to develop	Flexi-bility	Customi-zability	Notes
Development by the end users themselves	Usually low	Usually low	Depends	High	High	Not recommended.
Standard off-the-shelf and out-of-the-box solution	Low	High	Zero	Low	Low	The only time invest-ment required is the installation time.
Customized off-the-shelf solution	Medium	High	Low	Medium to low	Medium	This should be among your first set of choices.
Off-the-shelf com-ponents integrated through an intranet	Low	High	Low	Extremely High	Extremely high	This should be your first choice!

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Performance and Scalability

- Scalability refers to the ability of the KM system to support an increasing number of users and a higher load of transactions.
- Scalability also affects performance of the system at larger stage.
- Keep the following set of key performance-related factors in mind when you deciding on the design of a KM system:
  - Plan and account for additional time delays as usage grows.
  - Keep repository update time in perspective.
  - Keep time delays for navigating between different parts of the interface to a minimum.

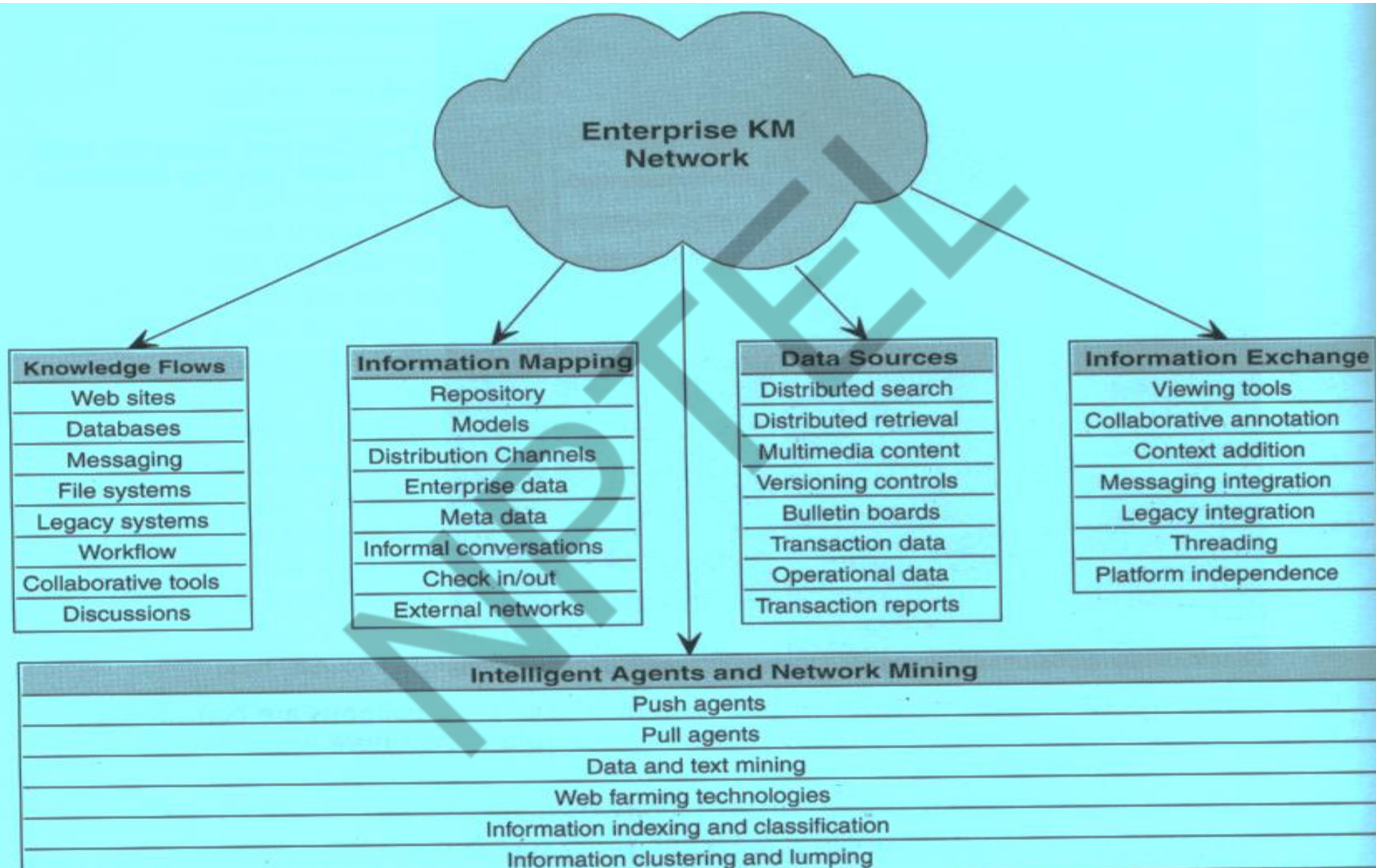# User Interface Design Considerations

- Functionality, Consistency, Visual clarity, Navigation and control, Relevancy, Feedback.
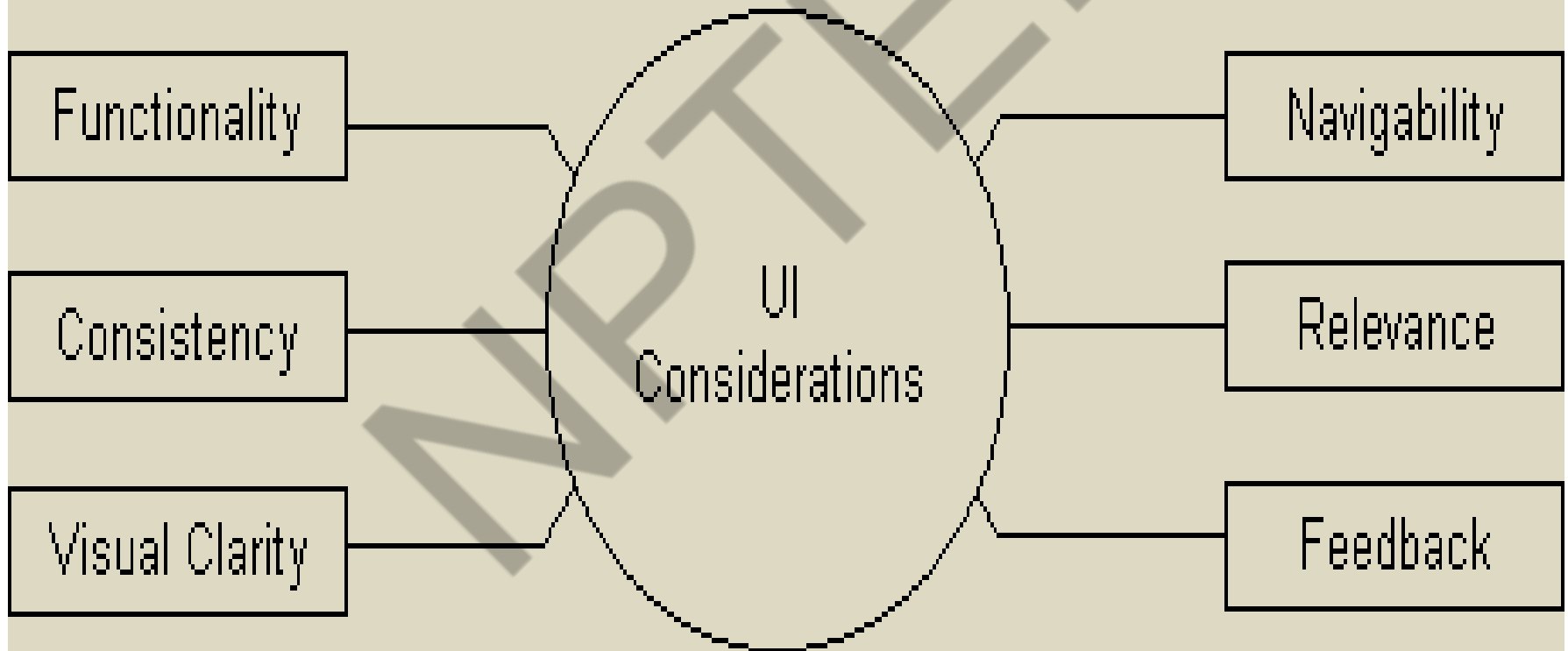
A Network View of The KM Architecture

- The team network should not be confused with idiosyncratic communications network in generic sense.

- The network constitutes both the technological network and underlying social and organizational network in which the technology operates.

- KM system should broadly fall under the category of shared IT applications and services within the hierarchy of the IT infrastructure.

A network oriented view of KM system

Enterprise KM Network

Knowledge Flows	Information Mapping	Data Sources	Information Exchange
Web sites	Repository	Distributed search	Viewing tools
Databases	Models	Distributed retrieval	Collaborative annotation
Messaging	Distribution Channels	Multimedia content	Context addition
File systems	Enterprise data	Versioning controls	Messaging integration
Legacy systems	Meta data	Bulletin boards	Legacy integration
Workflow	Informal conversations	Transaction data	Threading
Collaborative tools	Check in/out	Operational data	Platform independence
Discussions	External networks	Transaction reports	

Intelligent Agents and Network Mining

Push agents
Pull agents
Data and text mining
Web farming technologies
Information indexing and classification
Information clustering and lumping

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Future-proofing The KM System

1. Accept the inevitability.
2. Business drivers.
3. Common standards.
4. Users.
5. Intuitive
6. Metrics and performance.
7. Legacy integration.

2. Developing the KM System

Topics Covered

How a knowledge management system can be actually built along each layer.

Building Blocks: 7 Layers

1. *Interface layer*
2. *Access and authentication layer*
3. *Collaborative filtering and intelligence layer*
4. *Application layer*
5. *Transport layer*
6. *Middleware and legacy integration layer*
7. *Repository layer*

The Interface Layer

- The primary point of contact between the users and KM system content.

- The interface layer must provide a channel for tacit as well as explicit knowledge flow.

- The essential step in tacit knowledge transfer between people is the conversion of tacit knowledge to information and back to tacit knowledge
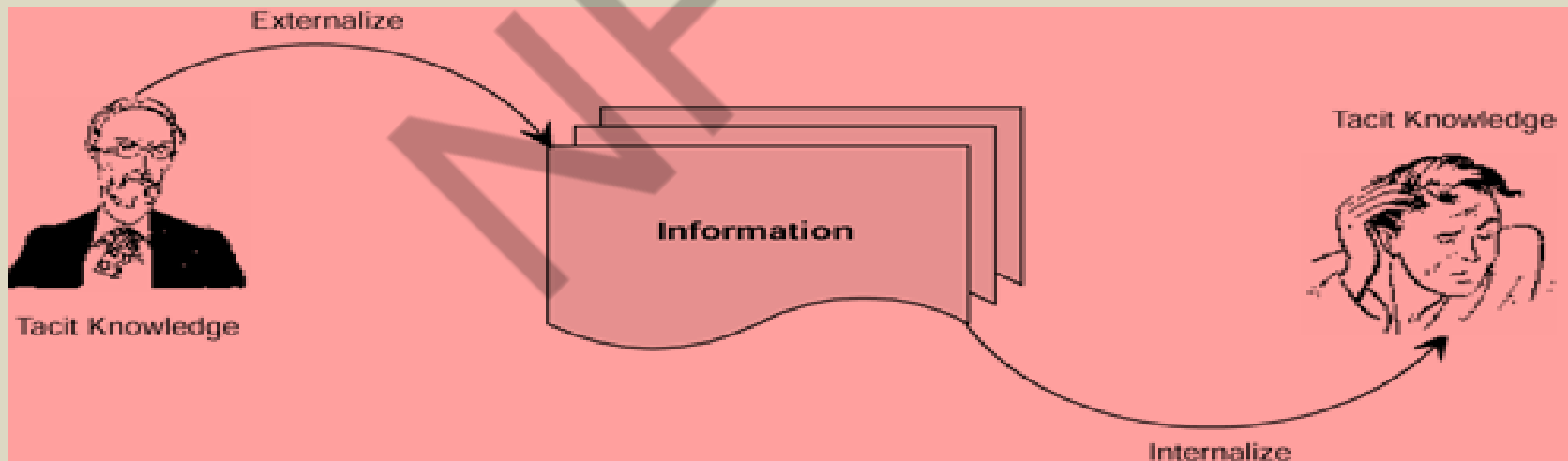
(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Contextual Expression at the Interface

- There is a lot of context that cannot be represented well in any type of knowledge base or repository.

- Tacit knowledge can be transferred by purely explicit mechanism through possible explicit mechanisms through possible explication; by purely informal mechanisms, such as conversation, or by technological enablers, such as electronic whiteboards that fall somewhere in between these two extremes.

Tacit Transfer

Formal Transfer

Explicit Knowledge Base

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

44
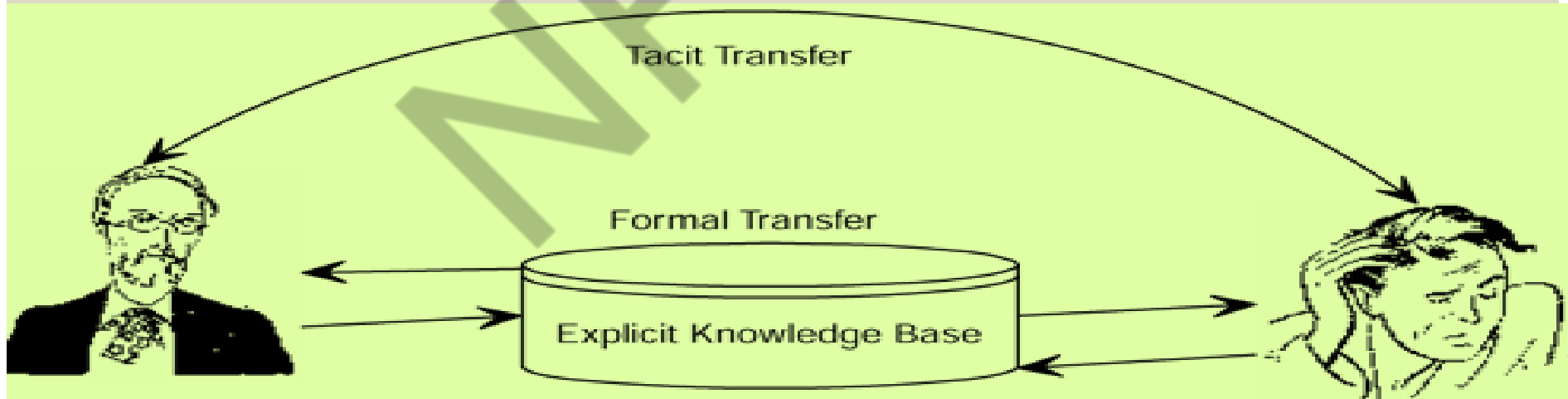
Platform Independence

- The use of a Web browser as a client also enables universal access the relevant portion of the KM system from any location or computer terminal connected to the Web.

- Content can further be optimized to move through low-bandwidth networks with the use of cache memory on the client and server side, by minimizing the depth/resolution of graphics, and by using mobile applications written in Java.

Learning From Intranets

- An intranet site must organize information and assemble it in a consistent, logical, and systematic manner to make it useful and successful.

- An intranet front end must allow users to get to the information that they need in painless and fast manner with respect to a KM system,.

Optimizing Video Content

- The essential point to keep in mind while configuring a server for video delivery is to optimize the video clip file itself for existing network bandwidth.

- A safe assumption to make as starting point would be to optimize content for 60 percent of the available bandwidth, then realign it based on actual usage pattern.

Universal Authorship

- Users working on different platforms can add content to the overall repository, irrespective of their platforms
- Another benefit of using a Web-based front end is that users working on different platforms can add content to the overall repository in HTML (Hyper Text Markup Language, most widely used language on Web format), which is the same across all platforms.
- Therefore, a report created and posted in HTML format by a salesperson using an Apple computer can be read by someone using a Windows PC.

The Access and Authentication Layer

- Some of the issues that must be addressed are:
- Access privileges: Assign rights to permit different levels of access to data such as read-only, write, edit, and delete capabilities
- Firewalls: Construct a firewall between the extranet and Internet. Thoroughly test the firewall by mock attacks
- Backups: Create backups, staging areas, and mirror sites

Virtual Private Networks

- VPNs eliminate the need for fixed point-to-point communication lines. Instead, they operate within a public network, such as the Internet, but with security that is as strong as that of more expensive, leased private lines.

Standards and Protocols for Expensive Networks

- Some of the standards that have been put forth and endorsed by some companies include the following:
- LDAP: Lightweight directory access protocol
- PPTP: Point-to-point tunneling protocol
- S/MIME. Secure Mime is a standard that lets users send secure e-mail messages by using certificate-based encryption and authentication
- Vcard: Virtual Card is a format for storing and presenting contact or registration information.
- Signed Objects: Signed Objects is a format for automating trusted software and document distribution defined by the JavaSoft Java Archive specification.

Biometrics and Other Forms of Authentication

- Biometrics, voice recognition, and fingerprint recognition are promising technologies that will allow users for a company or enterprise-wide network to get into the system in a rather transparent manner.

The Collaborative Filtering and Intelligence Layer

- The collaborative filtering and intelligence layer is the one that constitutes in intelligence with in a KM system.

  - The process of adding tags and meta tags to knowledge elements, either through automated mechanisms or manual procedures, is done at this level.

  - Intelligent agents are perhaps the best thing to happen to A.I. In terms of viable applications to the Web

From Static to Dynamic Structures

- Each document is connected to other documents through hyperlinks.

- The links are statically contained in each document and refer to other documents, video files, sound files, etc., by URLs.

- Activating a hyperlink means jumping from one document to another.

55
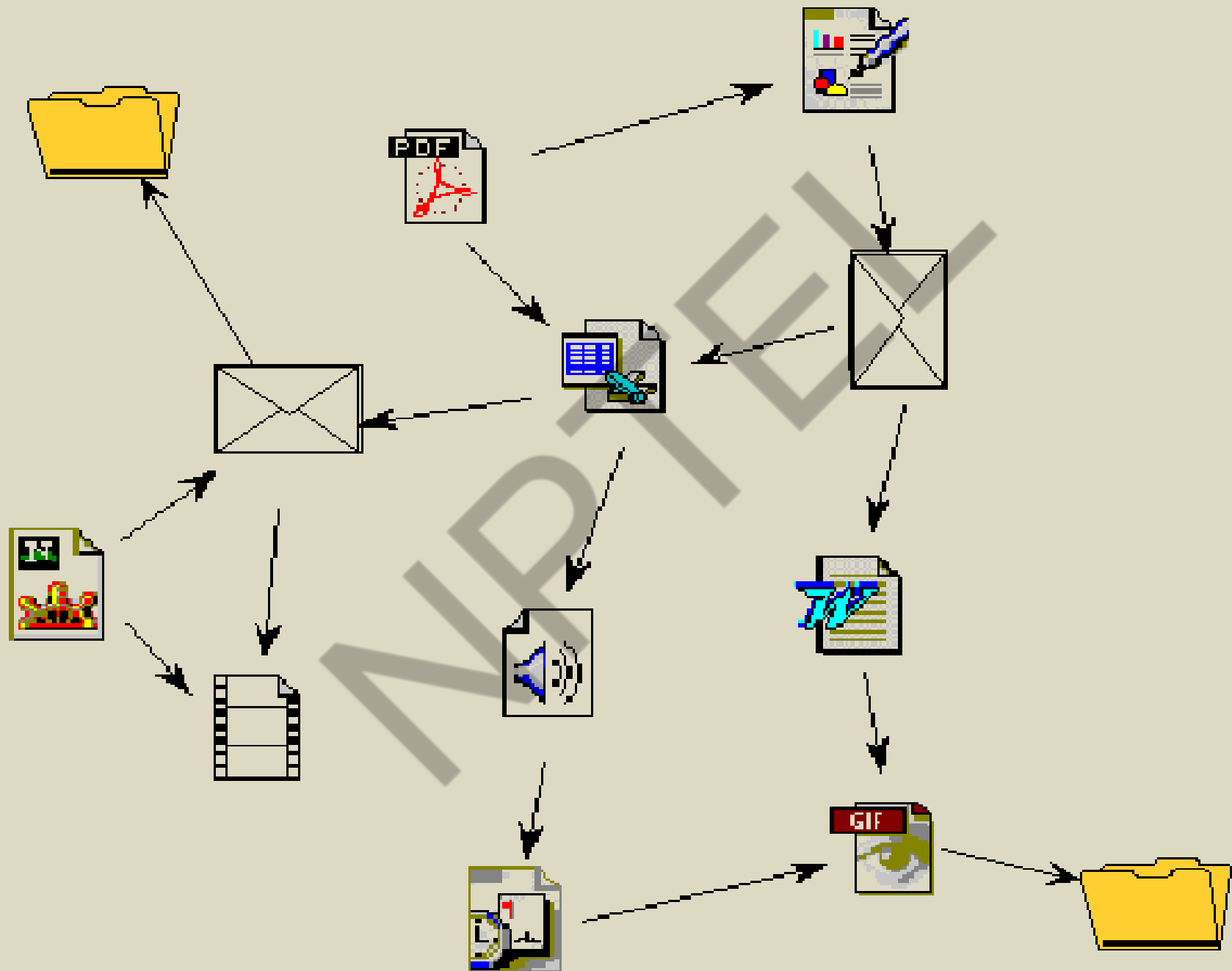
From Static to Dynamic Structures

- This approach has created other problems:
  - Navigational encumbrances:
  - Extensive collaborative authoring:
  - Orphan links:
  - Difficult in generating complex views:

Virtual Folders

- Using such a mechanism, users can reach the same information element in multiple ways:
  - By navigating:
  - By searching meta data:
  - By searching content:
  - By subscription:

Virtual Folders

- This concept is also based on the presumption that will not add content to the corporate repositories if it is too complex for them to do so.

- The goal is to make it possible to add the repository with little or no effort on the part of the user.

- Without such functionality, this work runs the risk of being *perceived* as useless at code check-in/check-out procedures that most programmers have to unwilling follow.
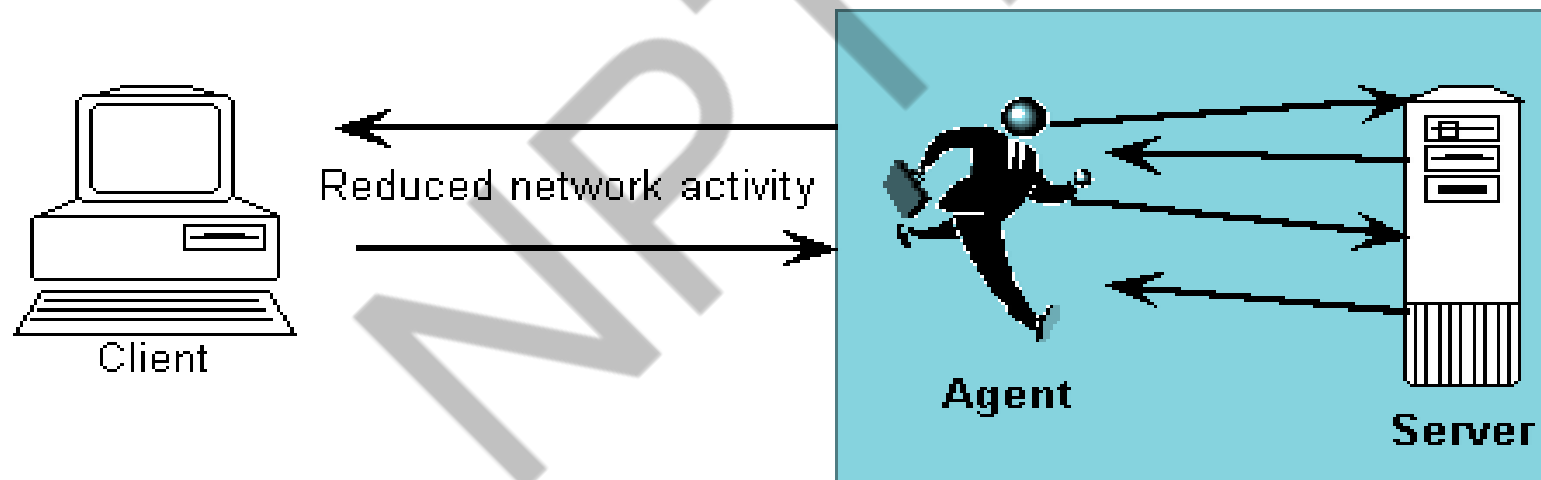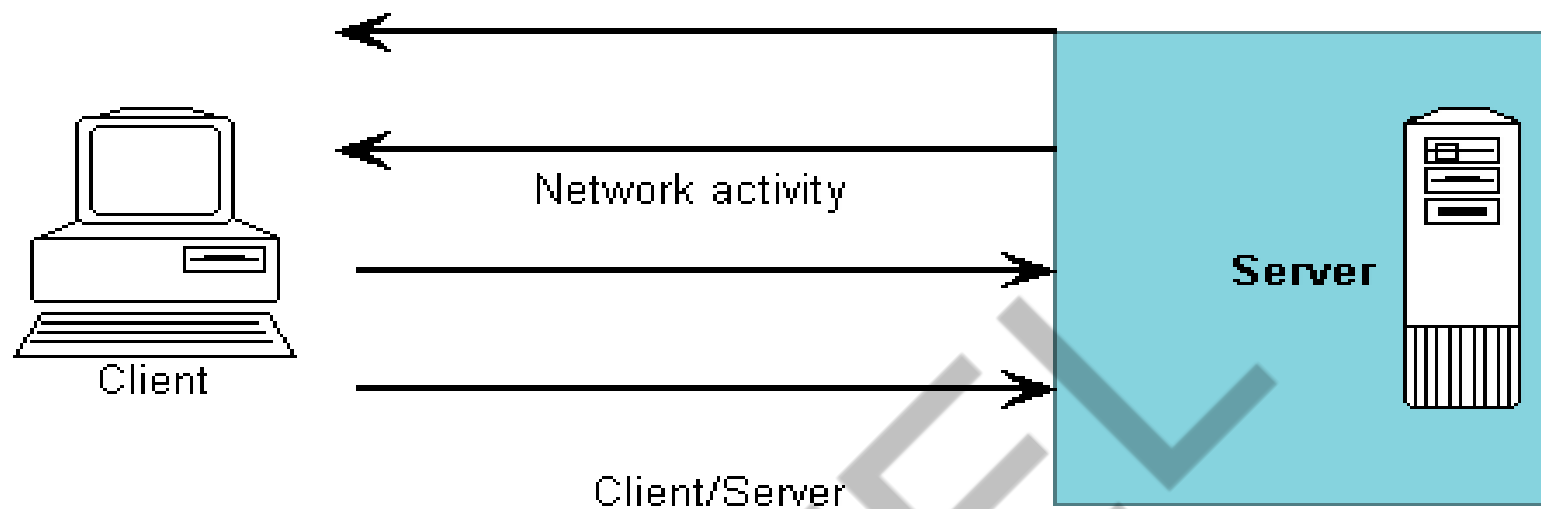
Automatic Full Text Indexing

- The collaborative filtering layer is responsible for indexing content in a manner the permits fast retrieval through multiple search mechanisms.

Automatic Meta tagging

- Meta tags can be automatically added to documents and other content, using software tools that are readily available.

- Such meta tags include information such as:
  - Who published the document?
  - When was it last modified?
  - Who reviewed it?
  - Who approved it?
  - What is the size of document?

From Client/Server to Agent/Computing

- In the client/server setup, the network load primarily exists between the client and the server (indicated by more interaction lines between the client and the server).

- On the other hand, in the agent/computing model , this load is shifted to the space between the agent server.

- The overall load on the network, therefore, is dramatically reduced.

Network activity

Server

Client

Client/Server

Reduced network activity

Client

Agent

Server

Agent/Computing model

62

Benefits of agent mobility

- A mobile agent is not bound to the system on which it is executed.

- Such and agent is free to move around the network across multiple hosts.

- Even though it is created in one execution environment, it can transport its state j and code with it to the next host within the network where it continues code execution.

Mobile agent for KM

1. Mobile agents reduce network load:

2. Real-time operations:

3. Protocol encapsulation:

4. Asynchronous and autonomous execution:

5. Seamless integration and heterogeneity:

6. Mobil agents are fault tolerant:

Agents and push models for knowledge delivery

- Mobile agents embody the Internet push model.

- Agents can disseminate news, bulletins, warnings, notifications, and automatic software and content updates.

- The strength that mobile agents bring to such knowledge-centered applications lies in their asynchrony.

The Application Layer

- Application such as skills directories, yellow pages, collaborative tools, video conferencing software and hardware, and conventional decision support tools are placed at his level.

The Transport Layer

- TCP/IP connectivity throughout the organization.

- An up-and-running Web server.

- A POP3/SMTP or MAIL server.

- A VPN to support remote communication, access, and connectivity.

- Support for steaming audio and video on the central server(s).

The Middleware and Legacy Integration Layer

- The legacy integration layer provides such connections between legacy data and existing and new systems.

- The middleware layer provides connectivity between old and new data formats, often through a Web front end.

The Repositories Layer

- The bottom layer in the KM system architecture .

- Consists of operational databases, discussion databases, Web forum archives, legacy data digital or digitized document archives, and object repositories.

3. Prototyping and Deployment

Topics Covered

- Moving From Firefighting to Systems Deployment

- Prototyping

- Pre-RDI Deployment Methods

- The Results Driven Incremental Methodology

3. Prototyping and Deployment

- **Systems Deployment**

- Besides training costs, companies almost never budget for nontechnology costs related to deployment and implementation of KM systems.

- Deploying any new system is usually a learning experience.

Prototyping

- Prototypes are the most underused form of rejection insurance that a development team can ever purchase.

- Iteratively improving a system with incremental prototypes lets the users see, touch, and feel a system even before it is completed.

Pilot Deployments (pilot testing)

- A pilot implementation of the KM system on a small scale can lead to insight that might prove to be invaluable before the full-blown system is implemented at an enterprise-wide level.

- A pilot test reveals significant and often fundamental design flaws early on in the deployment process

Selection of a Pilot Project

- The following tips help to evaluate potential projects and their viability as pilot projects are :
  - Avoid trivial projects.
  - Stay away from your company's lifeblood.
  - Favor projects with widespread visibility and noticeable effects.
  - Select a problem that the chosen piece of technology fits well.
  - Set tangible deadlines and metrics for success.
  - Select a process-intensive project that can be highly impacted by the user of a KM system

Lessons to be learned From Data Warehouses

- Most companies pursued investments in data warehouses to improve the quality if information within the organization and to improve access to it.

- Many companies start with small versions of a data warehouse (akin to pilot projects), usually centered on an application or a data set.

- The danger of implementing and experimenting with such a pilot is that its success can lead to rapid proliferation of data marts that are independent of one another

Legacy Deployment Methods

- The incremental approach to systems development and deployment assumes that functions required of a system, such as a KM system, cannot be known completely in the initial stages.

- This approach suggests that developers implement a part of the system and increment it rapidly, as new requirement surface.

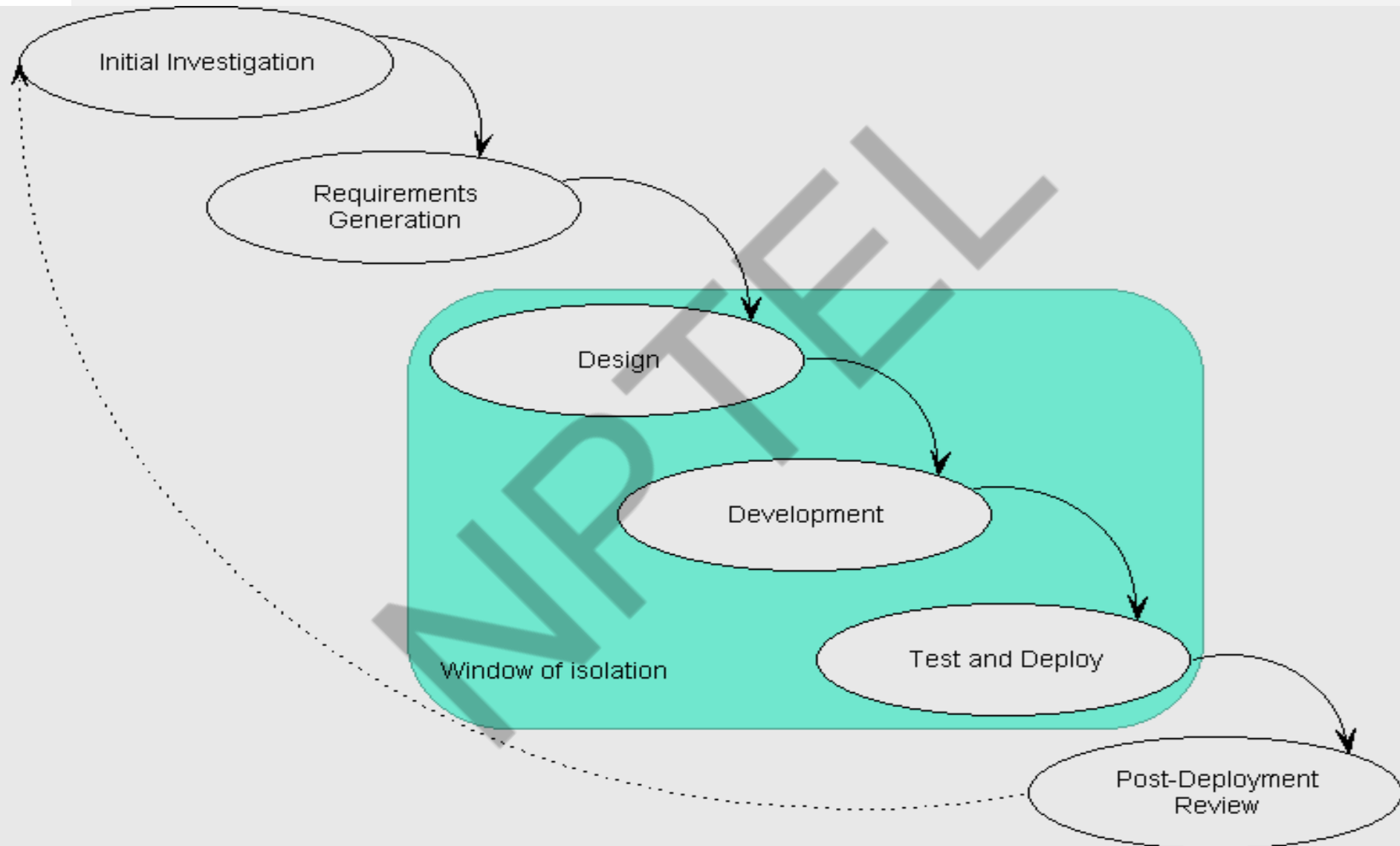- This way, the entire system can be implemented in increments, and changes can be made along the way.

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

77
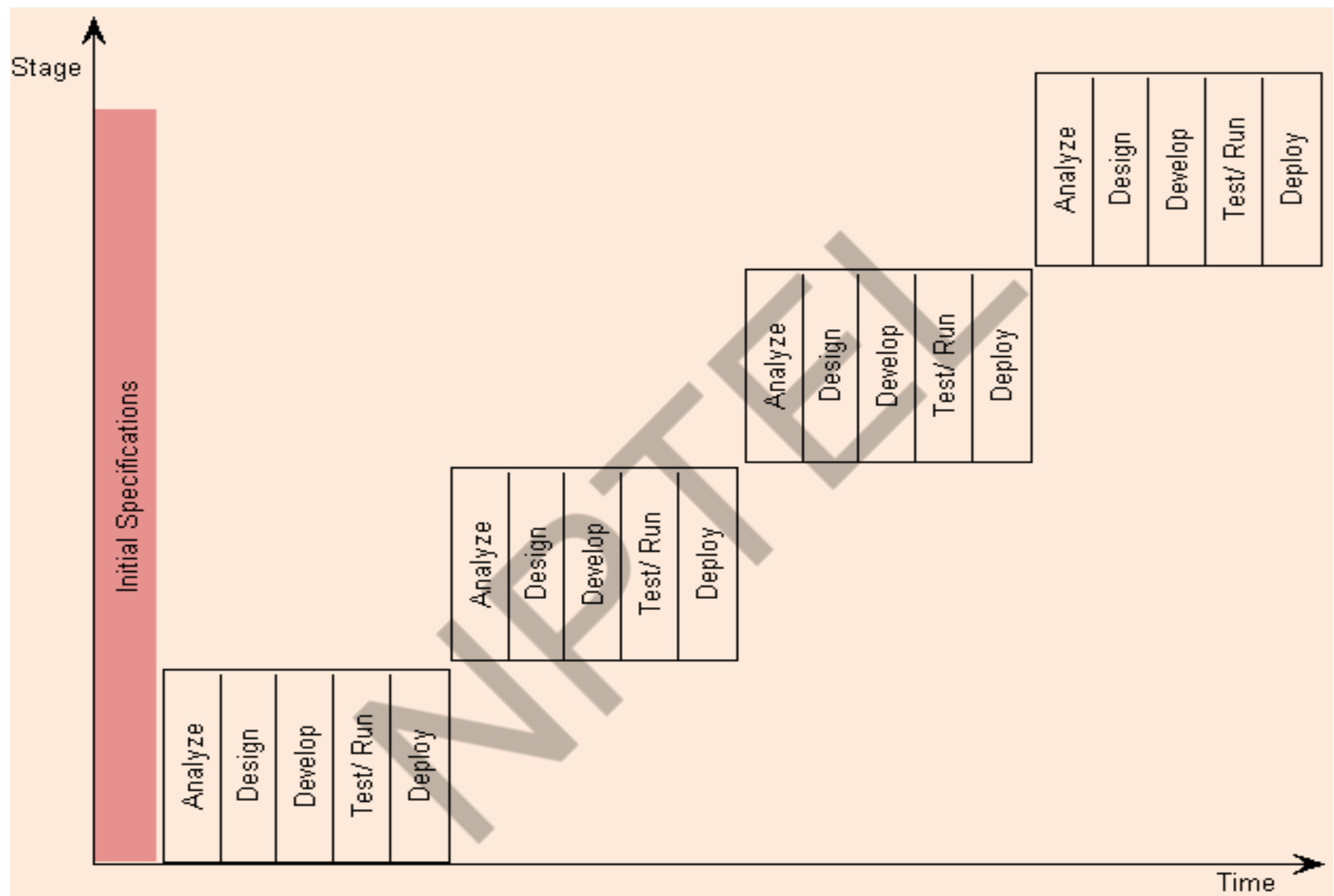
Legacy Deployment Methods

- The waterfall model, the parent of the incremental model for systems development, was the mainstay of the system development methodologies for years but has recently fallen out of favor.

- The waterfall model is a bad approach to take for implementing complex systems.

- If the feedback and learning loop are incorporated into this model and the project is broken down into discrete phases that build on another, it give us the incremental approach model shown in Figure 12-2.

Incremental approach model

Initial Investigation

Requirements Generation

Design

Development

Window of isolation

Test and Deploy

Post-Deployment Review

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)
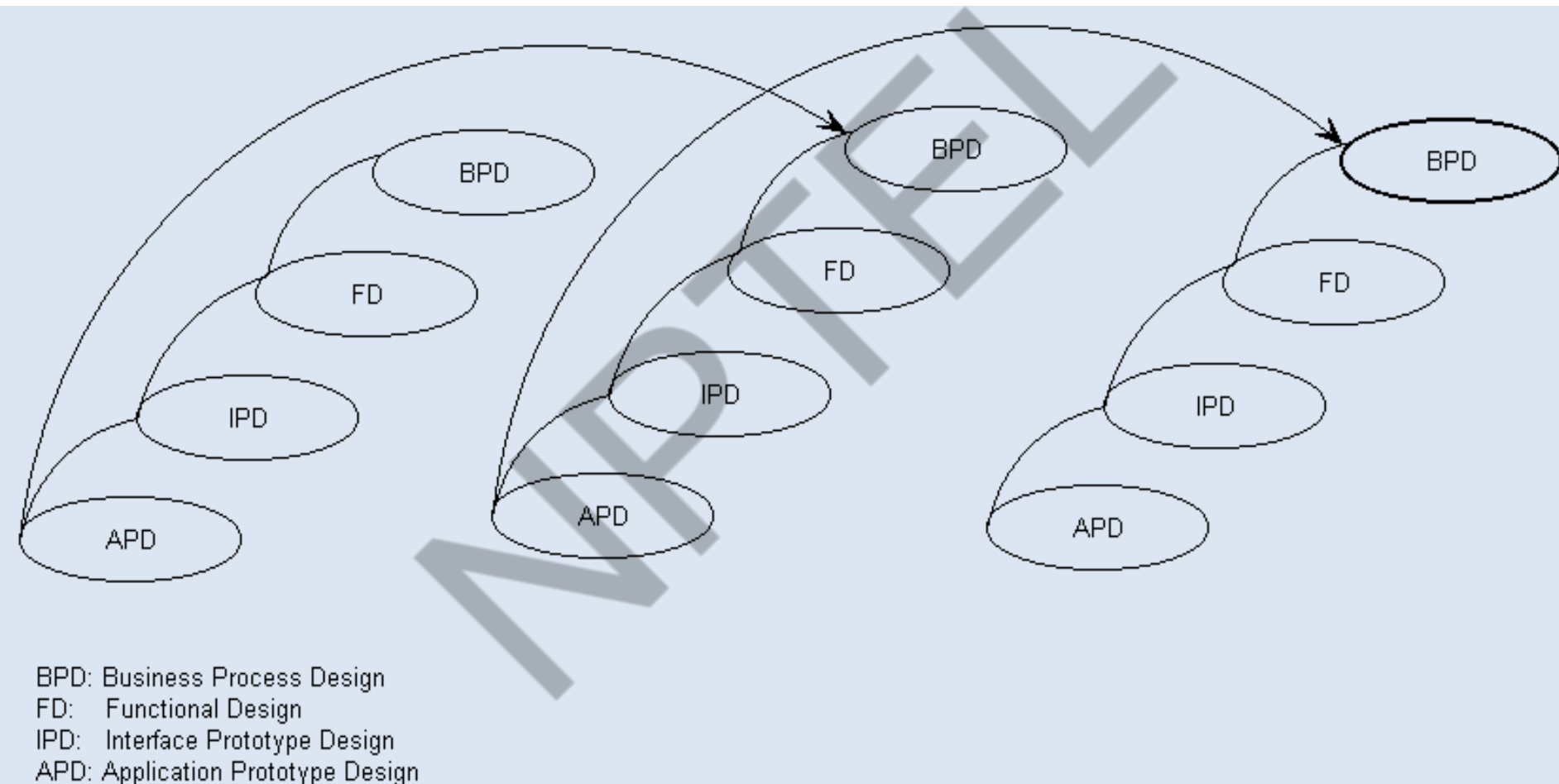
79

The Information Packaging Methodology

- Architecture and system planning

- Design and analysis

- Technology implementation

- Deployment and metric testing

Fig: Information packaging technology
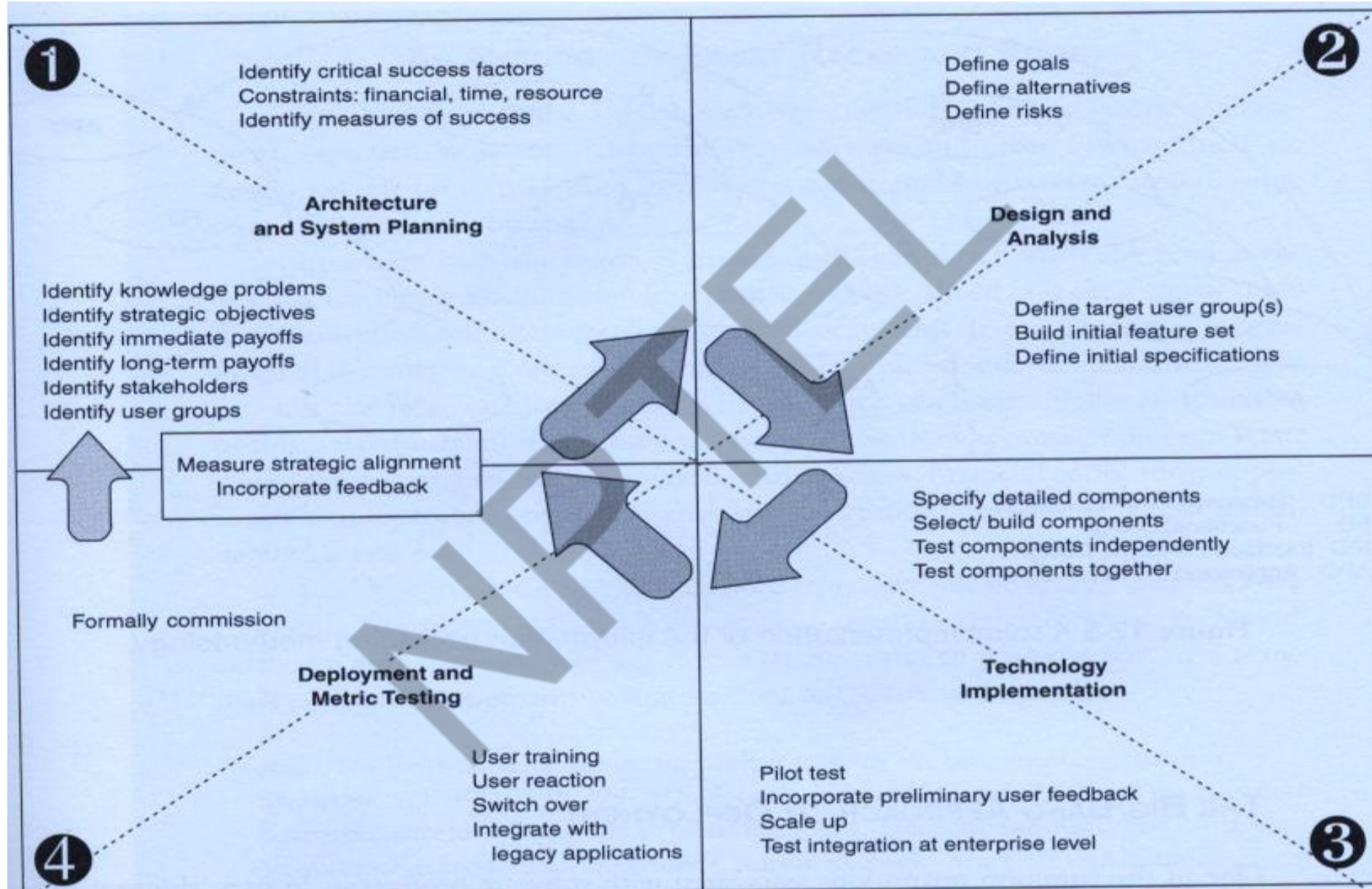
(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

The information packaging spiral methodology

BPD: Business Process Design
FD: Functional Design
IPD: Interface Prototype Design
APD: Application Prototype Design

The Big-Bang Approach To Deployment

- Delivery equals implementation
- Develop the software system in its entirety and implement everything at once, after the code compiled

# The Big-Bang Approach To Deployment
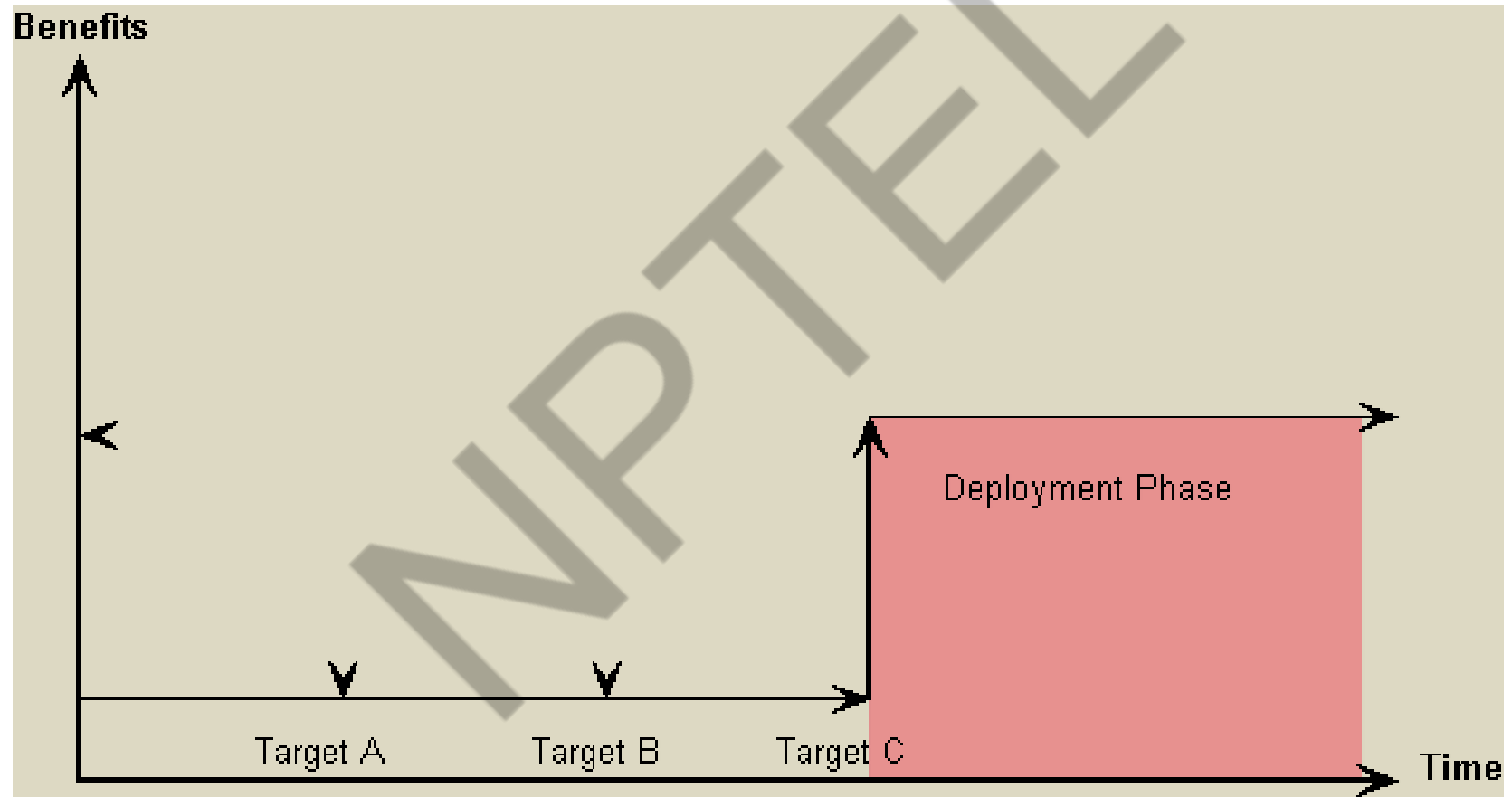
Enterprise level Integration: Boon or Bane ?

- The flexibility is a boon because it offers intensively amplified benefits and abundance of functionality.

- But this boon is also the primary bane.

- The excessive flexibility mean that your have to tweak to work for your company, and this necessity changes a software introduction initiative into an organizational change initiative.

The Results-Driven Incremental Methodology

- The RDI methodology specifies that the project be broken up into a series of short, fast-paced development cycles coupled with intensive implementation cycles, each of which delivers a measurable business benefit.

- The most obvious benefit of the RDI approach is that business benefits of the KM system can be realized much sooner, compare with a more traditional big bang approach.

Benefits of each RDI stage are realized immediately after completion of each release.
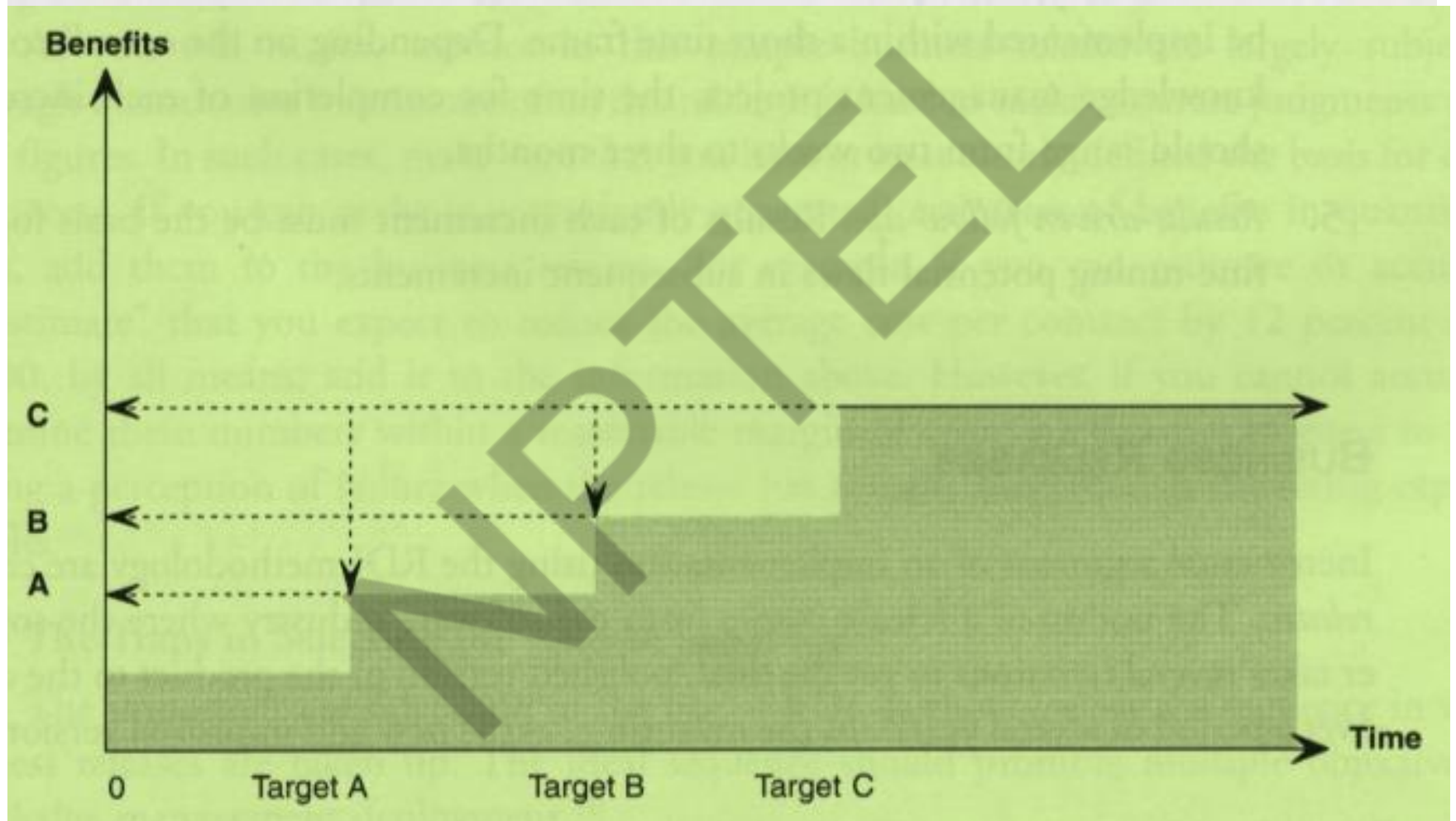
(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

Steps Involved in the RDI Methodology

1. Objective-driven decision support:

2. Incremental but independent results:

3. Software and organizational measures clearly laid out at each stage:

4. Intensive implementation schedules:

5. Results-driven follow-ups:

Business Releases

- Each business release should address at least the following questions:
  - What is the targeted business result?
  - What is the exact software functionality required to achieve the results?
  - How will the results be measured?
  - What complementary changes are need in policies, incentives, metrics, and procedures?

A Sample Business Release for a Consulting Company Based on the RDI Methodology

Incremental Business Release	Details
Business release number	23454-11.
Start date	05-11-2000.
Due date	05-28-2000.
Release manager	Leigh Jones.
Targeted business result	Improve partners' use of records and code from past ERP implementation in Malaysia to slash costs of new ERP projects in Singapore.

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

A Sample Business Release for a Consulting Company Based on the RDI Methodology

Incremental Business Release	Details
Software functionality	An intranet connected to the Singapore office. Access to design documentation on the Malaysia document server must be available. Hyperwave information server and a VPN must be used to enable low-cost access without a dedicated line. The software must support Mac and Windows users. The link must be secured with SSL (available in Hyperwave). Use 128-bit encyrption provided by software that is not subject to export restrictions from the United States.
Preliminary metrics and success measures	An improvement in the speed of execution of contracts. Lower cost per contract. Reduced travel expenses on the Singapore-Penang route.
Policy changes	Incorporate the following into partner appraisals: Use of the new system to access information; Timely filing of project data; Cost reduction: travel and project averages
Accessibility	Provide each partner a laptop with a wireless LAN link; alternatively provide each partner a Palm VII PDA, a wireless connection, a direct access account, and an analog modem.
Other measures and notes	To be added.

(Source: Tiwana, A.: Knowledge Management Toolkit, 2002)

The Traps in Selecting the Release Sequence

- Expected success.

- Cumulative.

- Highest payoff.

- Balance of the above.

Process divisibility and RDI releases

- Divide the technology in such a manner that successive increments involve the same software modules but at a deeper level of detail

- Break the technology deployment into pieces, each of which is implemented at the deepest level of detail in the first round.

- The RDI methodology provides a technique that allows for refinement of the current stock of deployment and process knowledge in ongoing releases.

RDI's Role in Tools and Task Reinvention

- Reinvention of the tools, interfaces, and task environments, such as the design or aesthetic fit of the KM system, often goes hand in hand with reinvention of the job itself.

- It would be ideal if the design of the KM system were such that the interface was very similar to the one that existed early and the whole process of using the KM system was almost transparent to the user. However, this is rarely possible.

Cross-Functional Synergy

- Synergy refers to the ability of the knowledge management system to allow different groups of users, representing different functional departments, to produce results exceeding those that they would produce working without the support of such a system.

The complexities of collaboration

- The various levels of complexity that must be figured into the design of a KM system include:
  - Logistical complexity:
  - Technological complexity:
  - Organizational complexity:
  - Environmental complexity:

Avoiding Overengineering

- Overengineering refers to the act of implementing system functions that may never be used or adding details that are unnecessary for deriving the desired business results.

- Although many managers may preach incrementalism in system deployment, they rarely practice it.
  - Incrementalism and structured methodologies are viewed as being noncomplementary
  - The benefits of incrementalism are perceived to be marginal that it seems like it is not worth the effort

Developing Clear Communication Processes

- Explains the expectations and reasoning behind the introduction and integration of the KM system with business process.

- This communication leaves no surprises for the users and makes it easier for them to accept a culture where continuous is a normal part of work life.

Human Barriers in Technology Design

- A combination of appropriate design of technology and complementary incentives

- An immediate reward for an employee can compensate for an immediate effort that can result in long term reward for the firm.

- Linking long-term goals to long-term rewards rarely works.

One Infinite Loop

- To keep a KM system kicking and alive, it needs iterative improvements as the business environment and accompanying processes evolve over time.