DOUG ENGELBART INSTITUTE

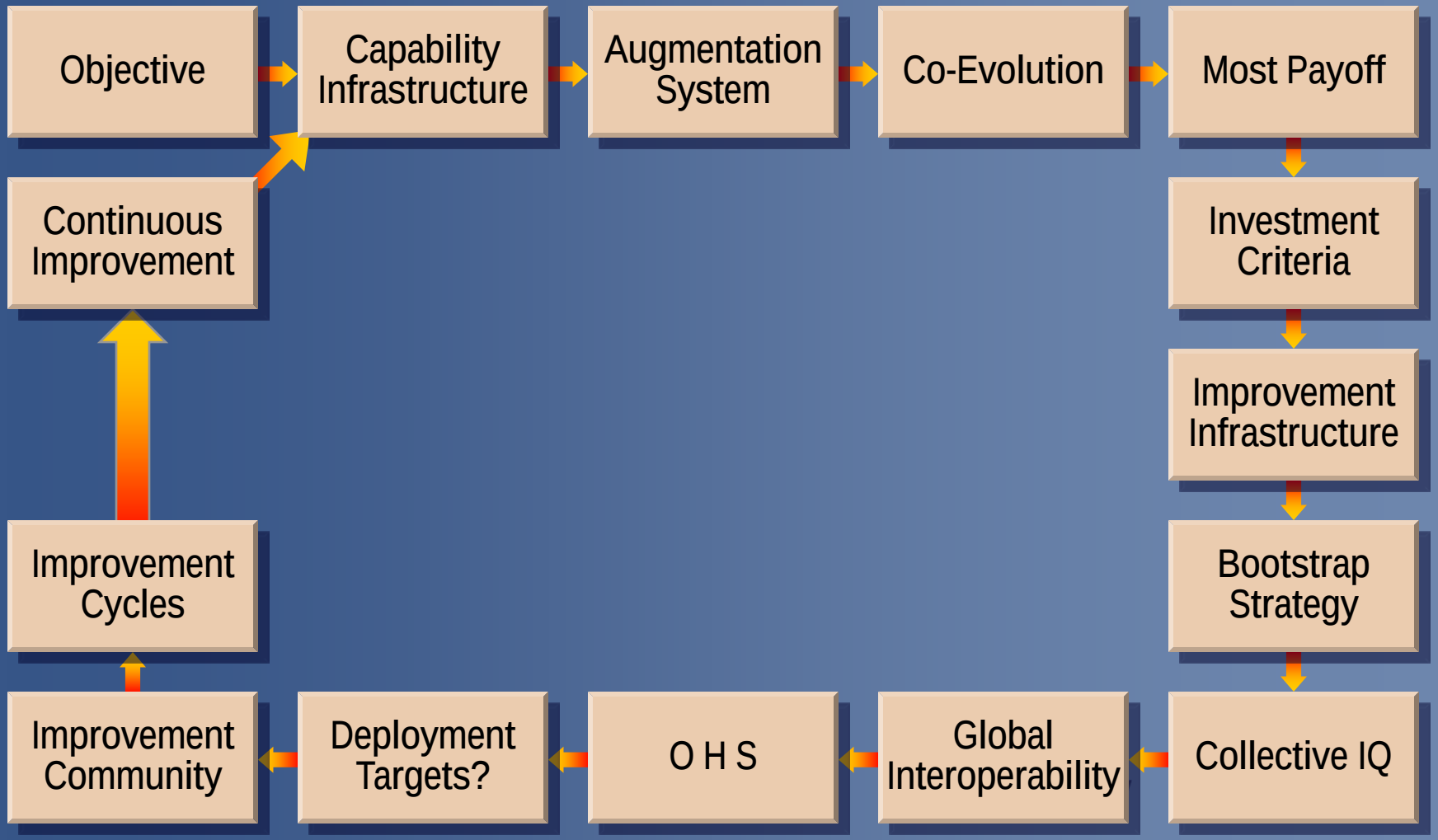
Boosting Collective IQ

A Design for Dramatic Improvements in Productivity, Effectiveness, and Competitiveness

Douglas C. Engelbart
Christina Engelbart

dougengelbart.org

The Bootstrap "Paradigm Map"



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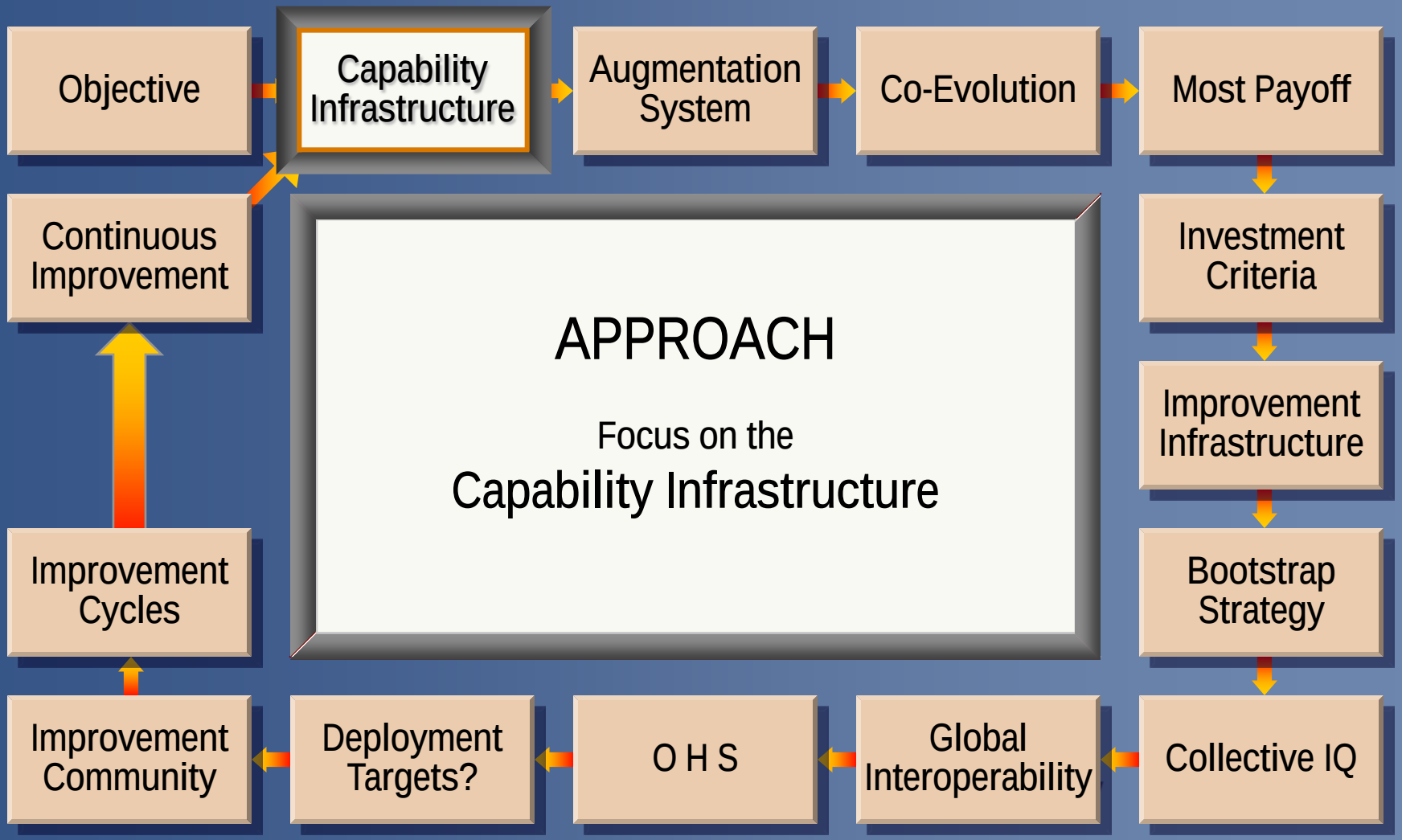

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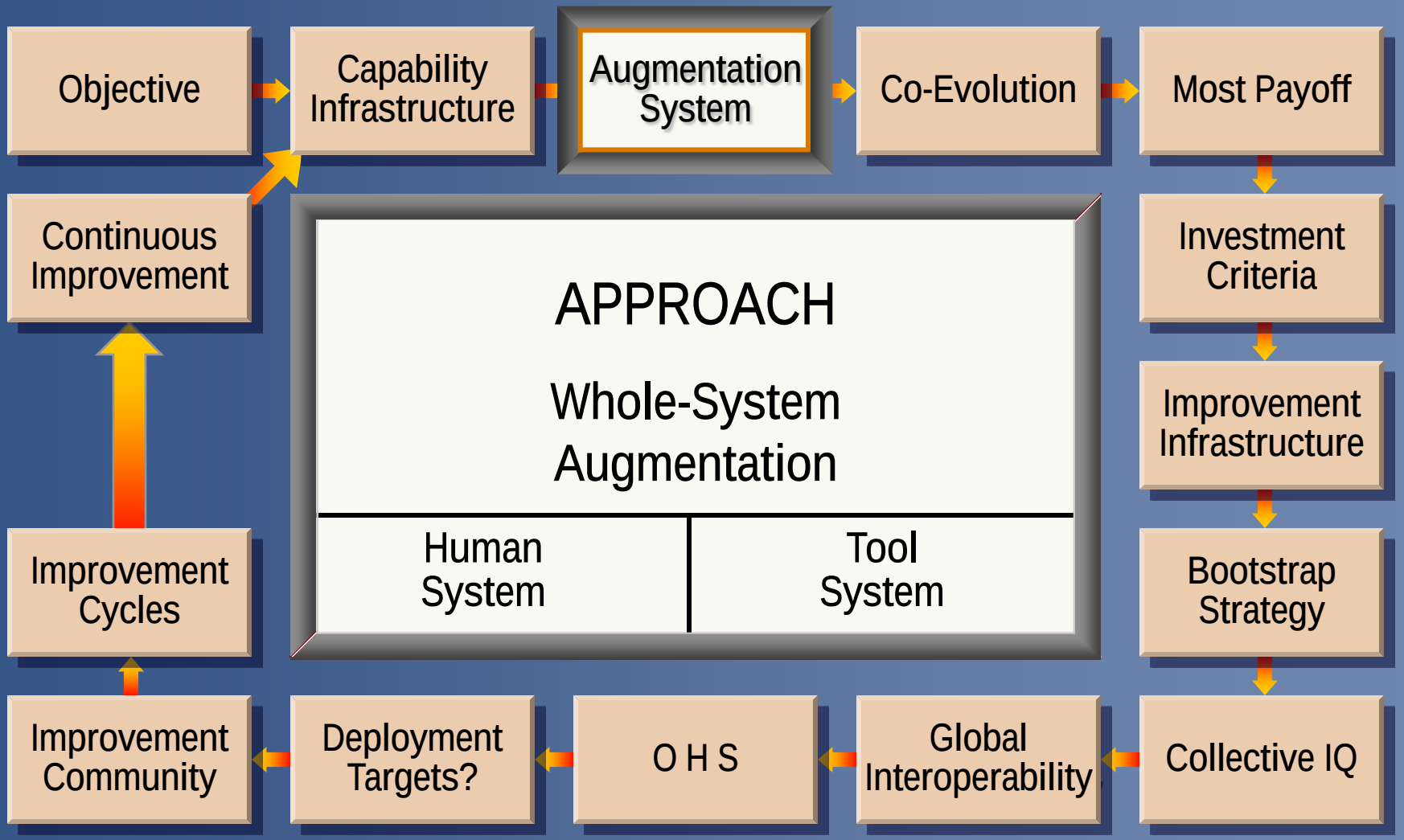

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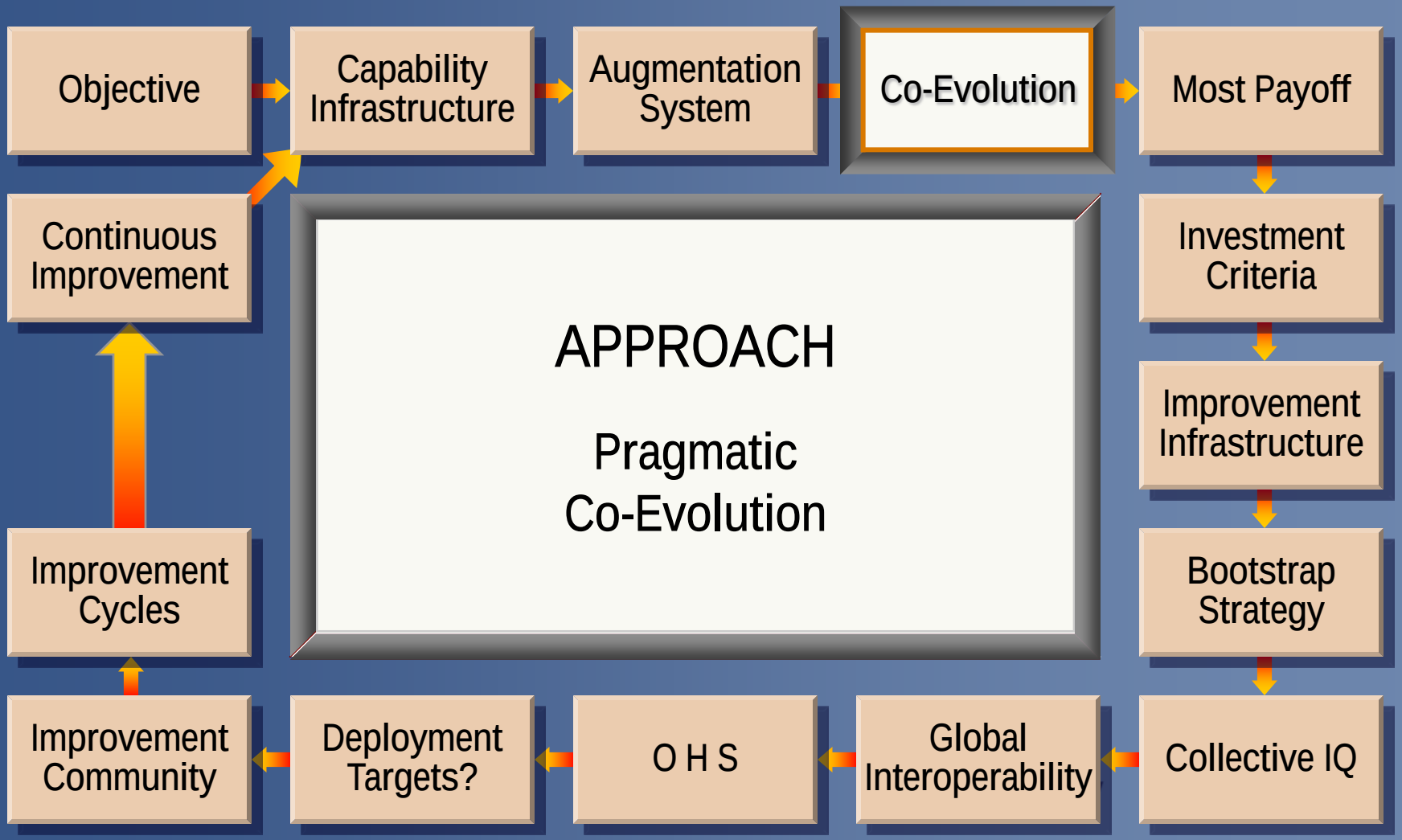

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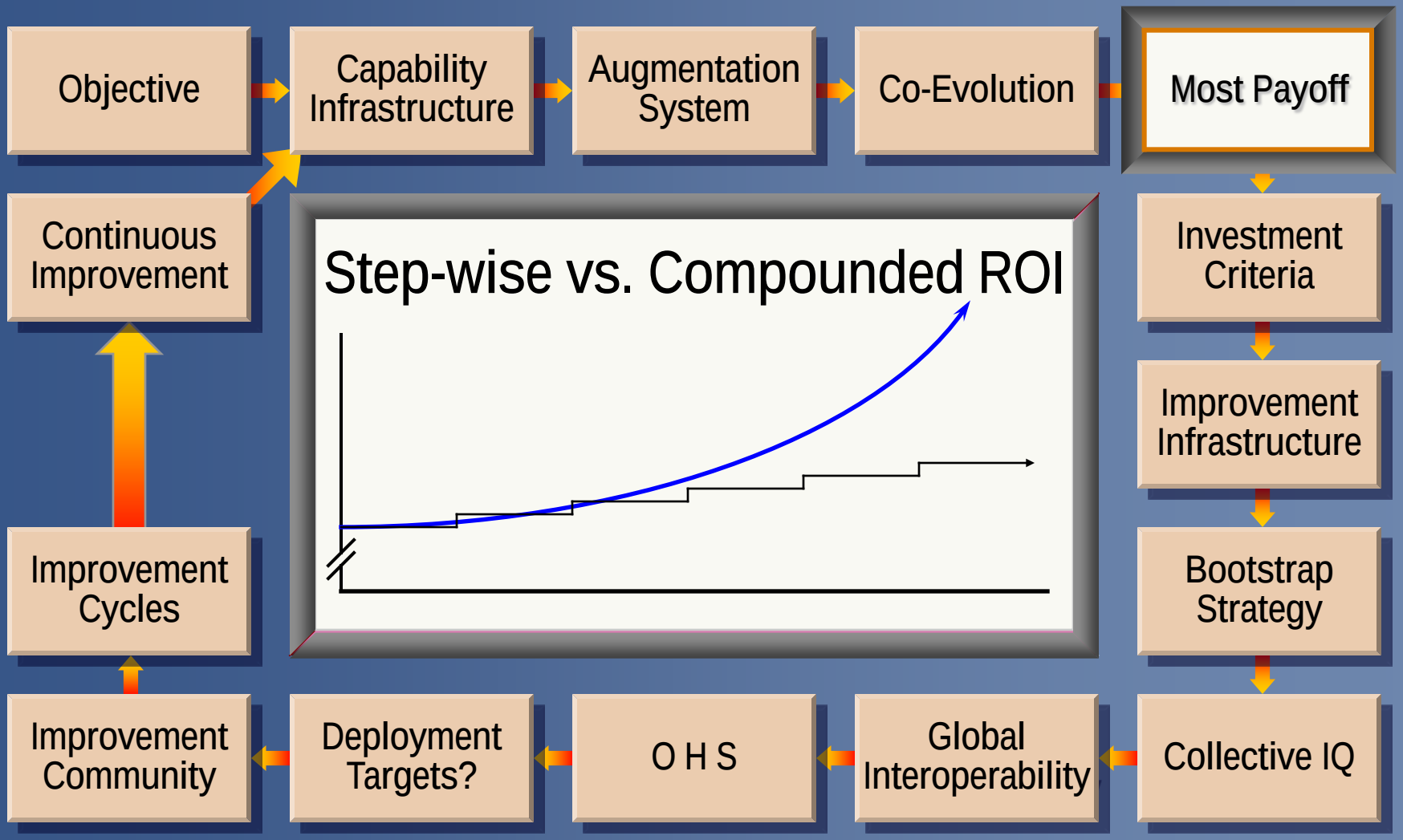

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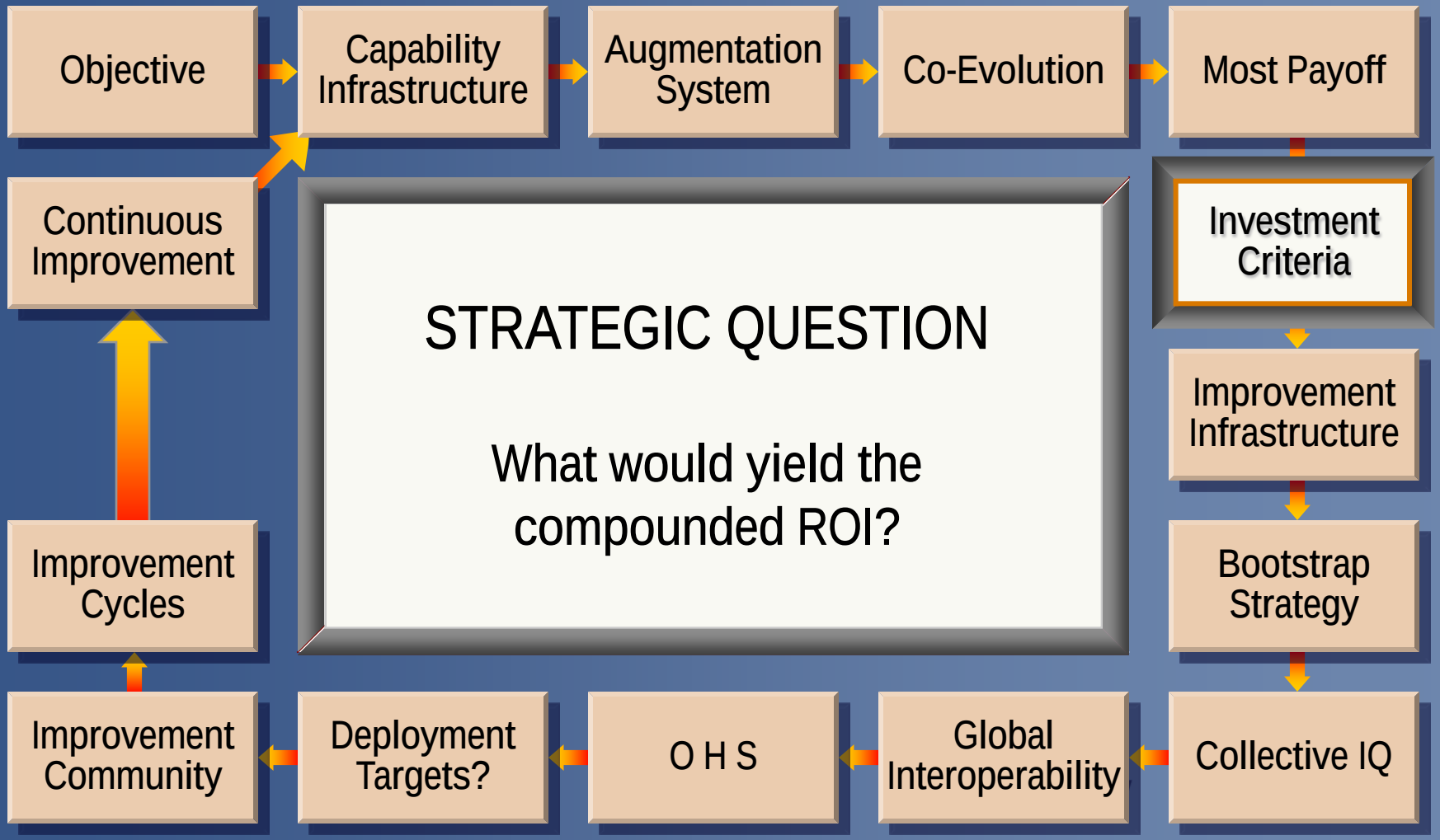

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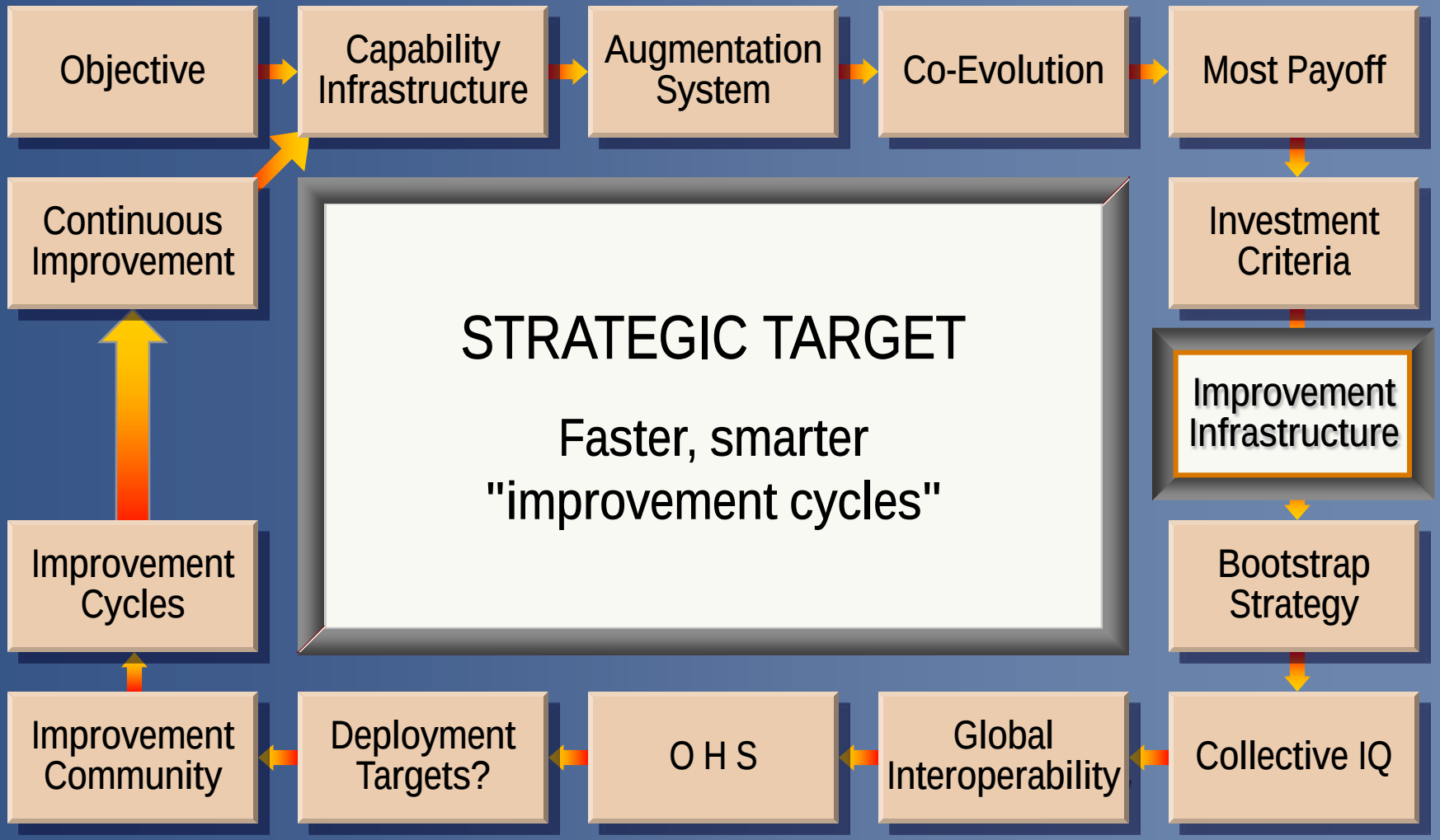

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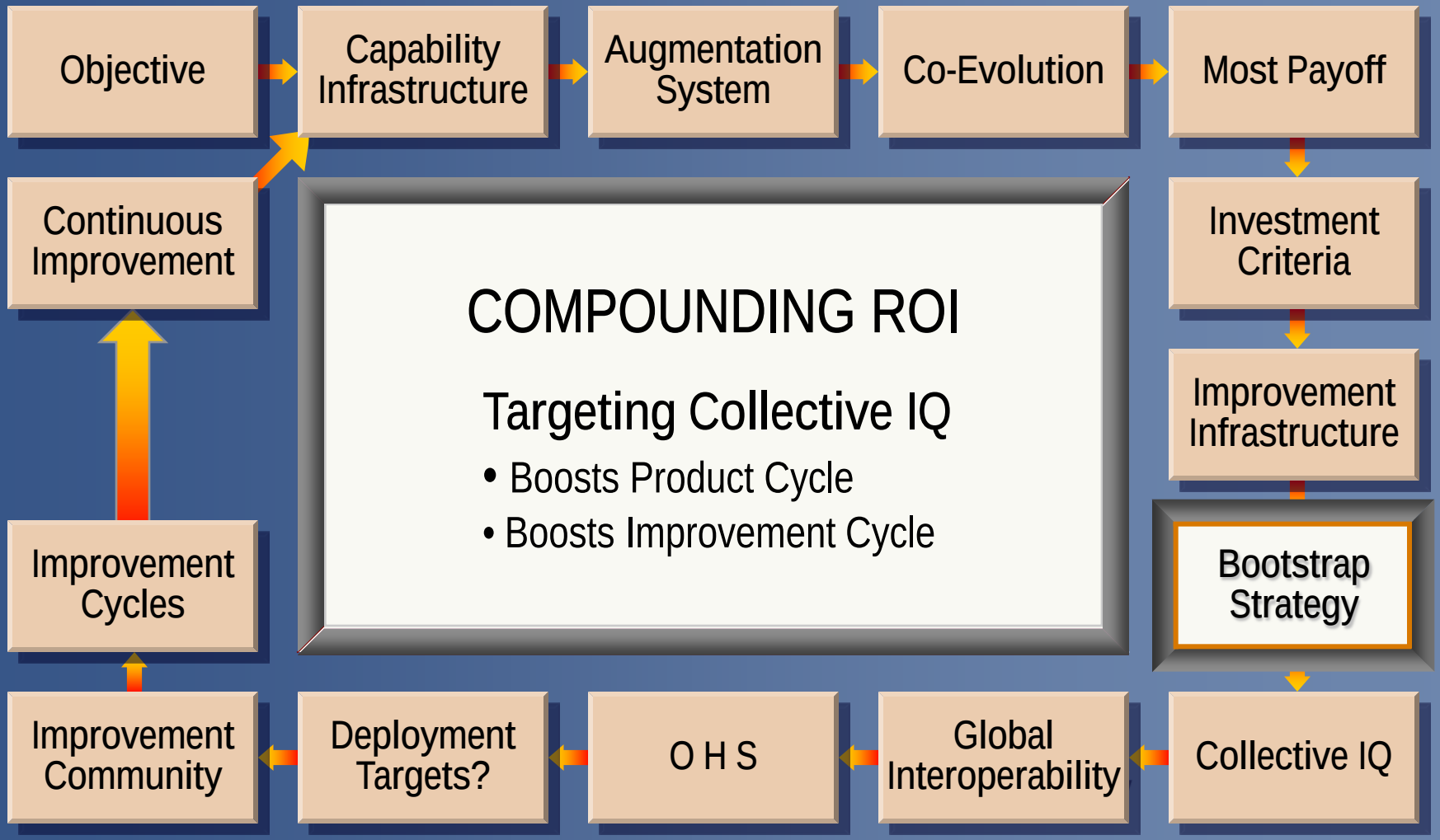

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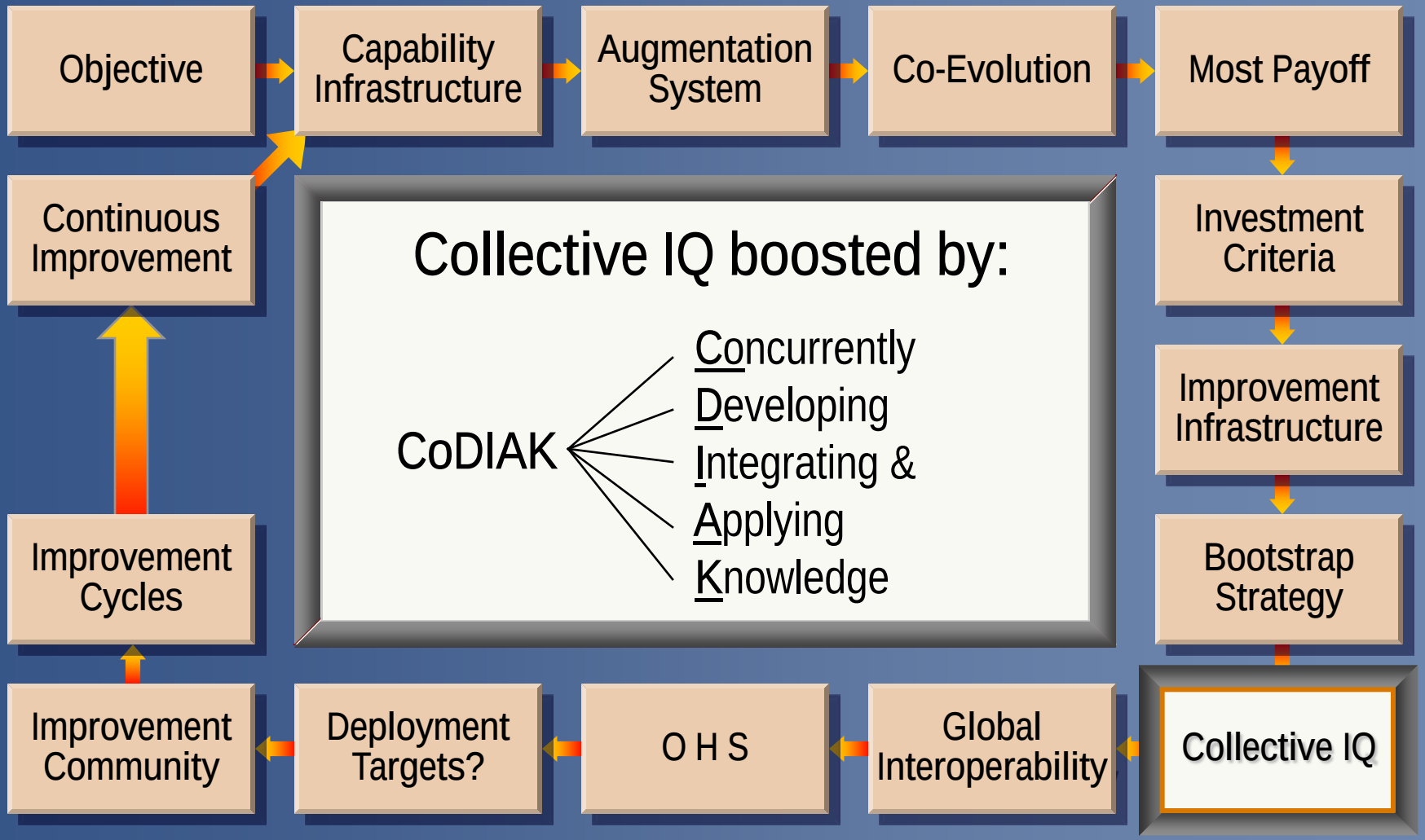

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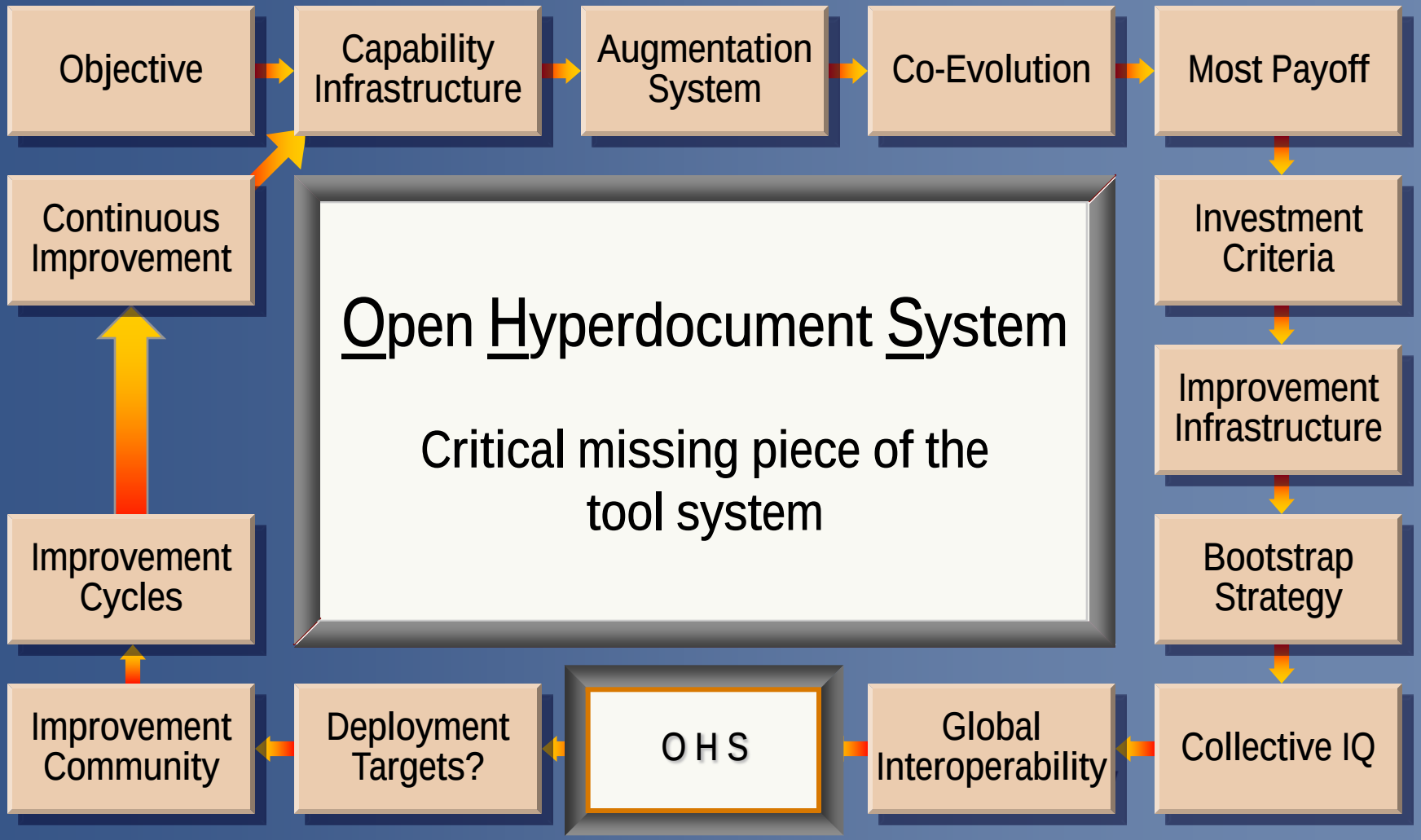

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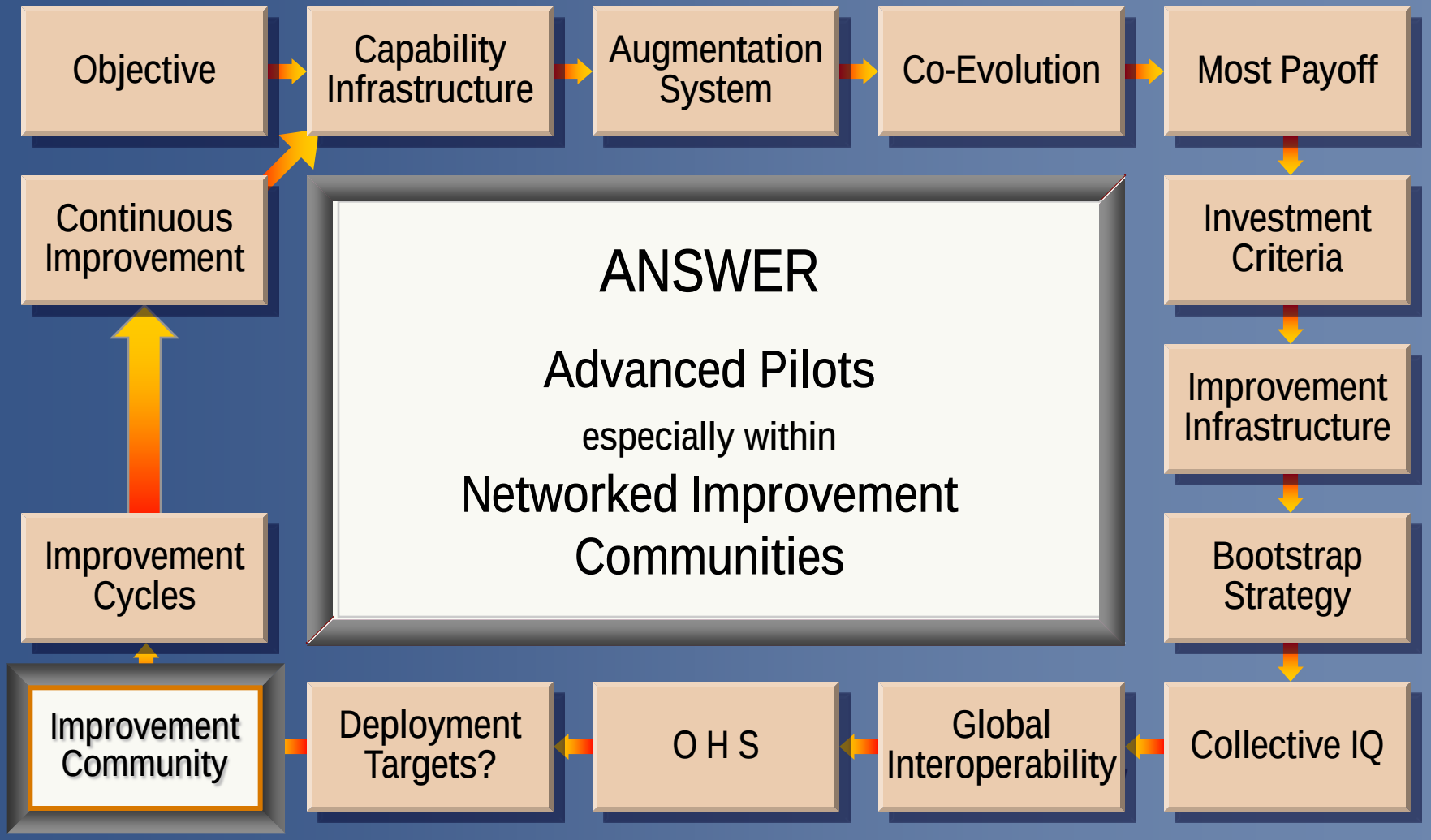

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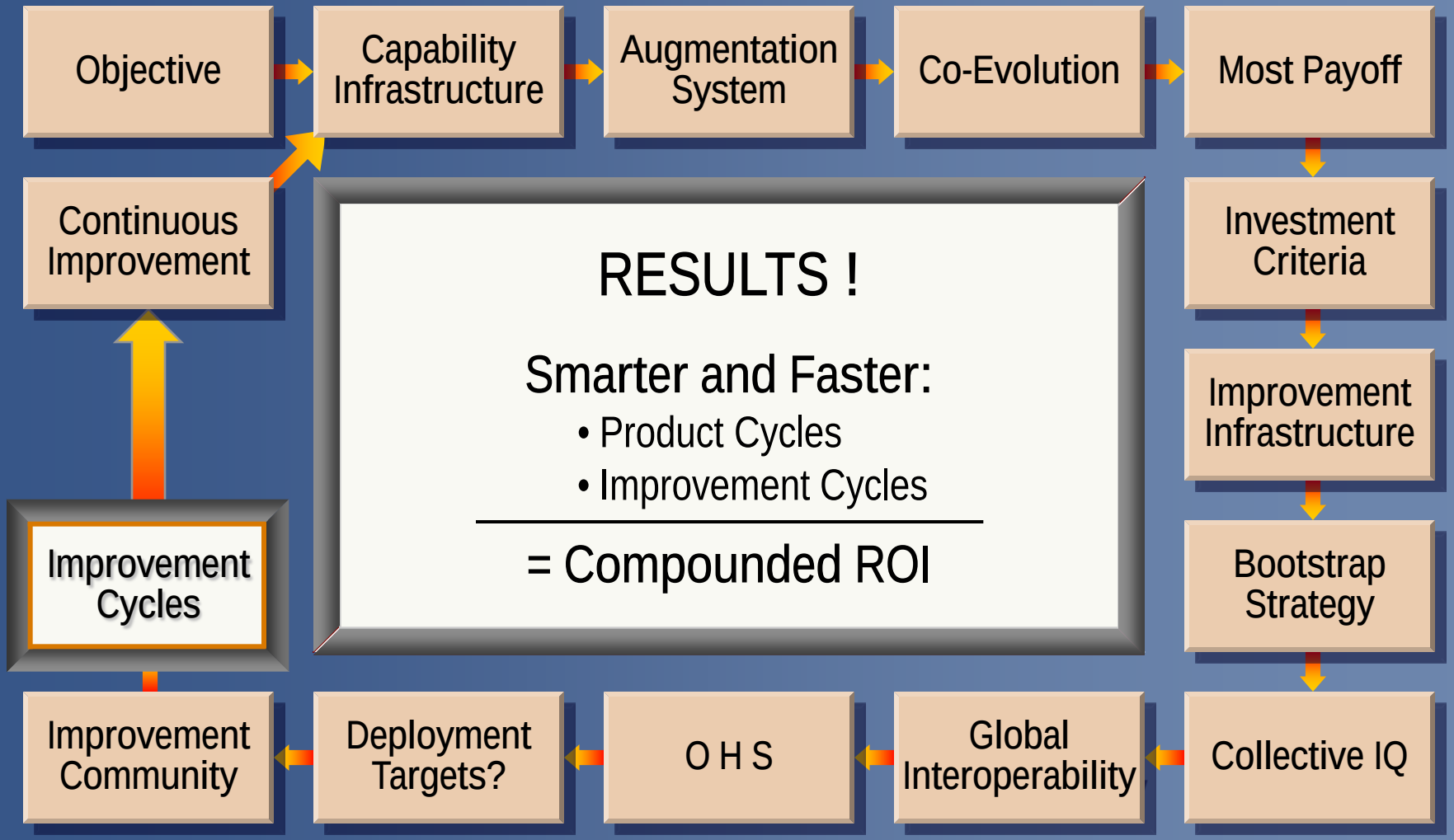

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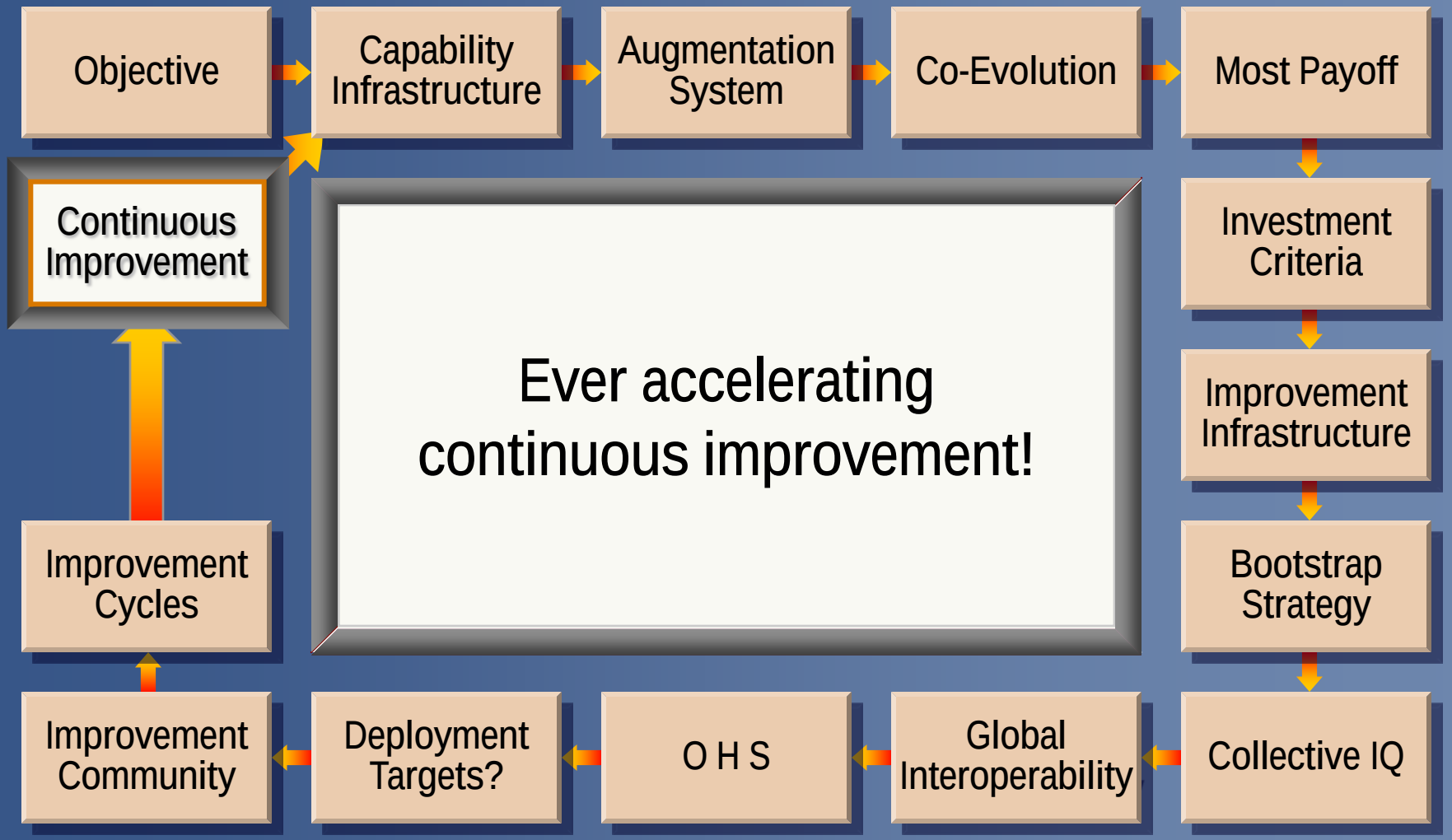


The Bootstrap "Paradigm Map"

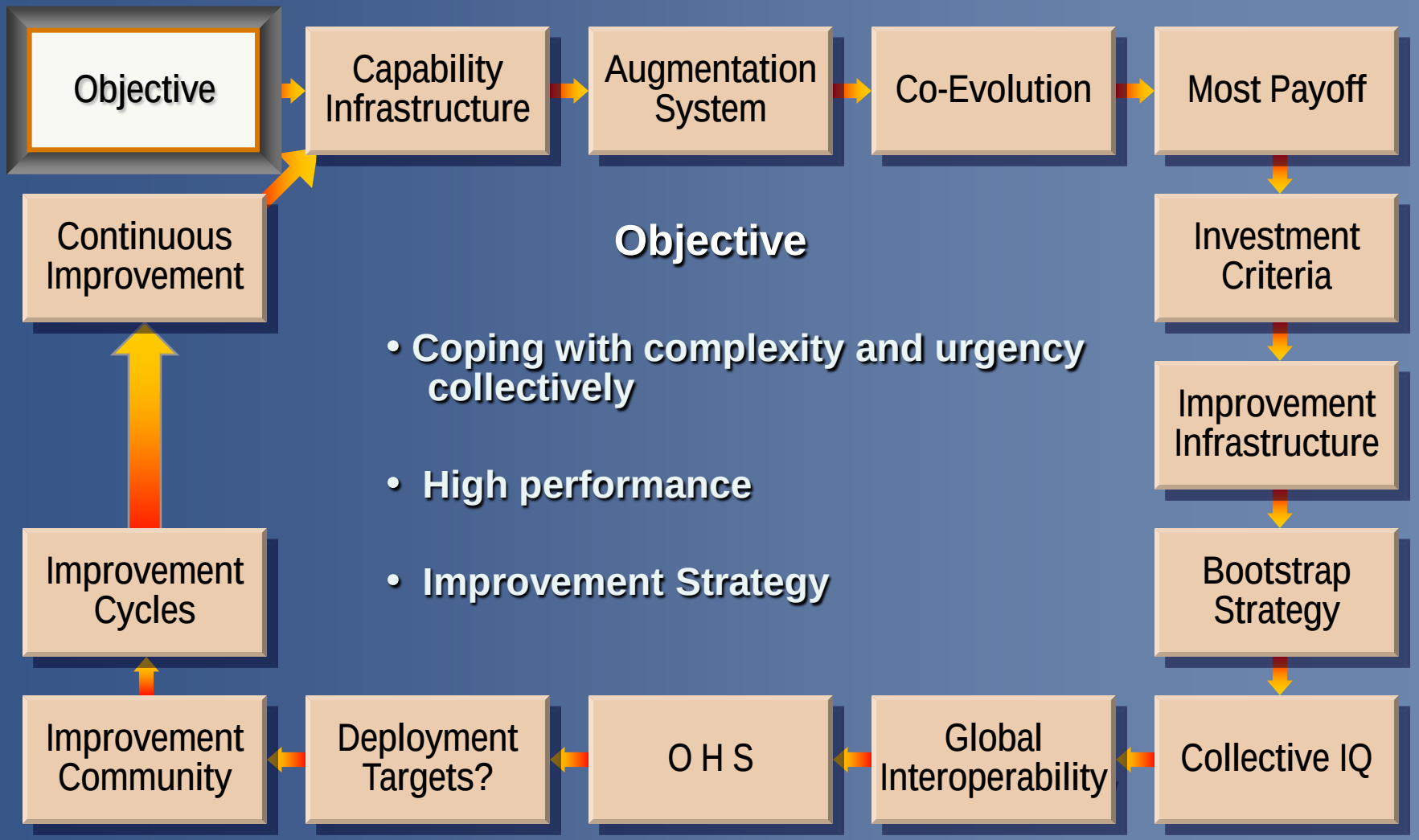
Objective

- Coping with complexity and urgency <u>collectively</u>

- High performance
  - Individuals
  - Teams
  - Organizations
  - Regions

- Improvement Strategy
  - Boosting Collective IQ
  - Boosting Improvement Infrastructure
  - Networked Improvement Communities

The Bootstrap "Paradigm Map"



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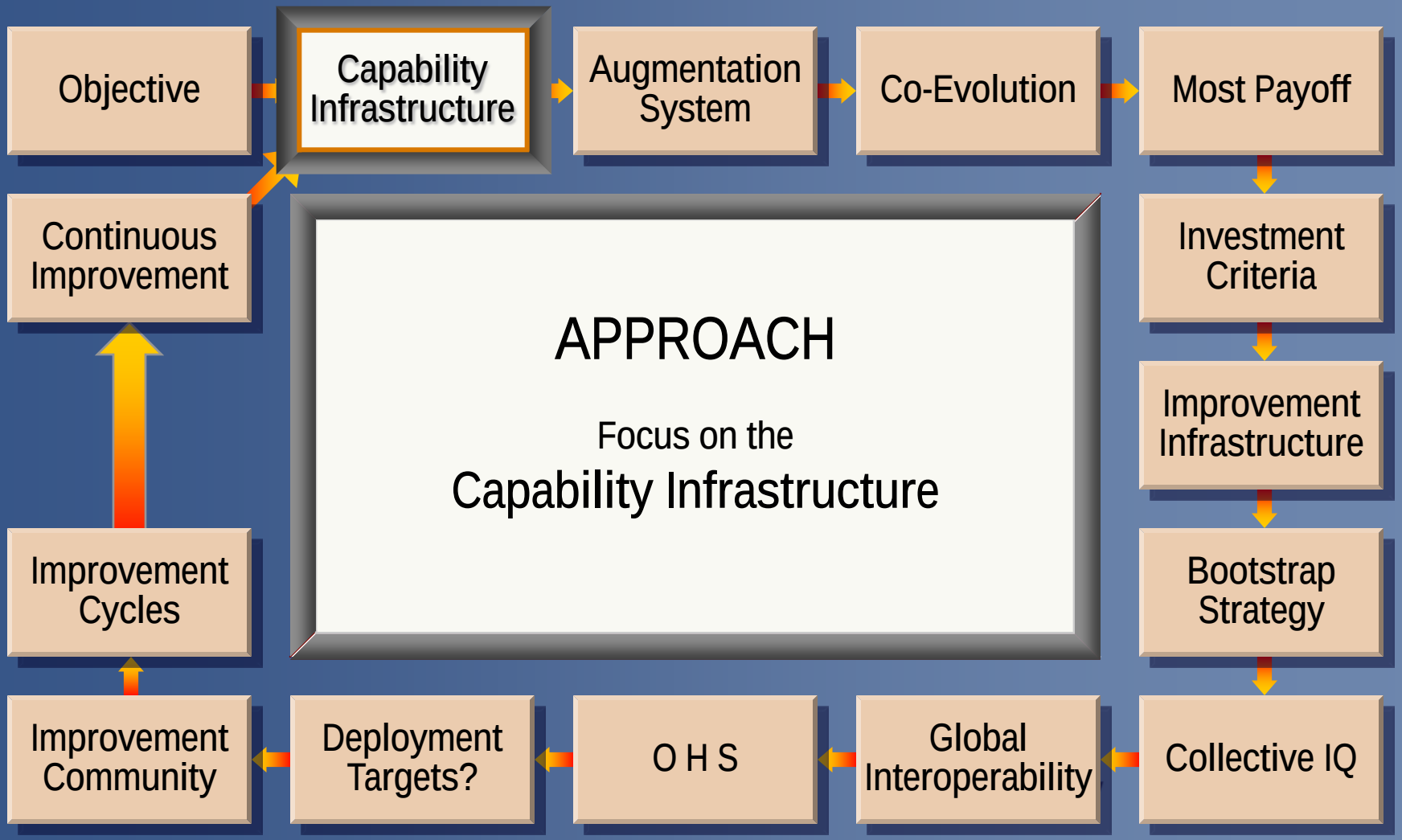
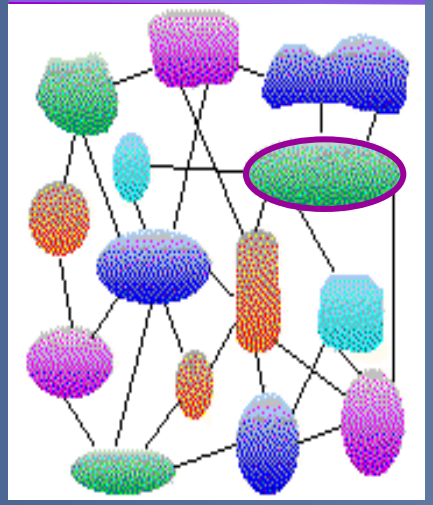


Capability Infrastructure



Solving large-scale problems requires collective capability

The Bootstrap "Paradigm Map"

Objective

Capability Infrastructure

Augmentation System

Co-Evolution

Most Payoff

Investment Criteria

Improvement Infrastructure

Bootstrap Strategy

Collective IQ

Global Interoperability

O H S

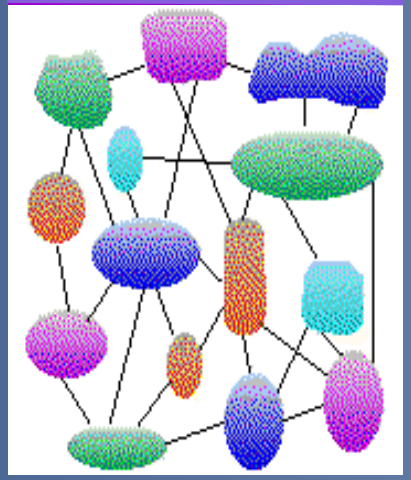
Deployment Targets?

Improvement Community

Improvement Cycles

Continuous Improvement

Capability Infrastructure



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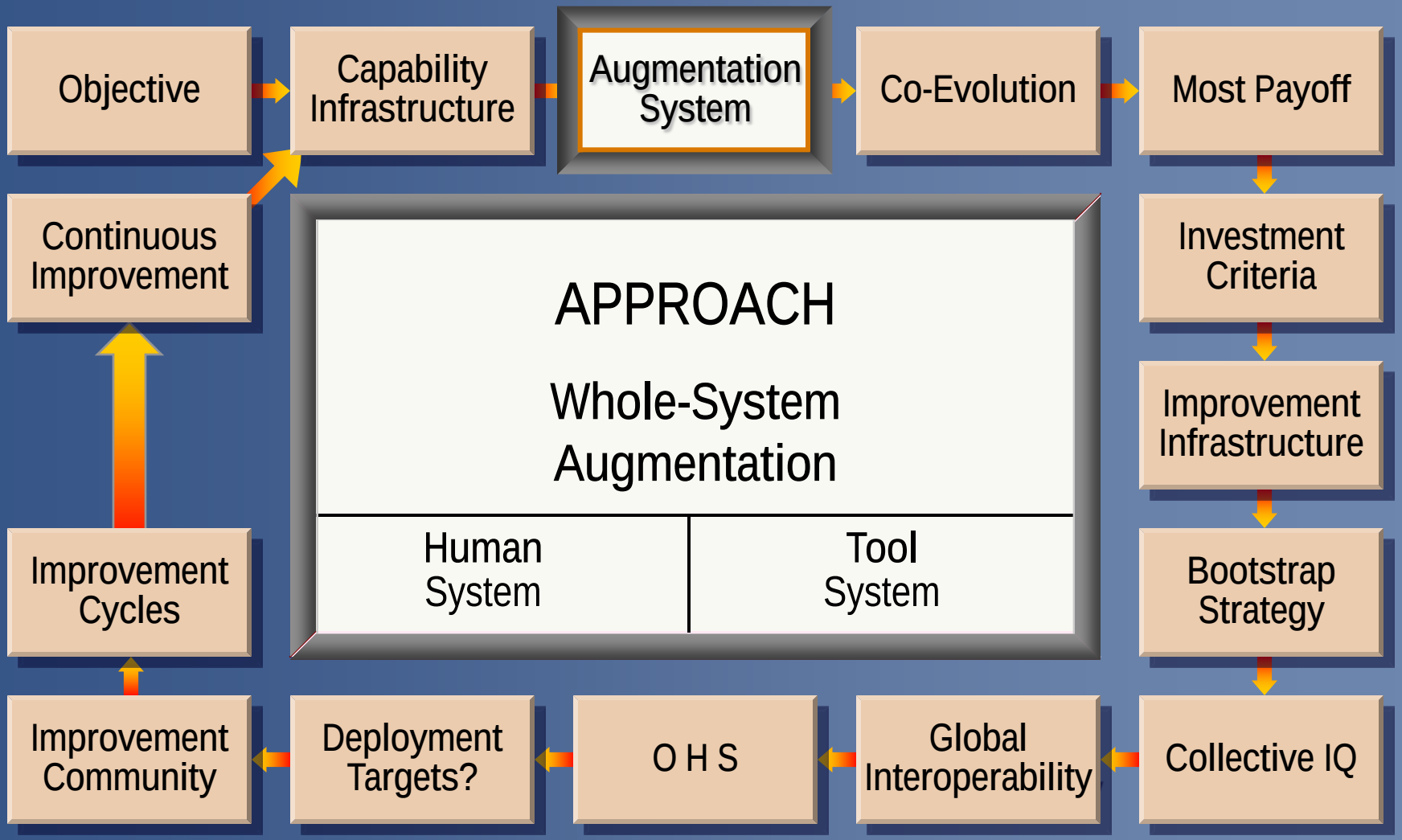
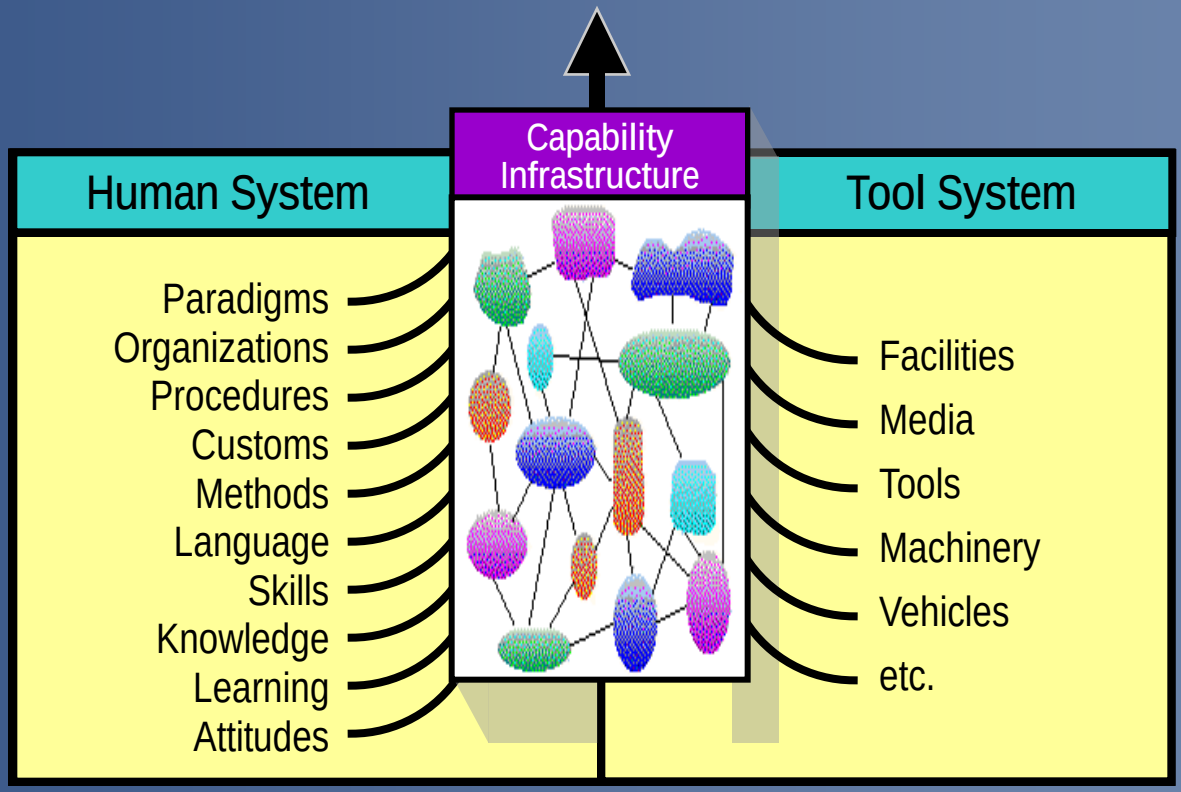
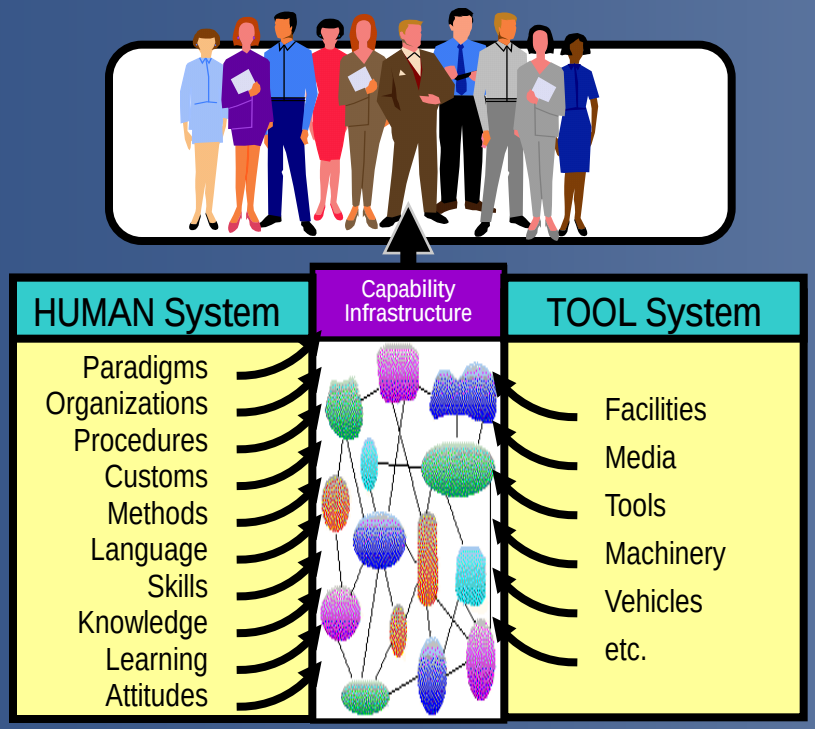


The Whole Augmentation System

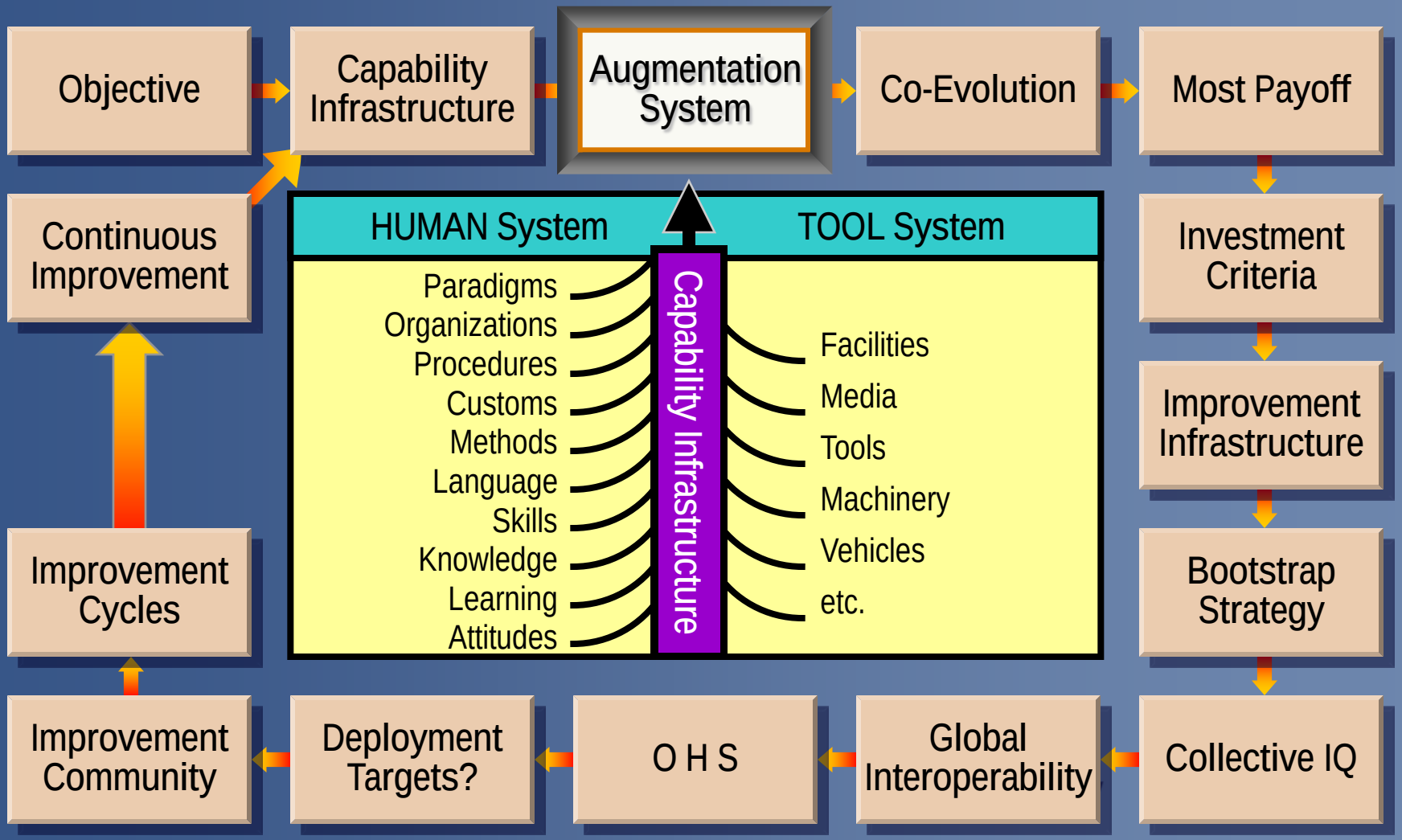


Augmentation System



Capability Infrastructure fed by the Human / Tool Augmentation System

The Bootstrap "Paradigm Map"



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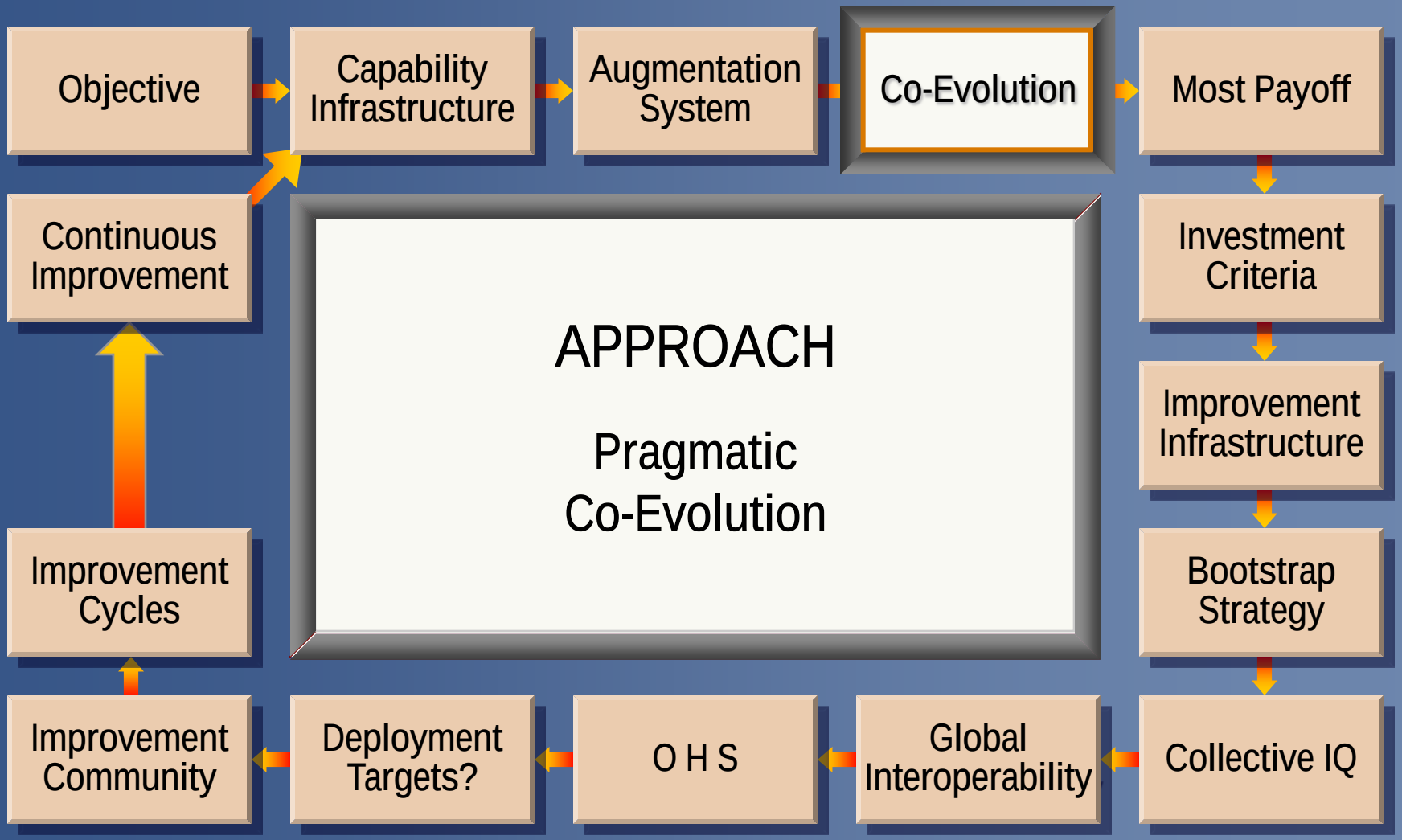
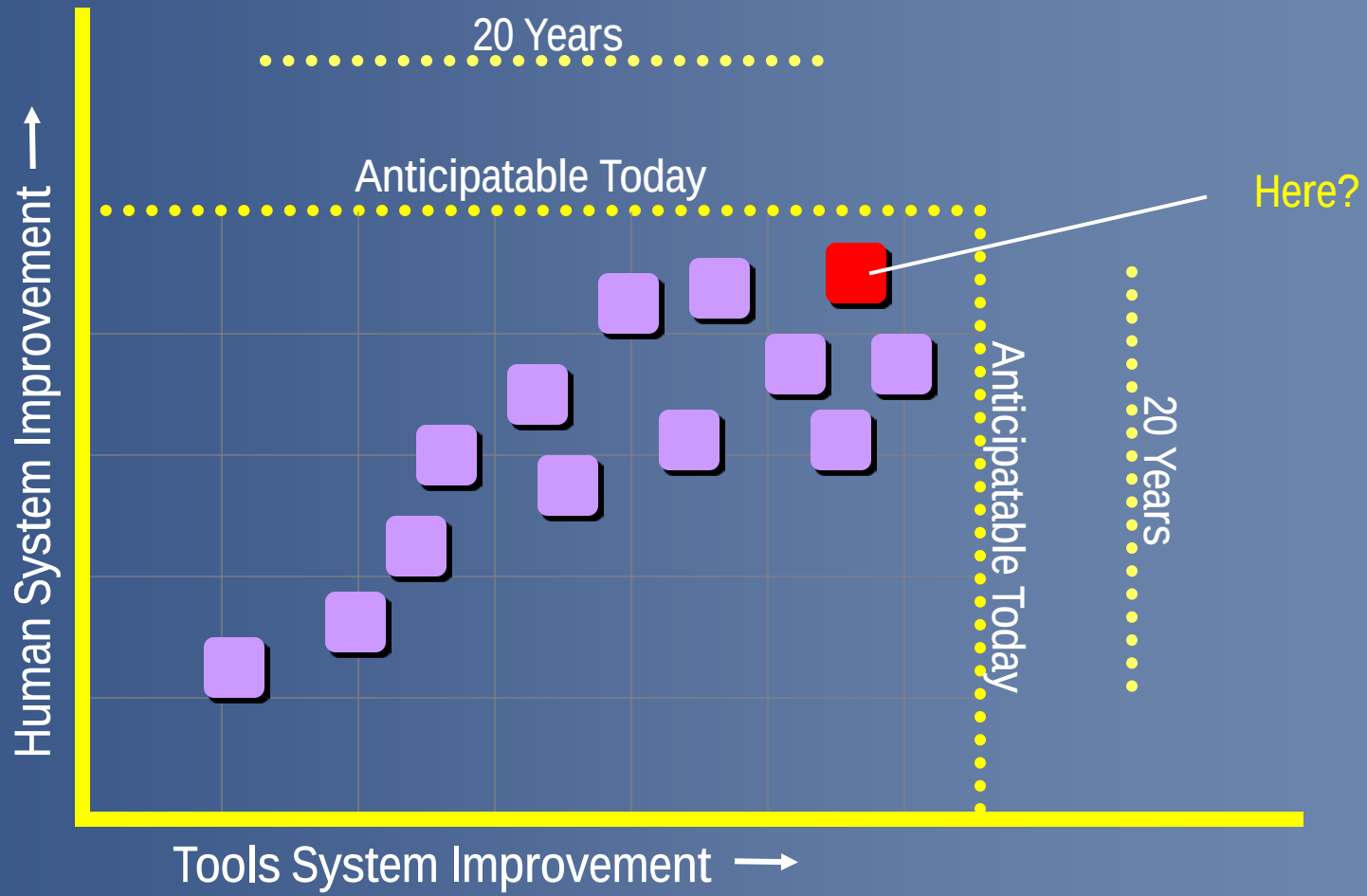


The Co-Evolution Frontier

Where is your organization today?

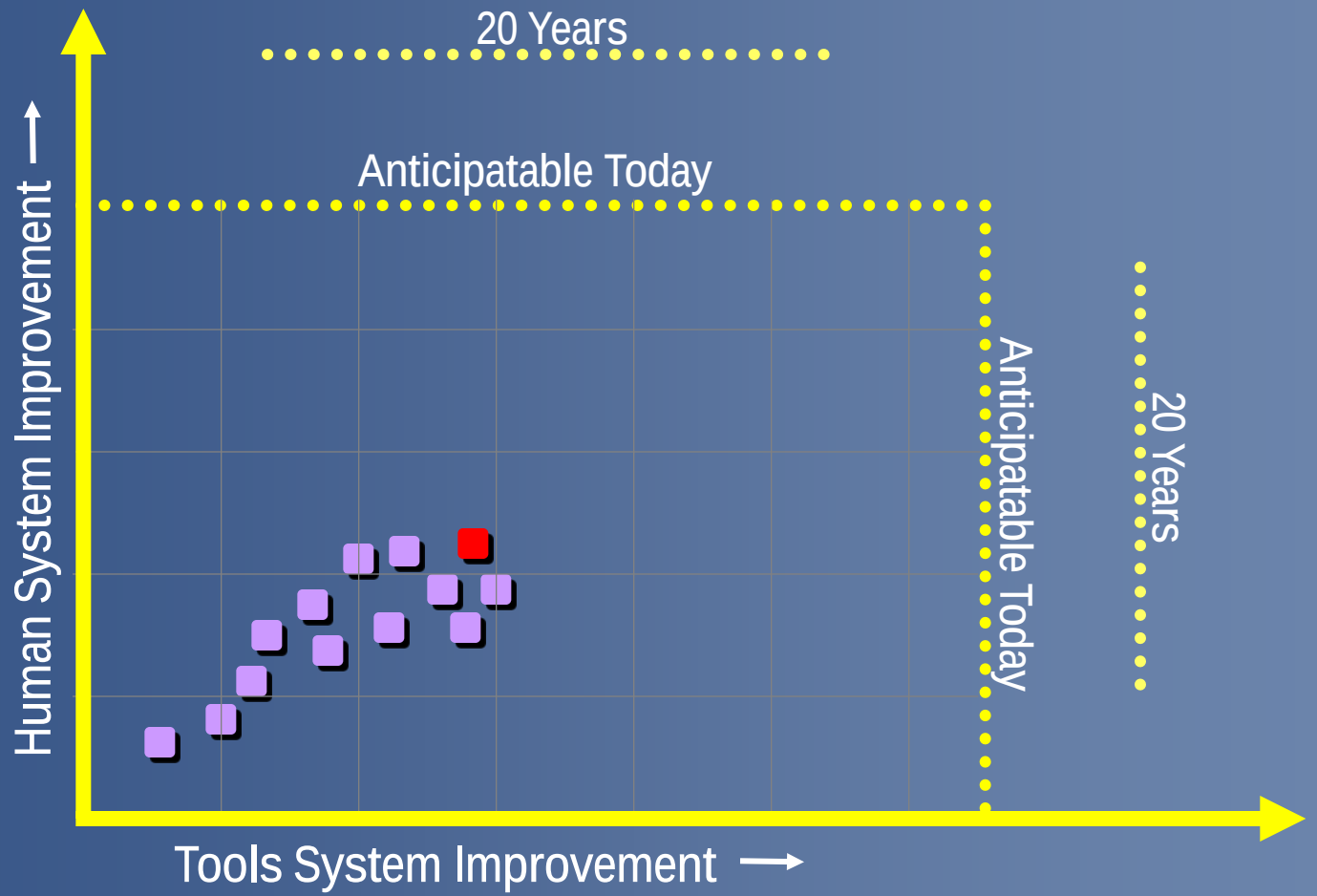
1



The Co-Evolution Frontier

Or, is this more like it?

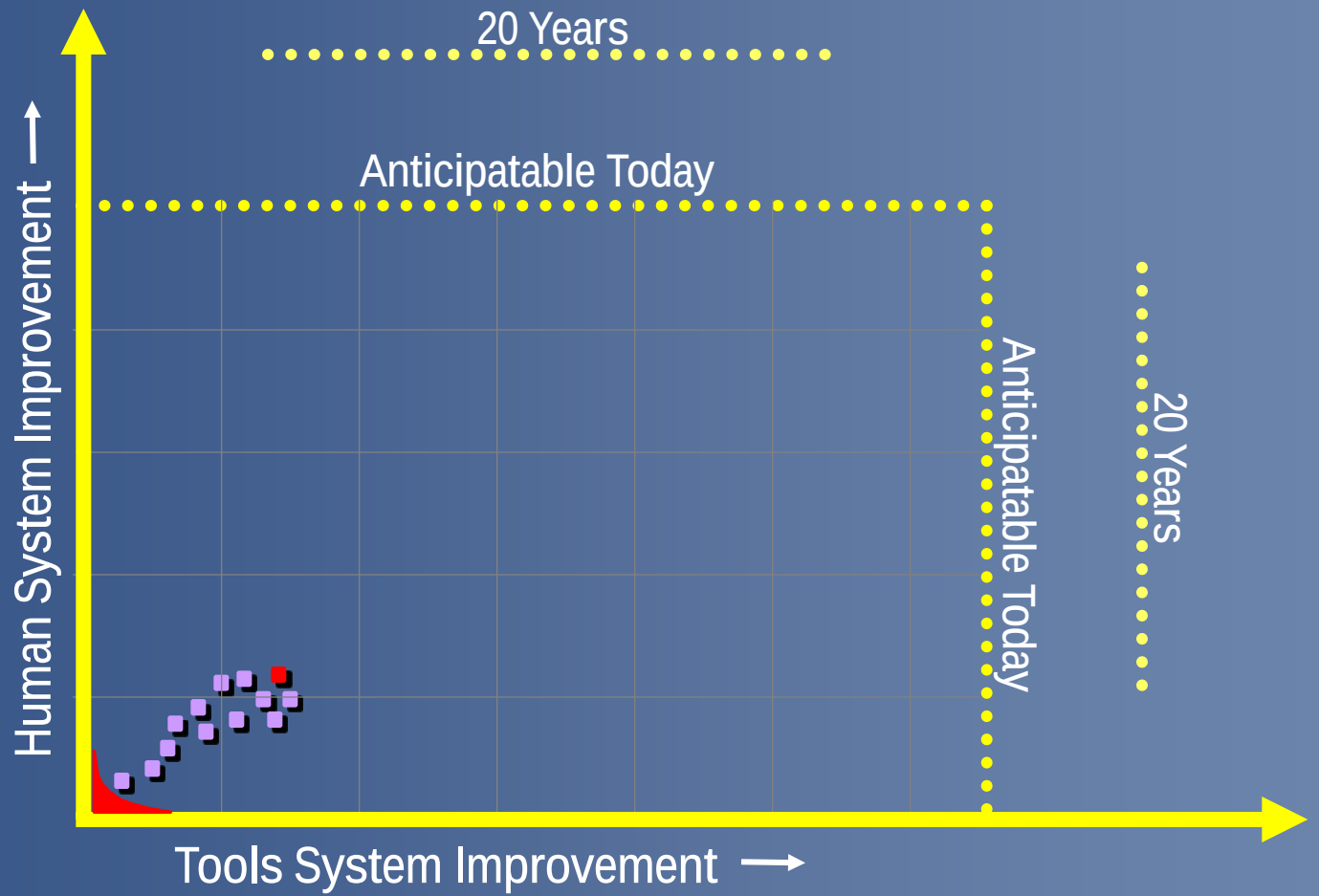
2



The Co-Evolution Frontier

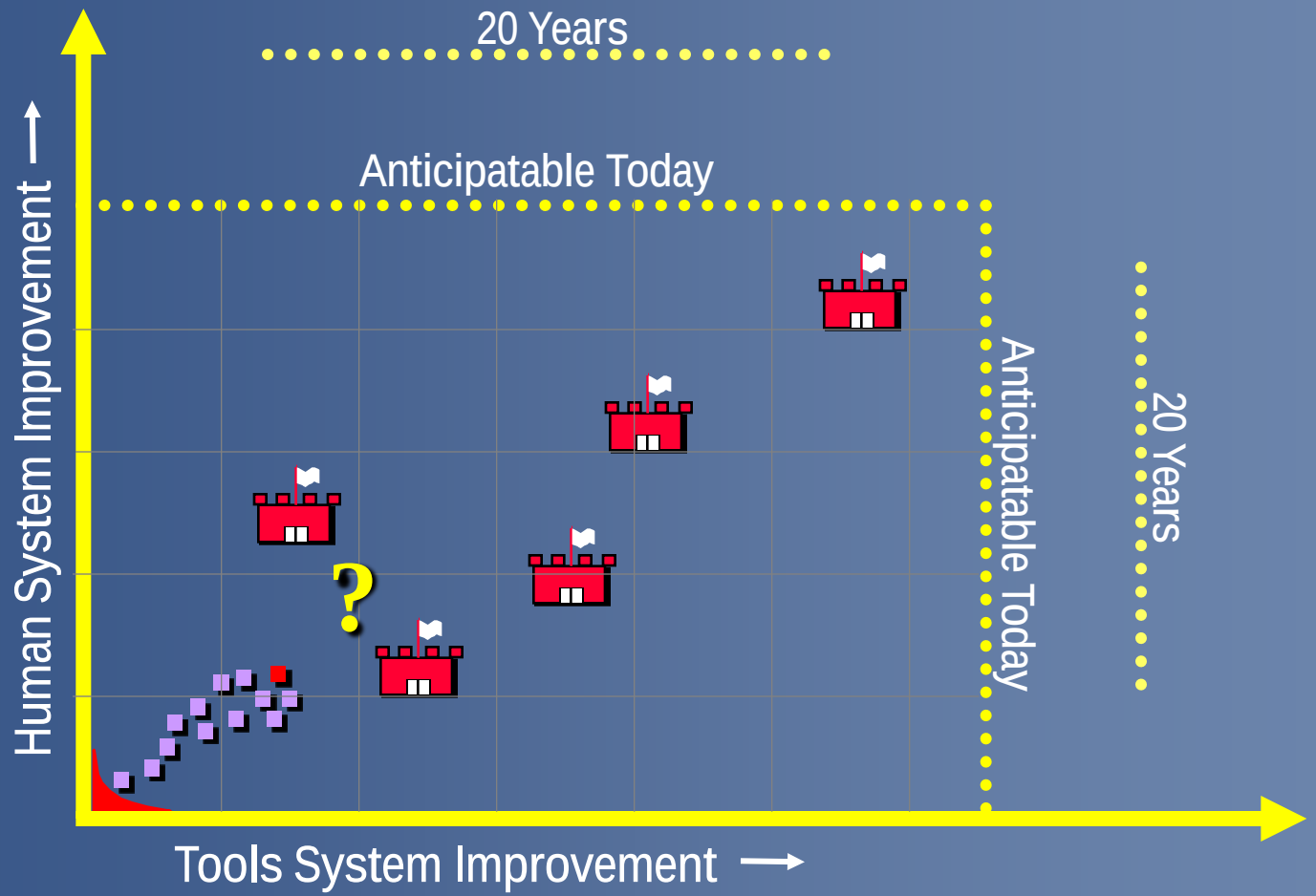
Or this ? (more probable)

3



Outposts on the Co-Evolution Frontier

Who will be the trailblazers?



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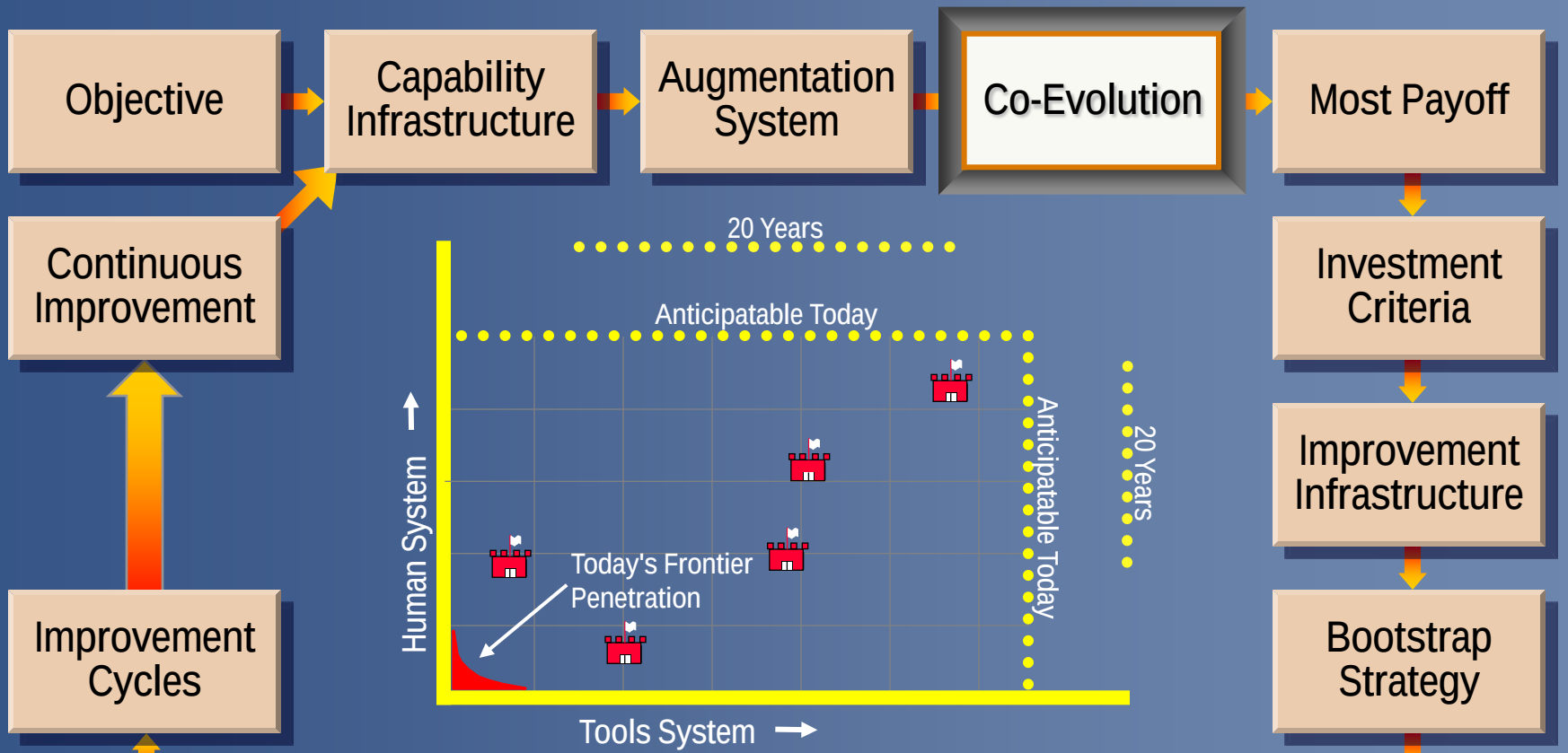

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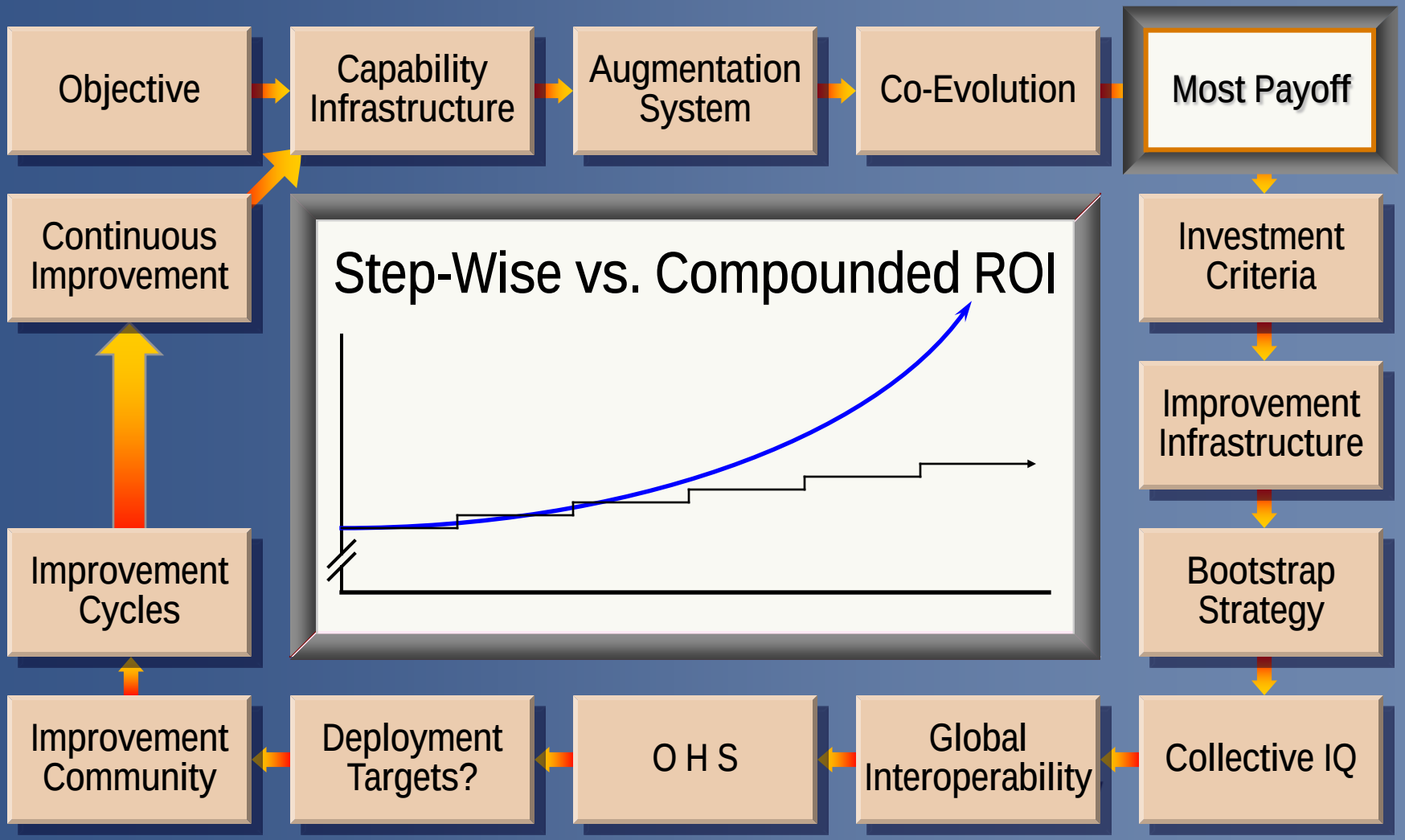

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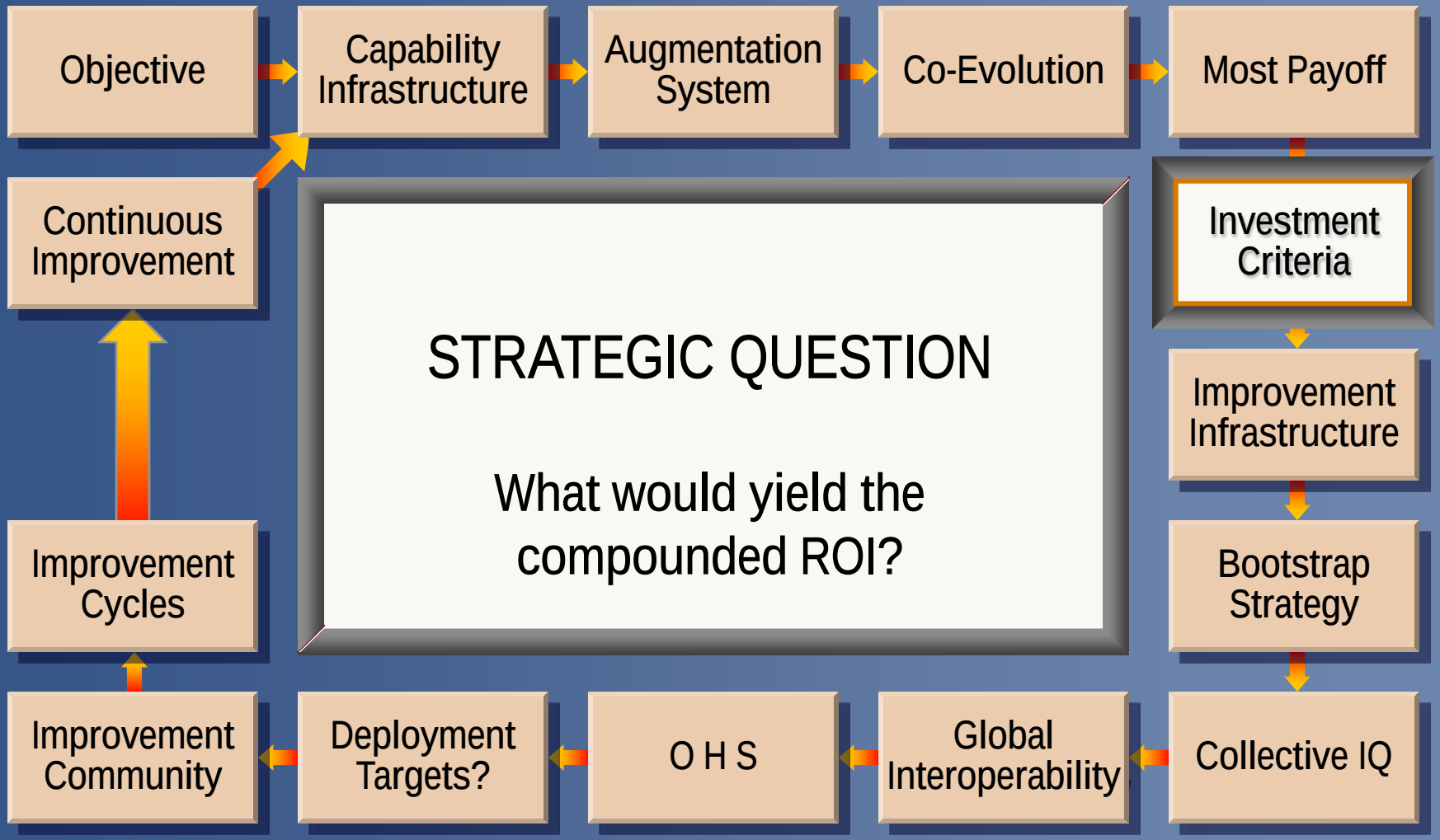

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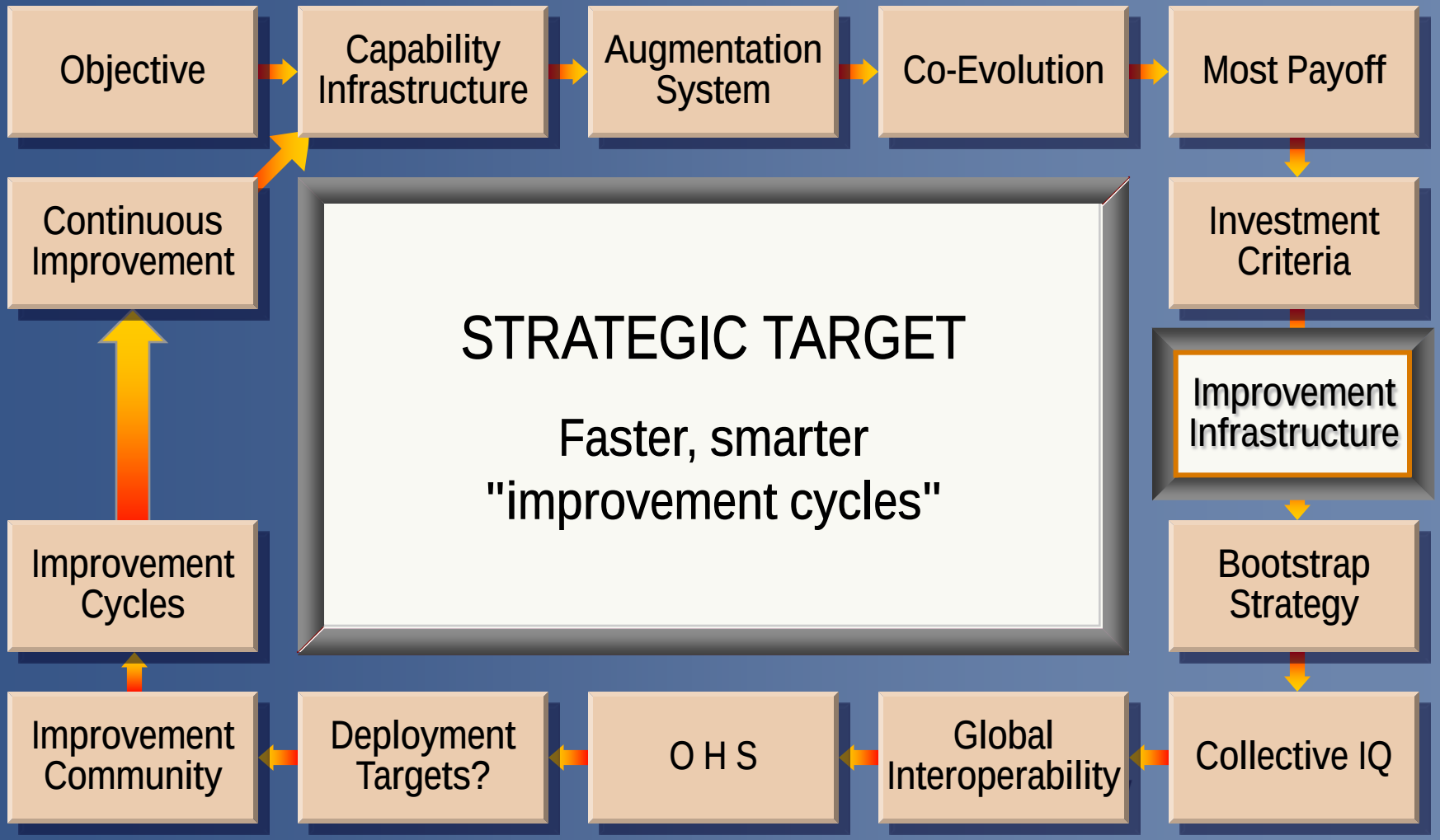
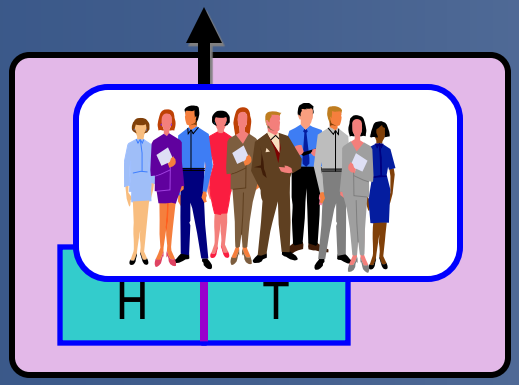


Simple Organizational Model



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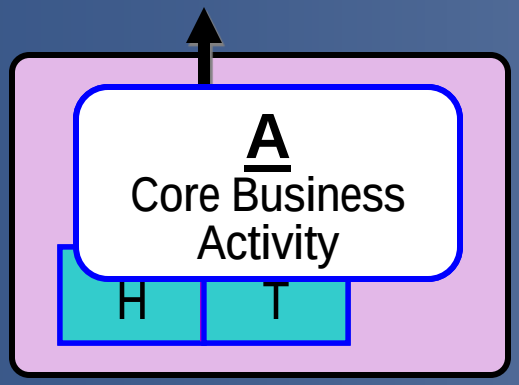

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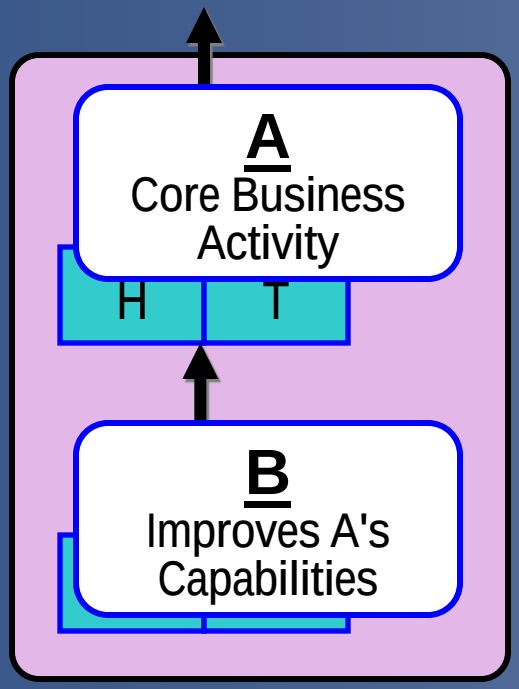
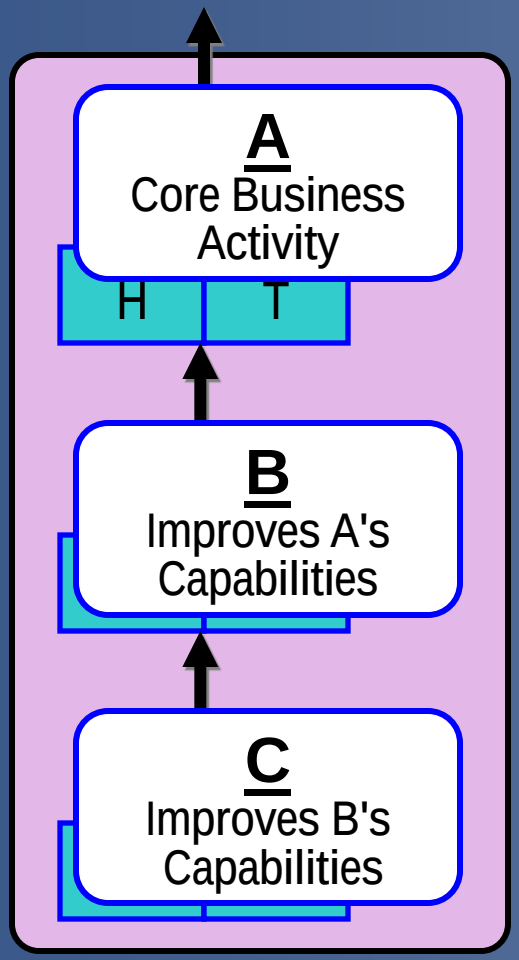


Showing explicit provision for Improving product cycle

There should be a permanent "continuous improvement" B activity (as for TQM)

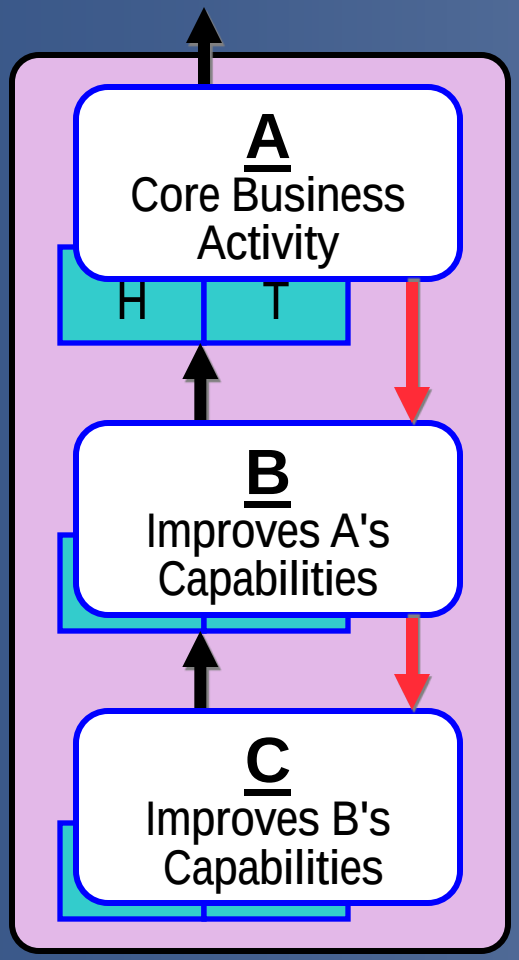
Goals of B and C Activities



Improving Product Cycle

Improving Improvement Cycle

Pushing the Frontier Requires Collaboration



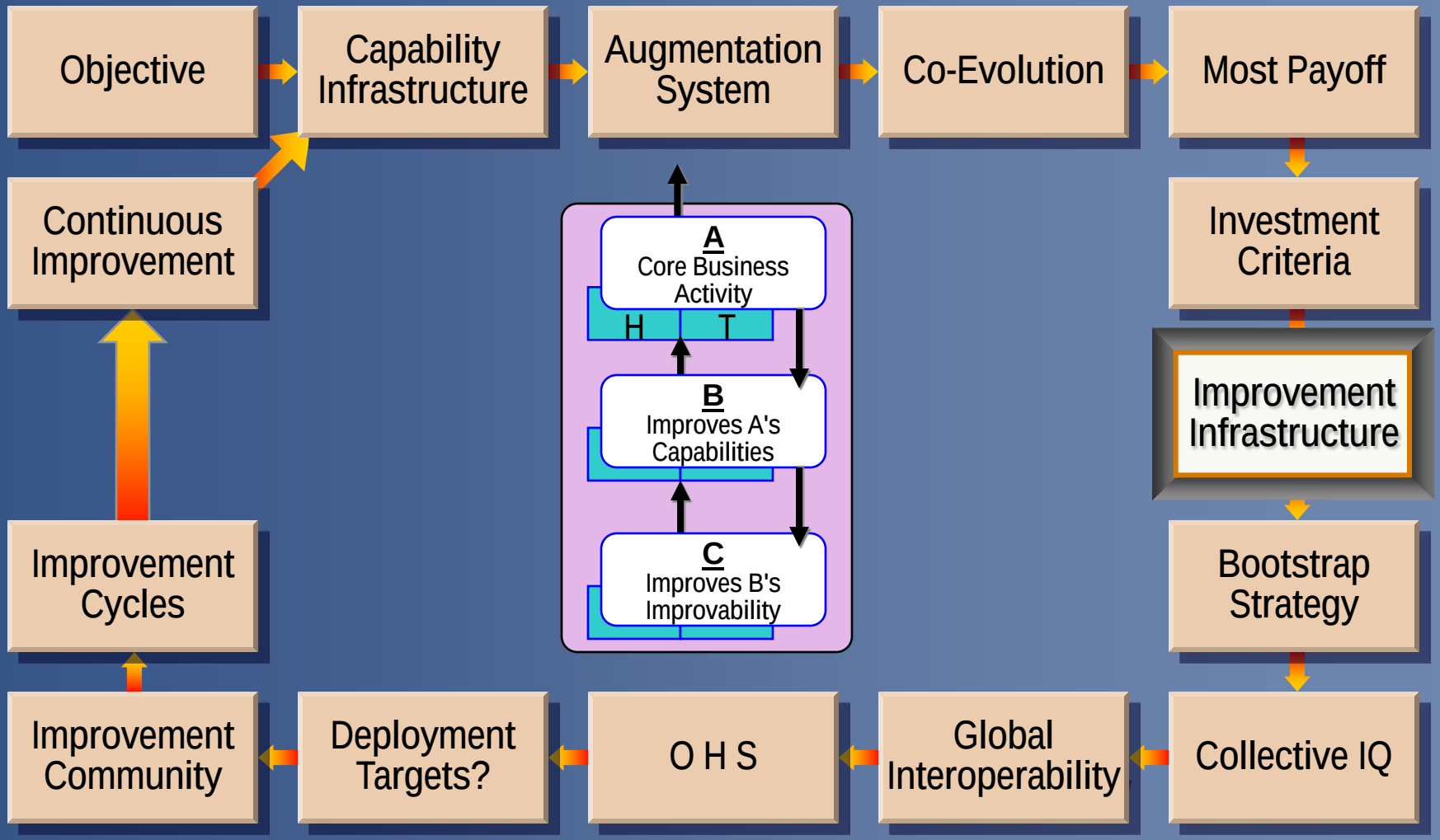
INTEGRATING:

- Input, feedback
- Evolving requirements
- Lessons learned
- Evaluations

TRANSFERRING:

- Paradigm shifts
- Pilots
- Best practices
- Support

The Bootstrap "Paradigm Map"



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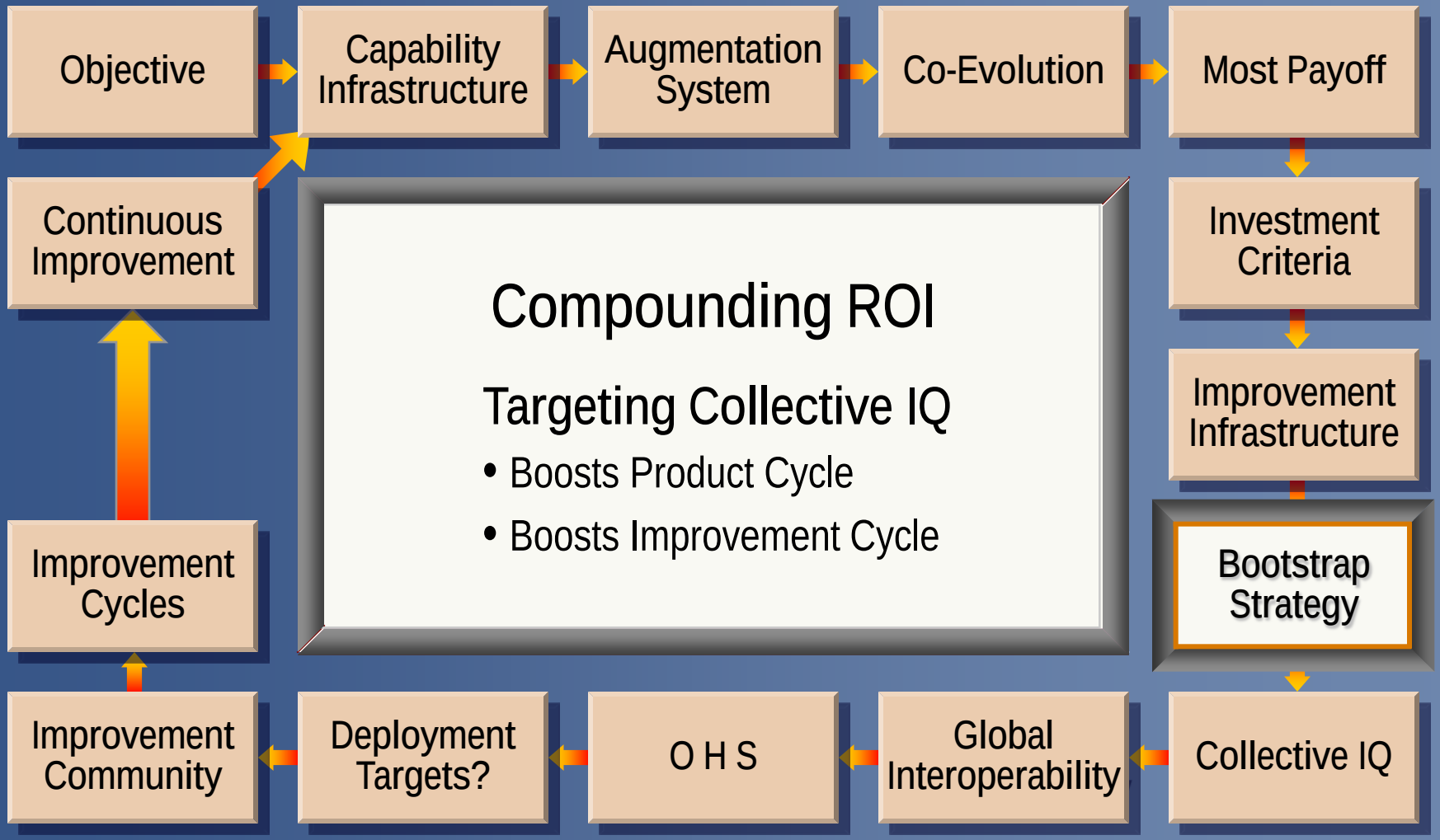
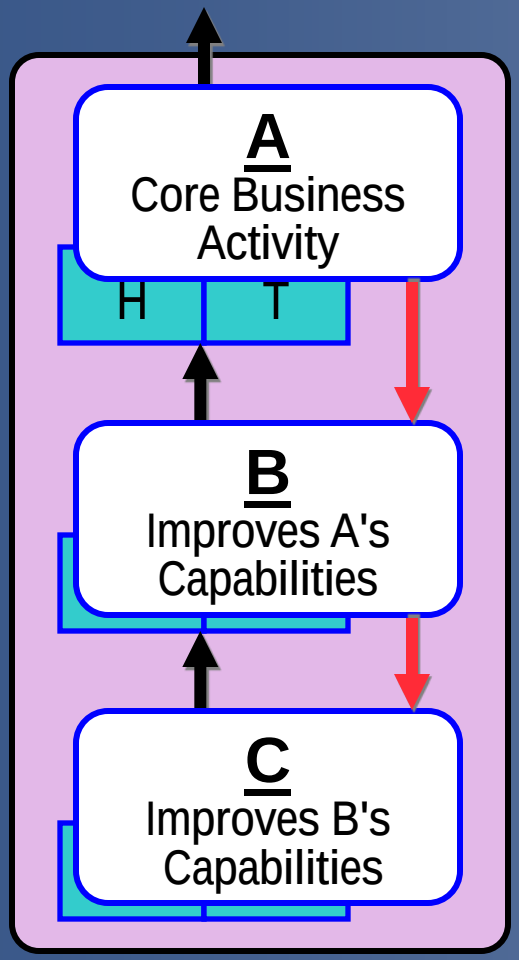


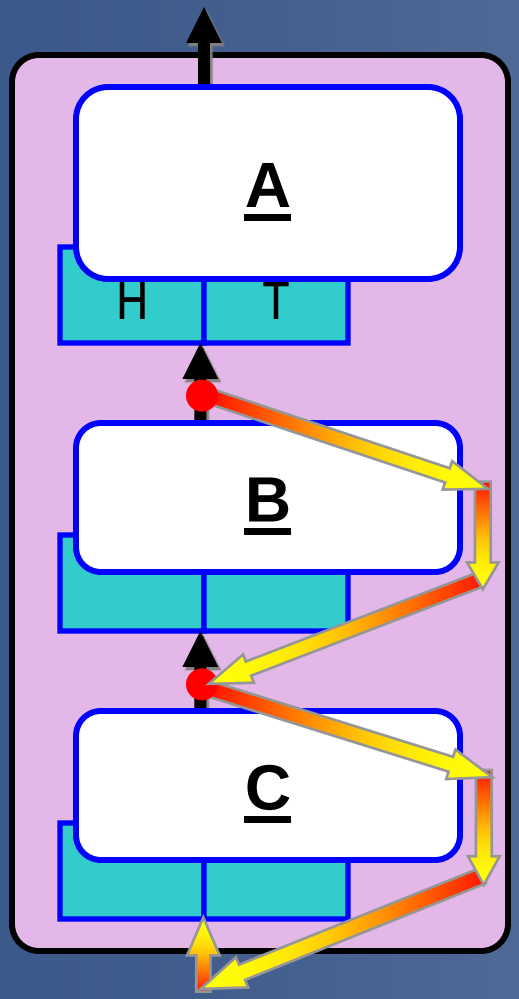
The Goals of B and C Activities



Improving Product Cycle

Improving Improvement Cycle

Extra Bootstrapping Leverage



Leveraging gains in collective IQ at multiple levels of the organization yields compounding ROI

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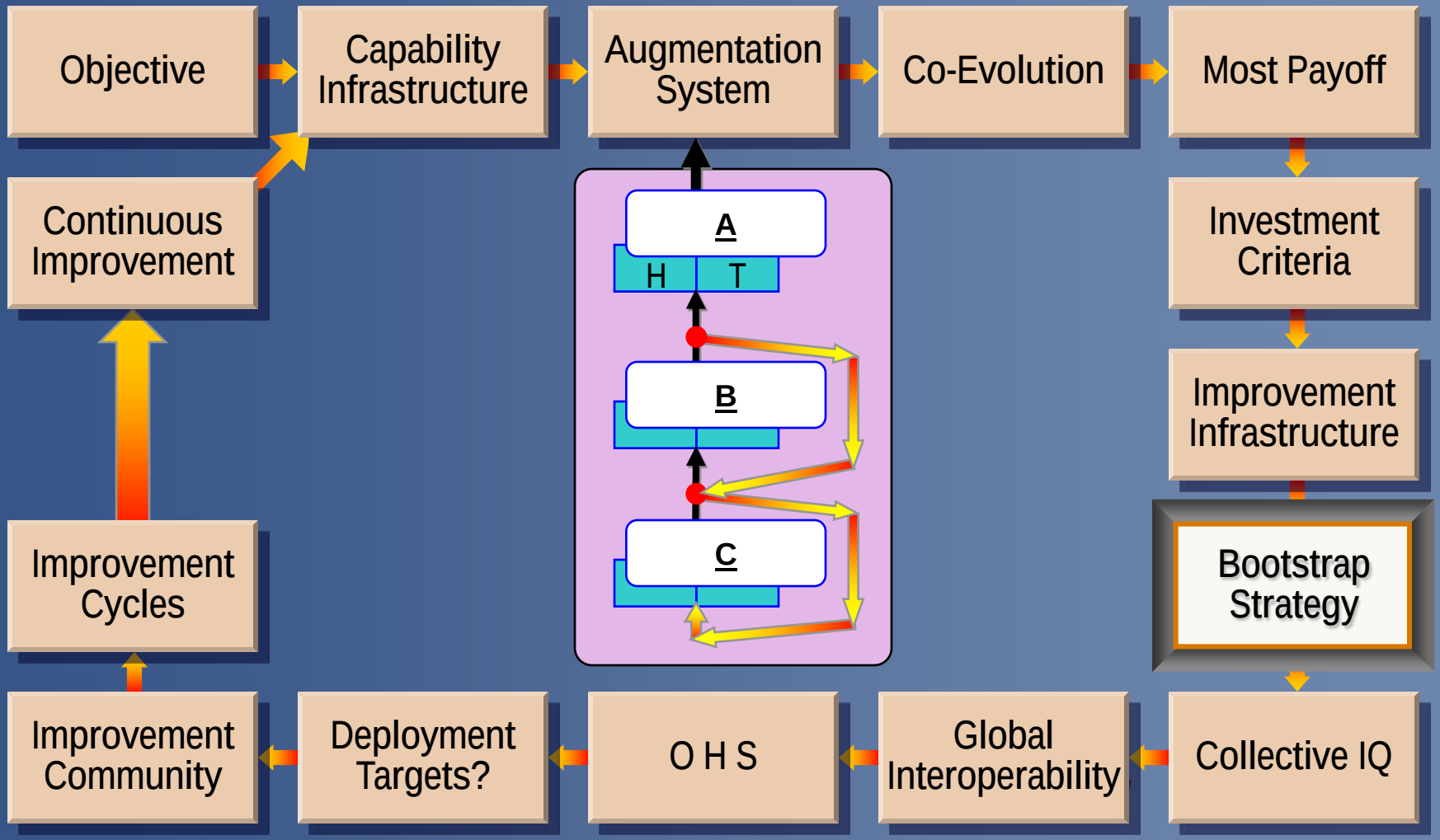

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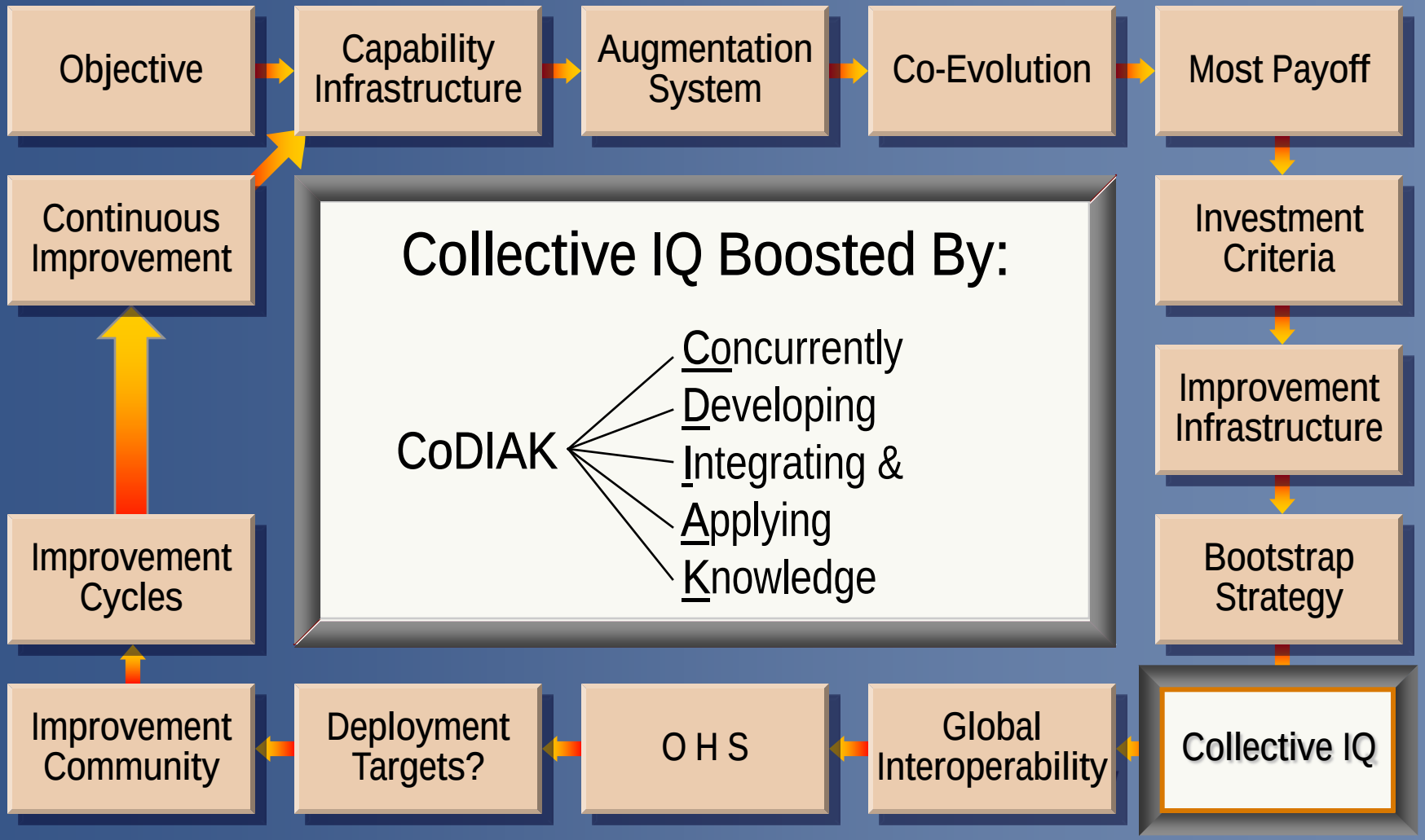
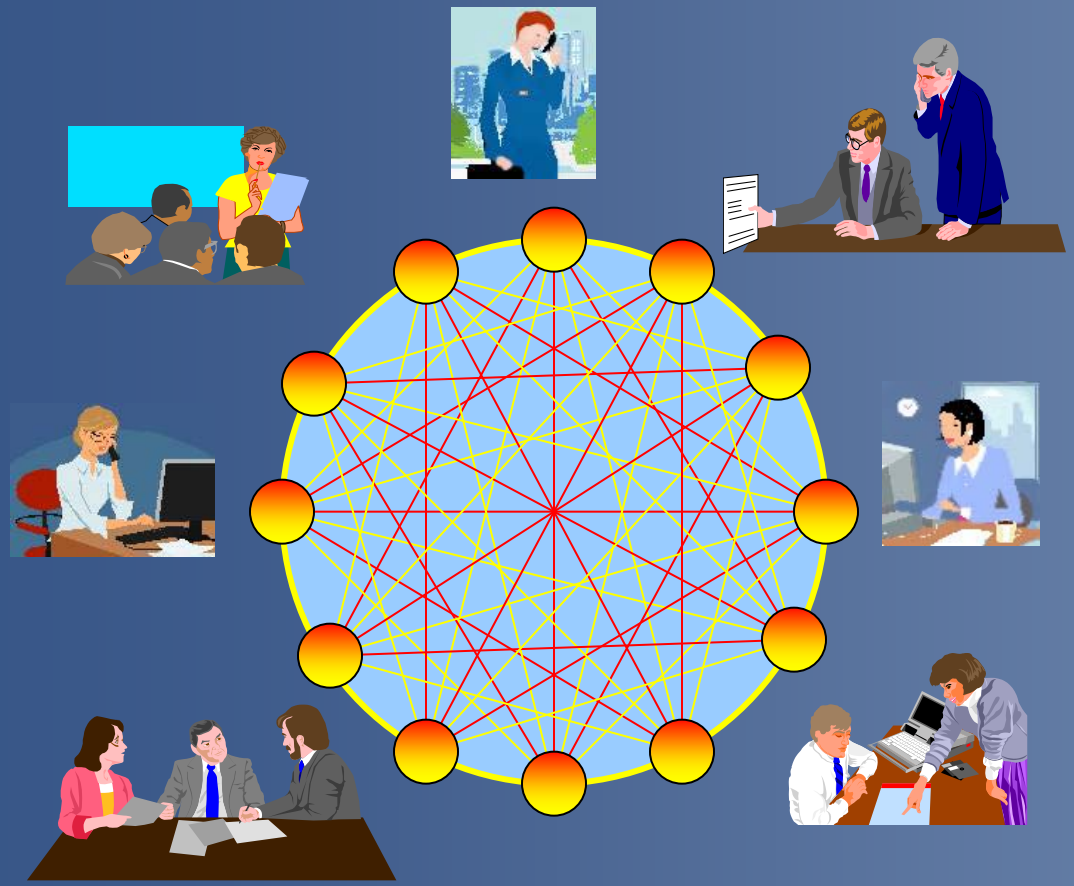


Collective IQ:

How well people work *collectively*



Organizational Unit of any size

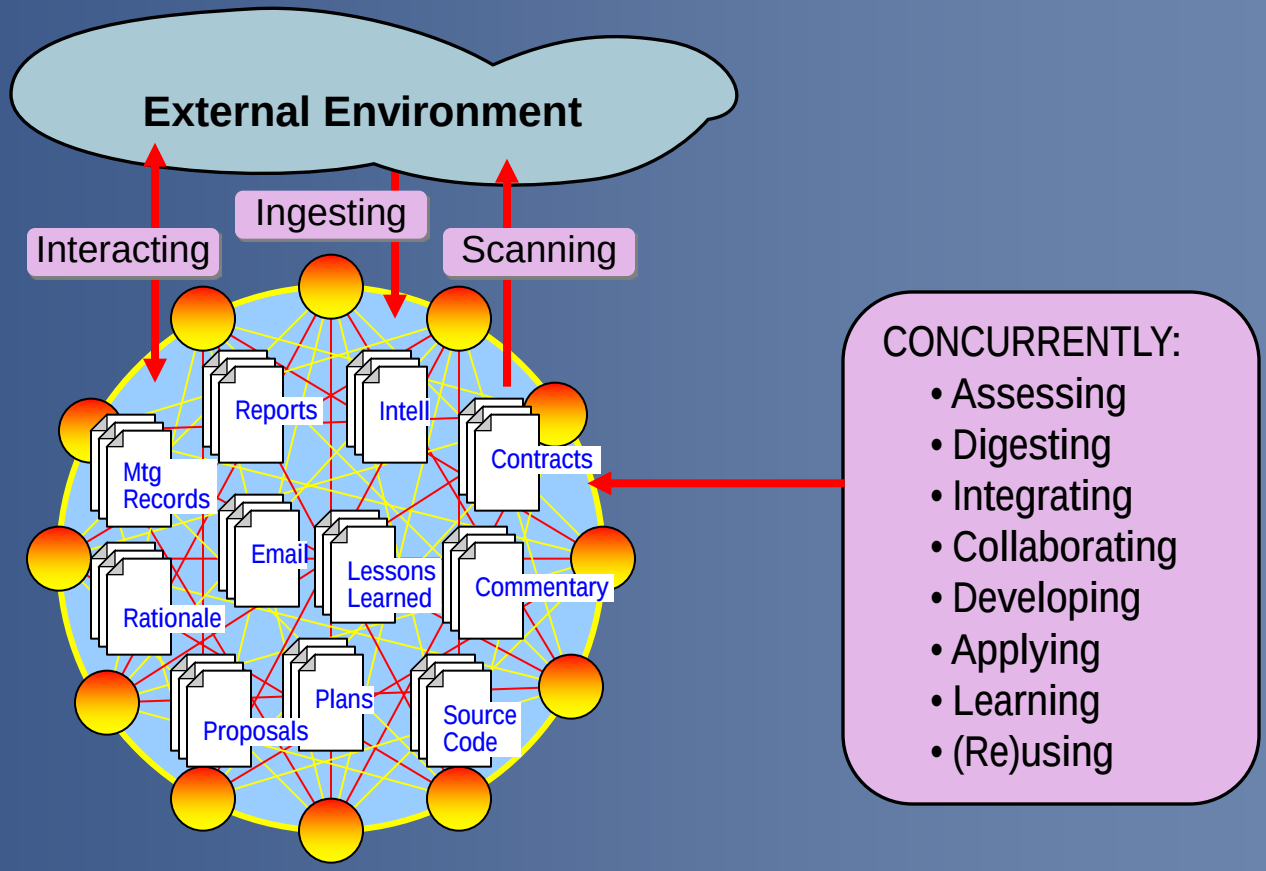
How quickly and intelligently people can respond to a situation *collectively*…

Leveraging their collective

- memory
- perception
- planning
- reasoning
- foresight
- experience

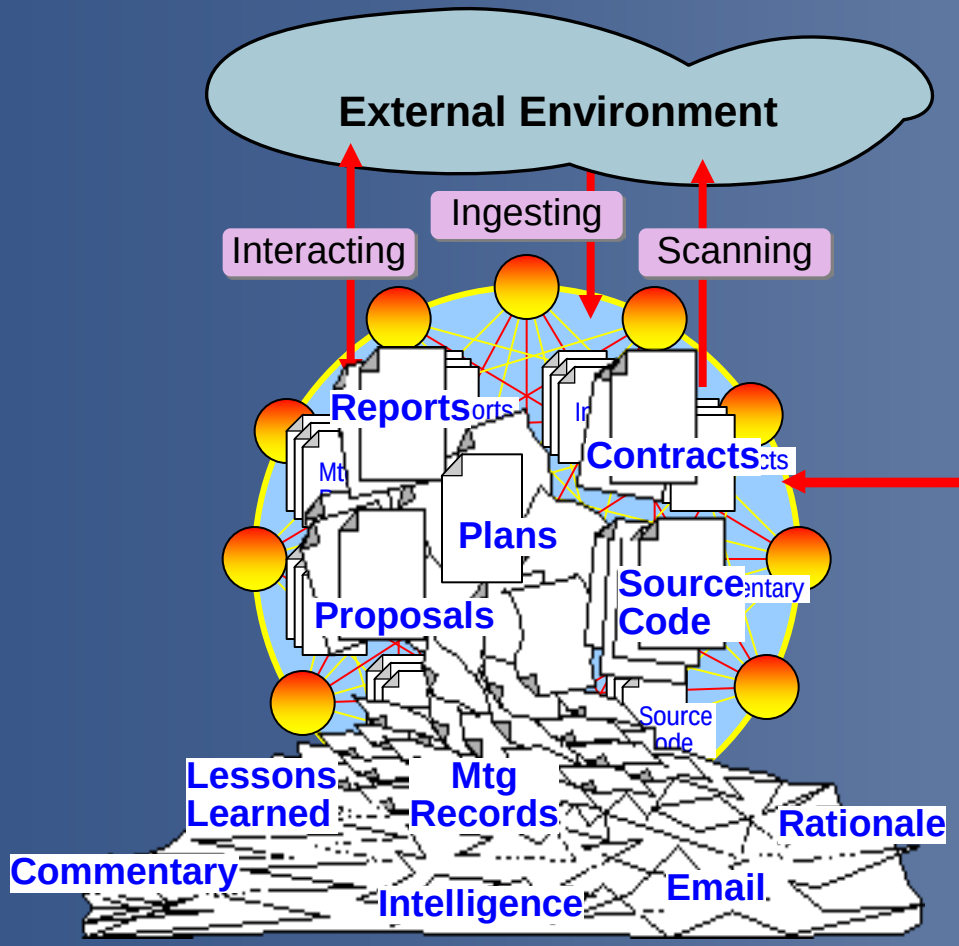
into applicable knowledge

Engaged in Basic Knowledge Processes



A *Dynamic Knowledge Repository* (DKR) emerges

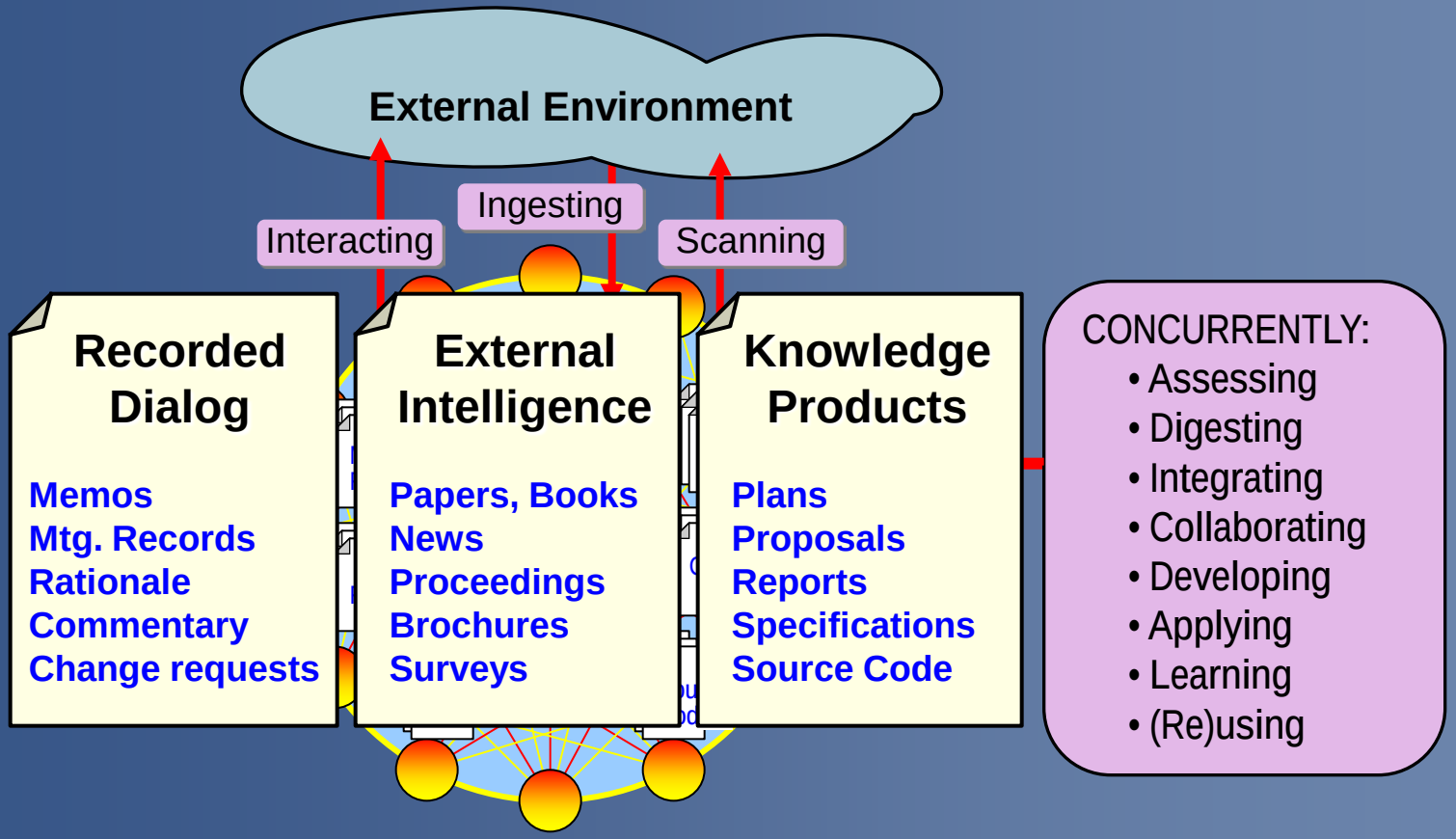
Engaged in Basic Knowledge Processes



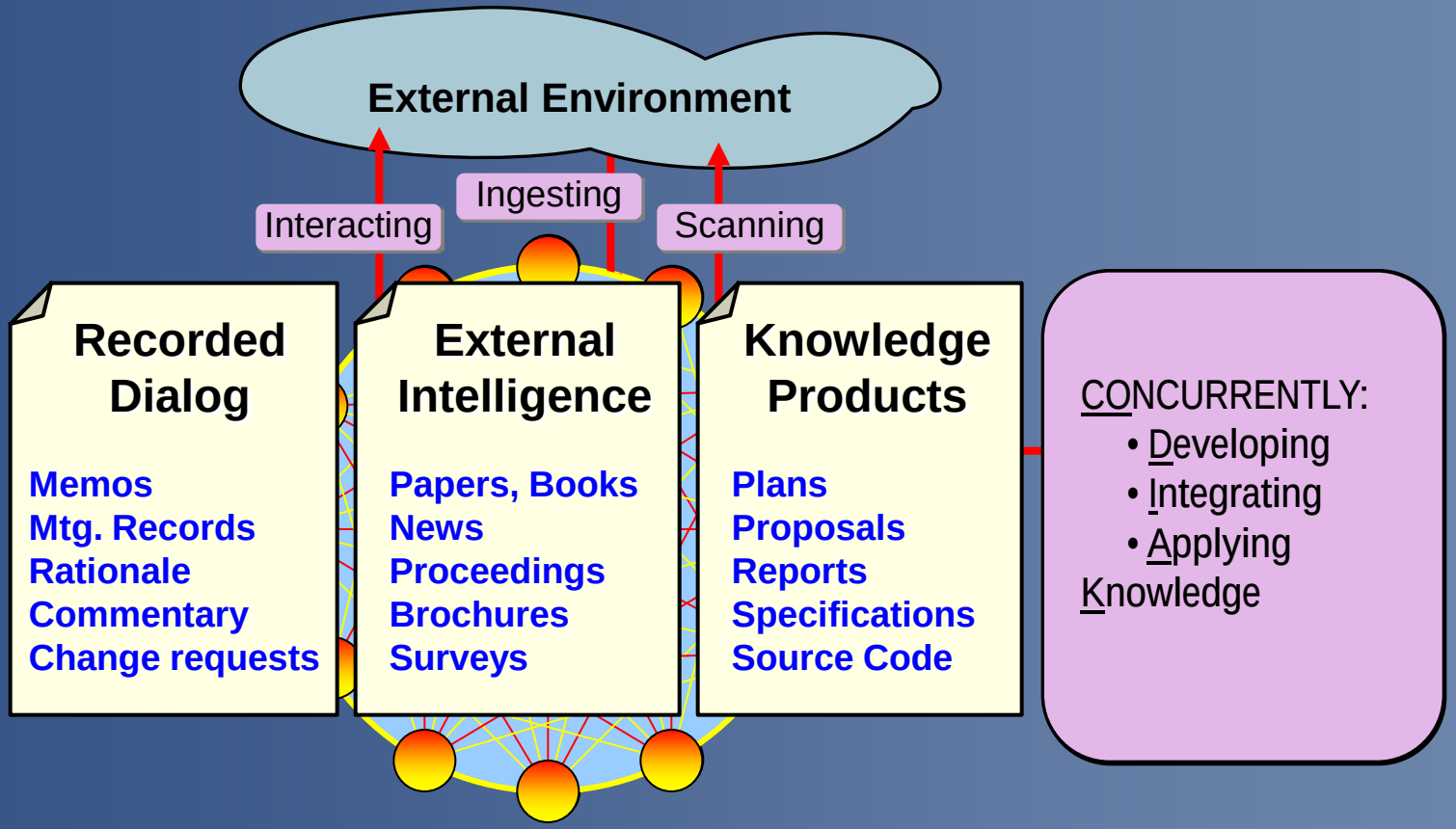
CONCURRENTLY:

- Assessing
- Digesting
- Integrating
- Collaborating
- Developing
- Applying
- Learning
- (Re)using

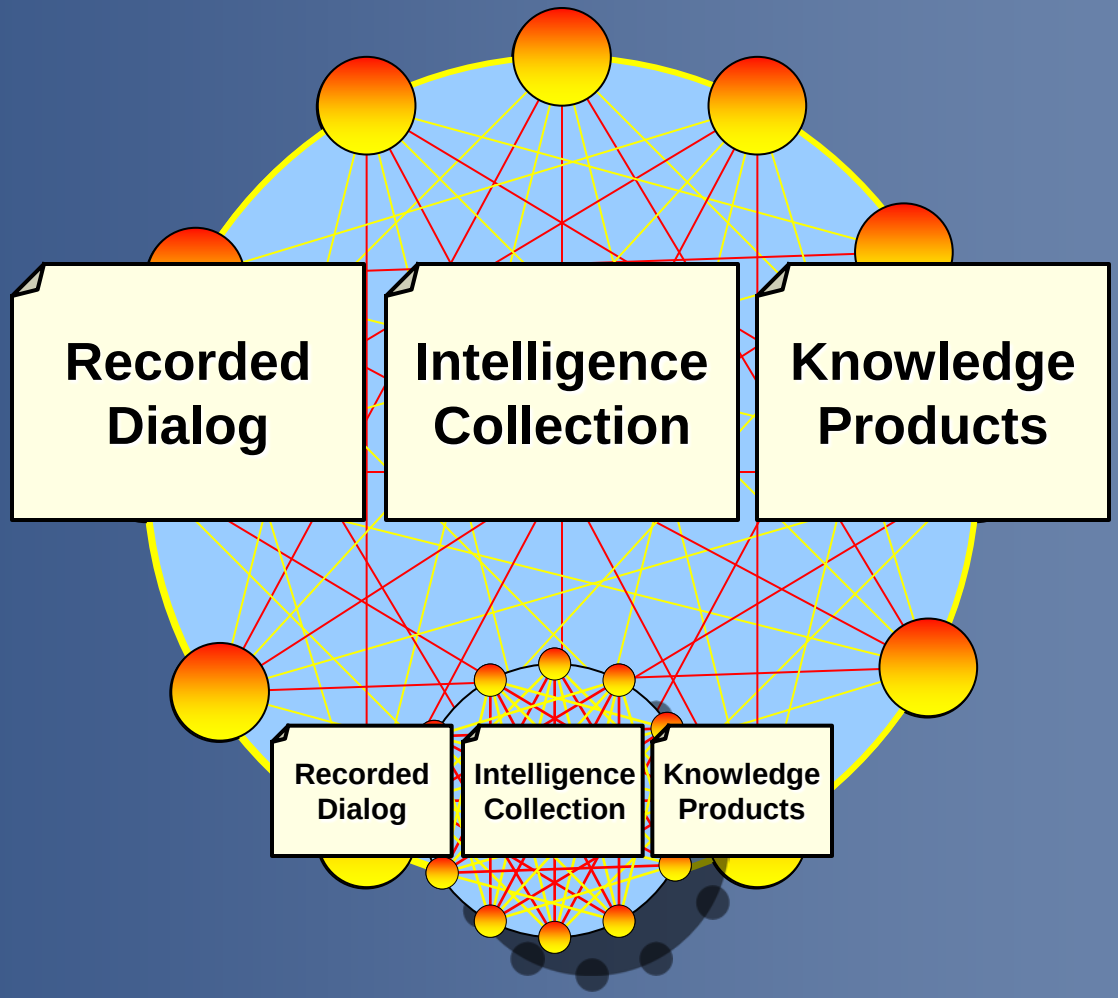
Useful Categorization of the Evolving Knowledge Base



Collective IQ Depends on CoDIAK



Concurrently Amplified by Interacting Knowledge Domains



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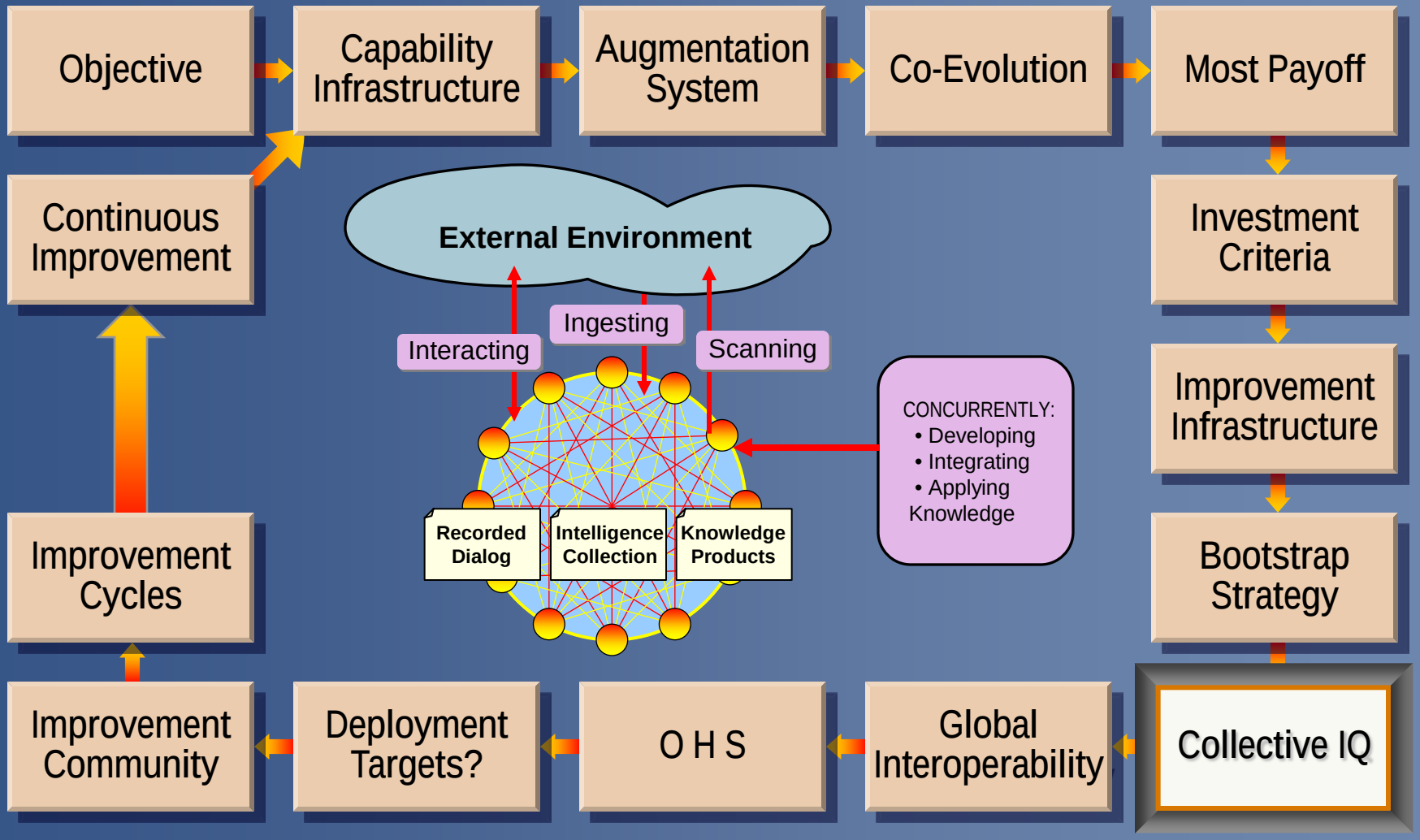
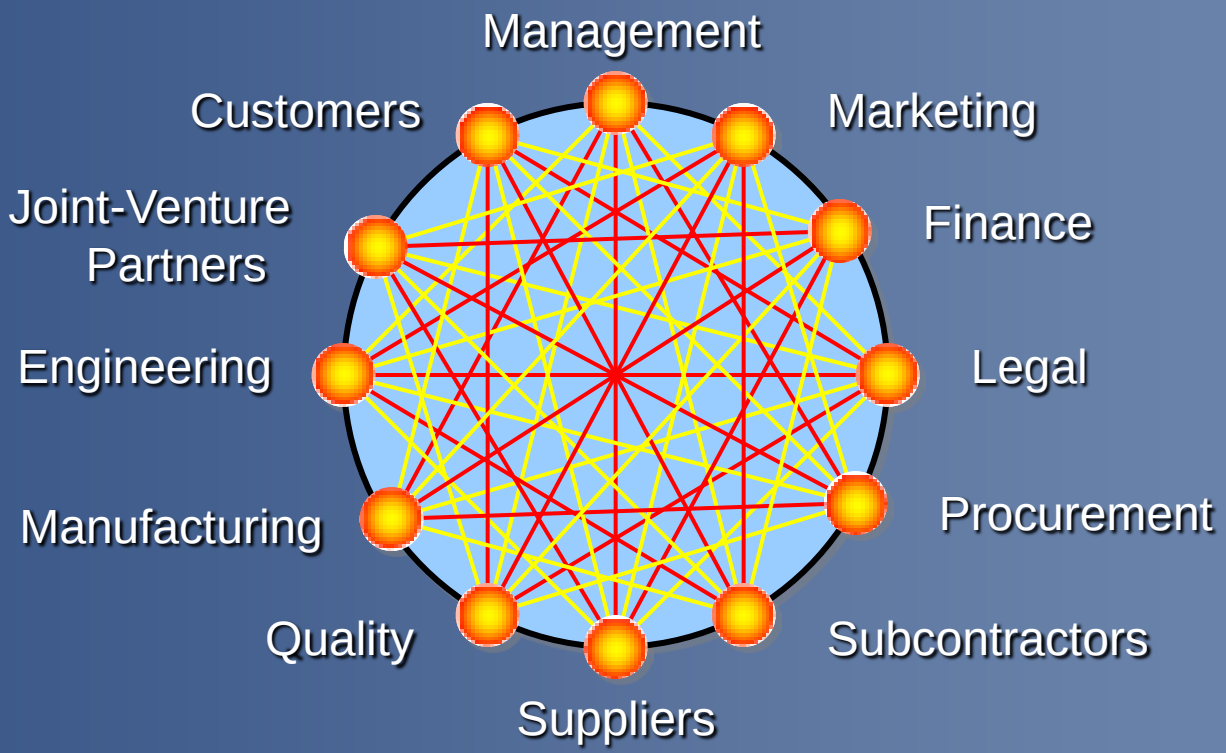
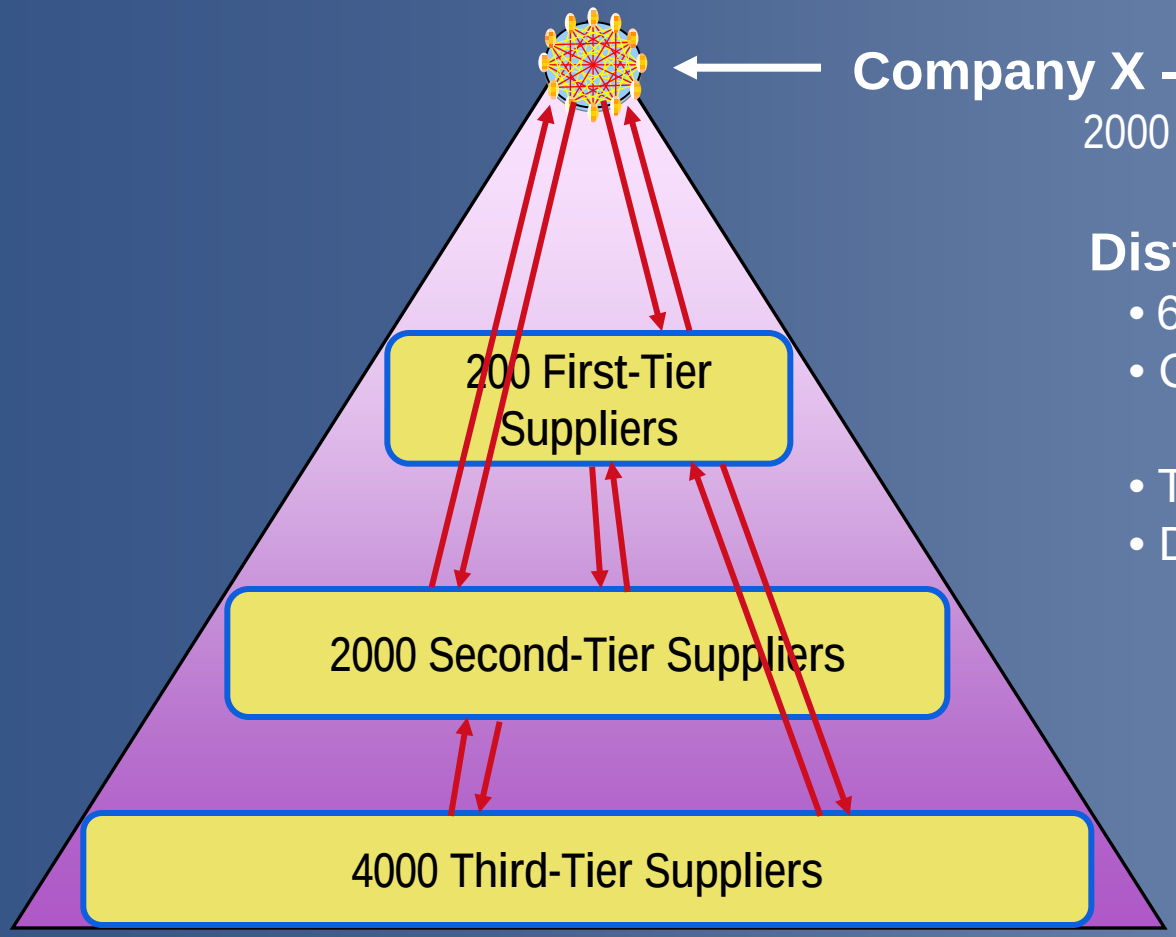


The Bootstrap "Paradigm Map"

Example: Manufacturing Organization



Islands in a supplier hierarchy of a major aircraft program would be very costly



Company X -- Major Aircraft Program

2000 - 3000 people

Distributed Nationwide:

- 6000 + companies
- Collaborating on tasks & specifications
- Tracking progress
- Developing products

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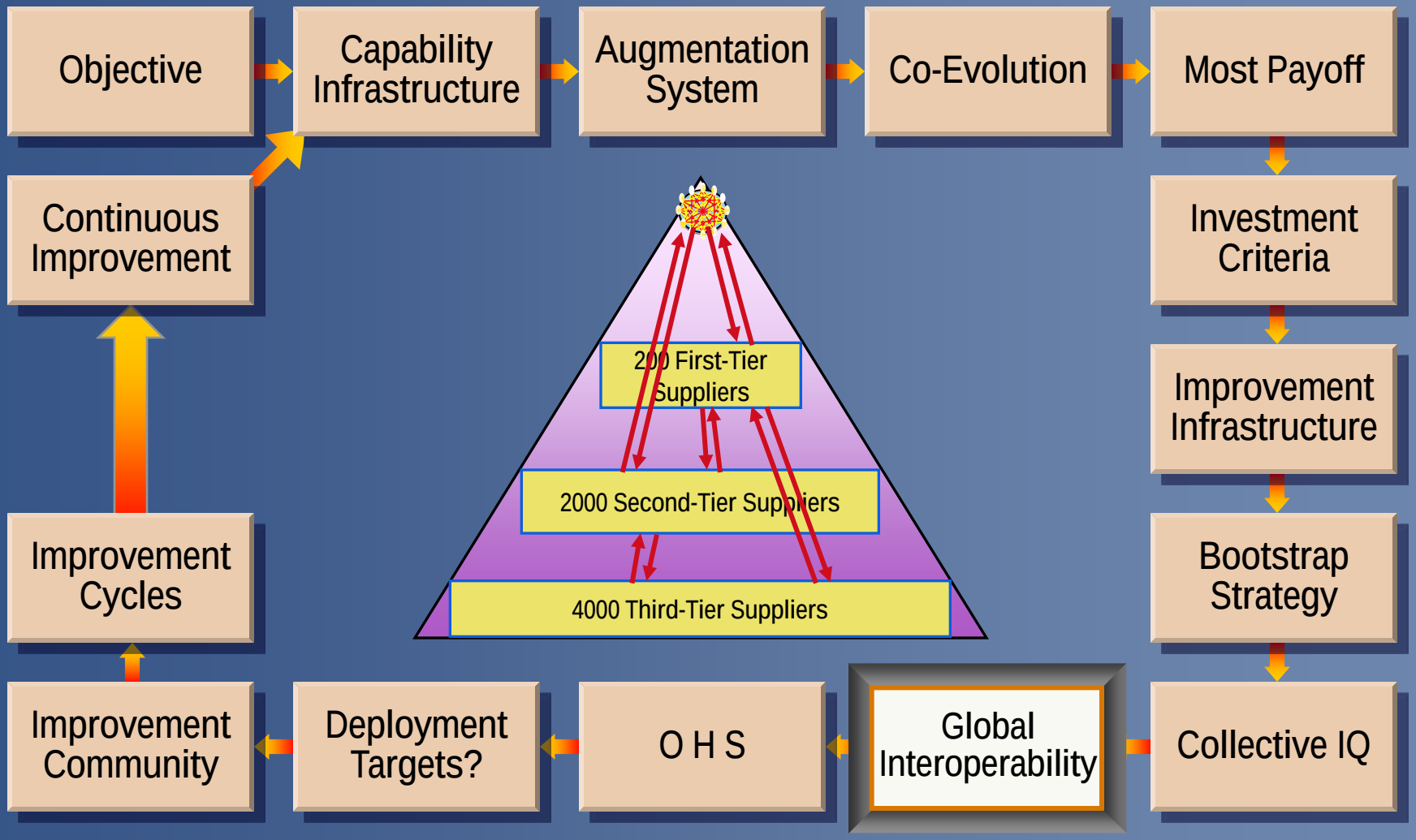

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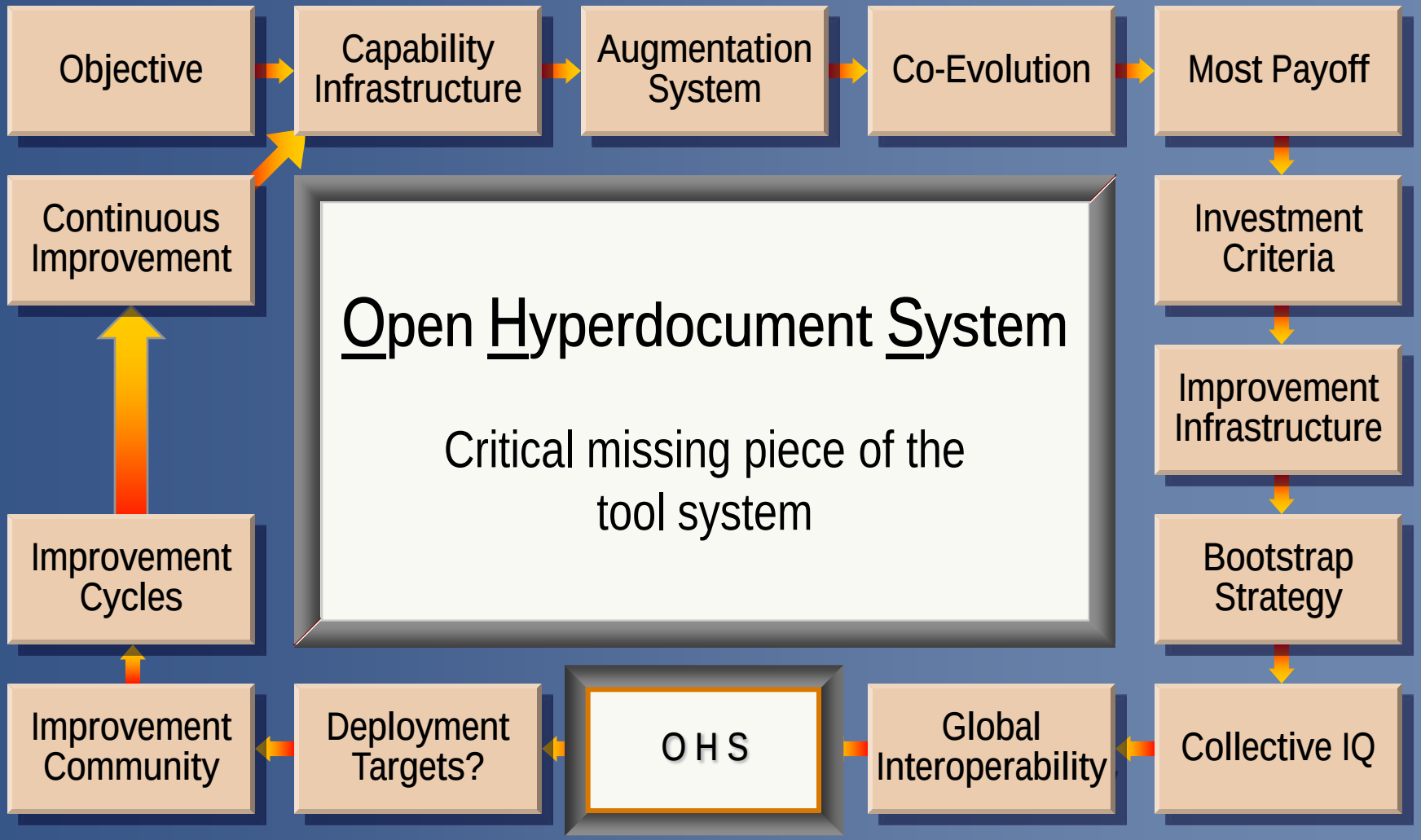
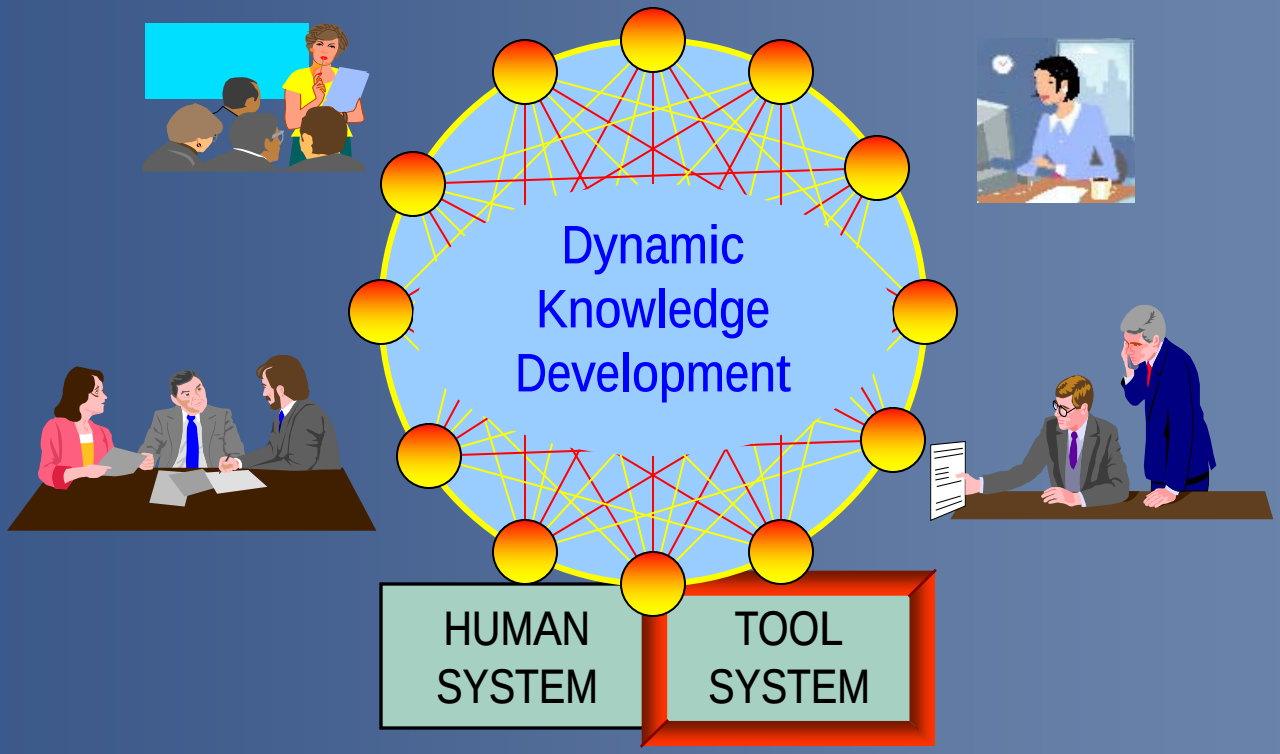


OHS Technology Boosting Collective IQ



OHS Enabling Technology

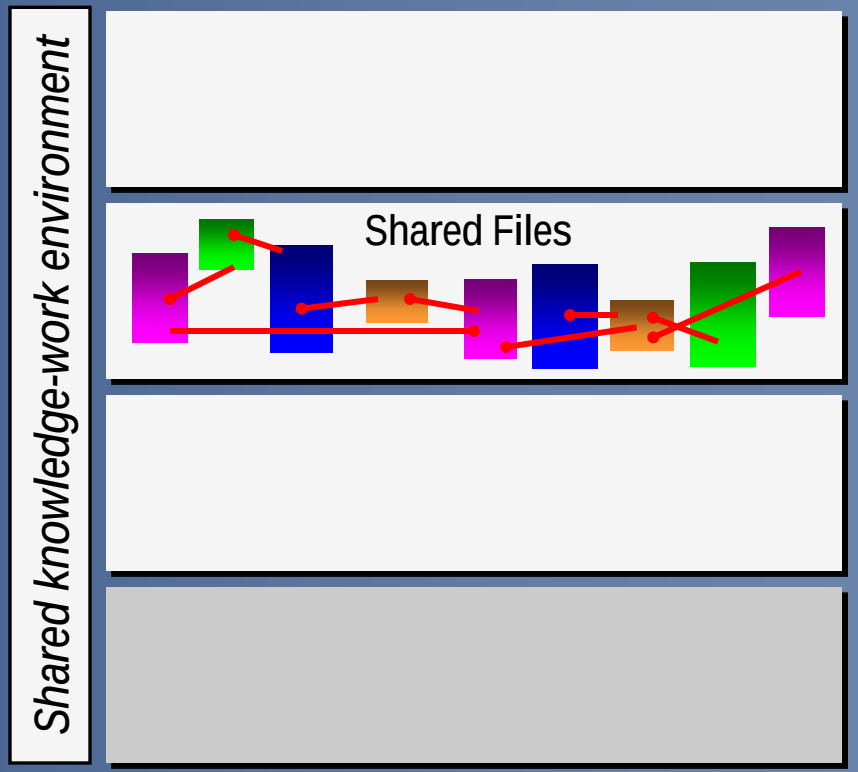
A collaborative hyperdocument environment

- Hypermedia for "real work"
- Unified knowledge capture and management
- Enhanced utilization of knowledge assets
- Enables concurrency, coordination, and collaboration
- Evolvable, interoperable, scalable, and integrative

OHS for Basic Collaborative Knowledge Work

- Structured
- Object linking
- Viewing
- Browsing
- Shared Screens
- Scripting

CoDIAK Example



OHS for Basic Collaborative Knowledge Work

- Structured
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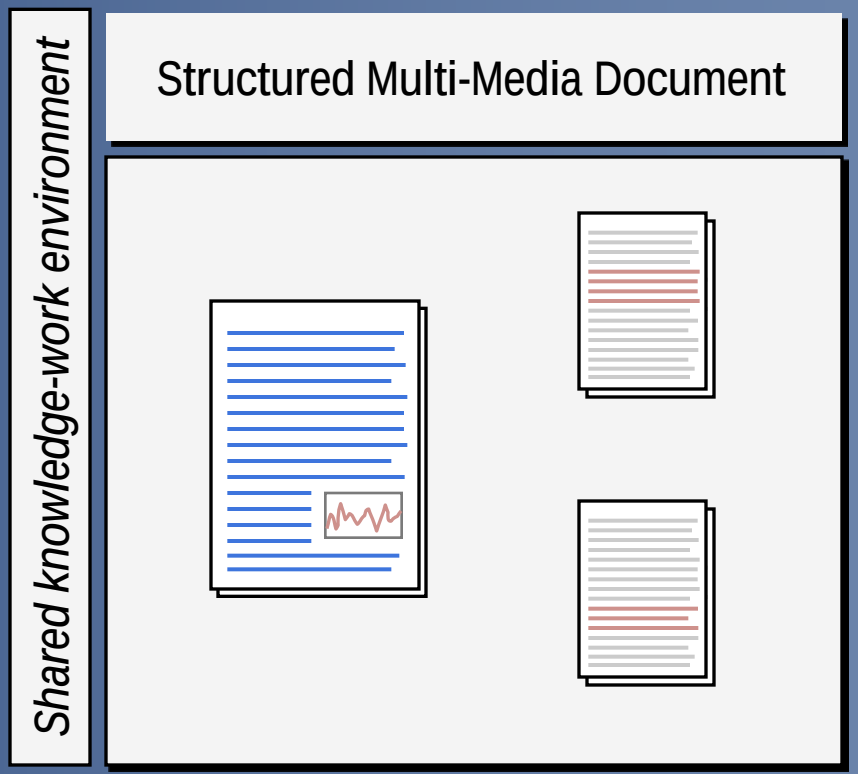
- Scripting

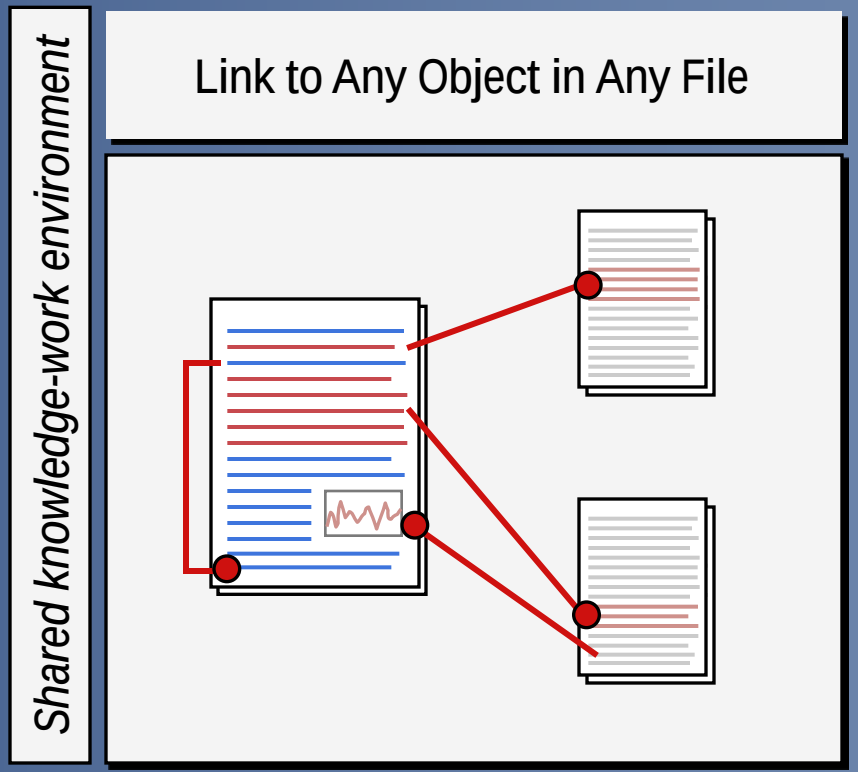
CoDIAK Example



OHS for Basic Collaborative Knowledge Work

- Structured
- Object linking
- Viewing
- Browsing
- Shared Screens
- Scripting

CoDIAK Example



OHS for Basic Collaborative Knowledge Work

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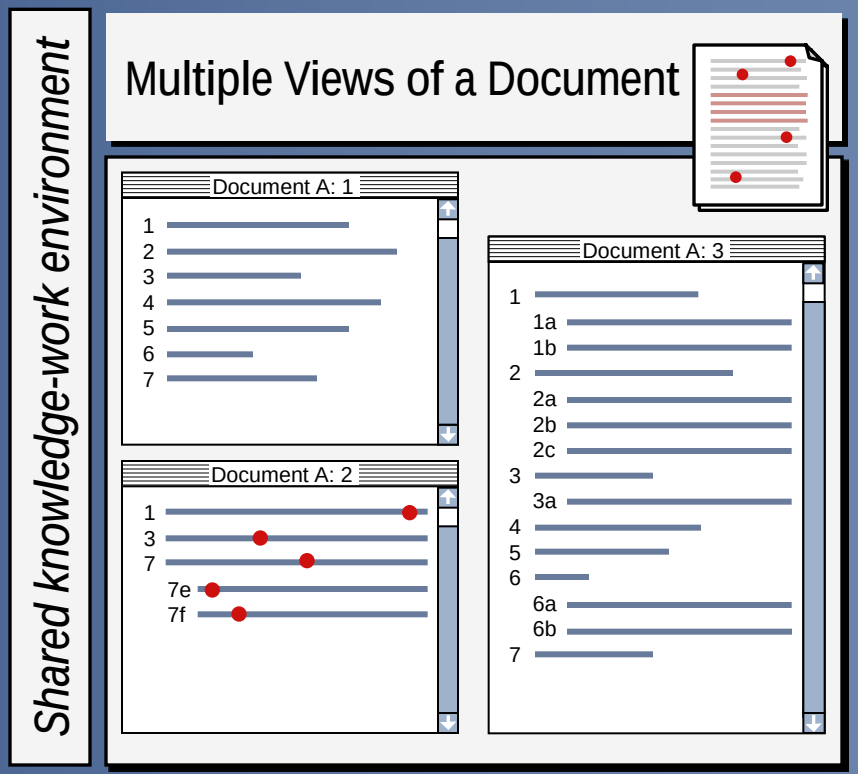
CoDIAK Example



OHS for Basic Collaborative Knowledge Work

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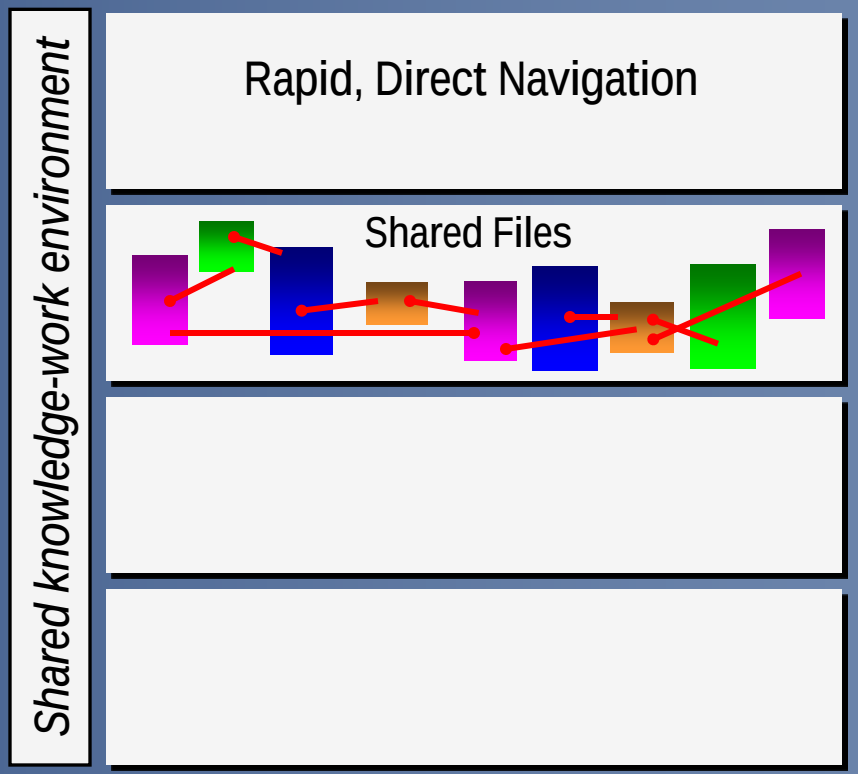
CoDIAK Example



OHS for Basic Collaborative Knowledge Work

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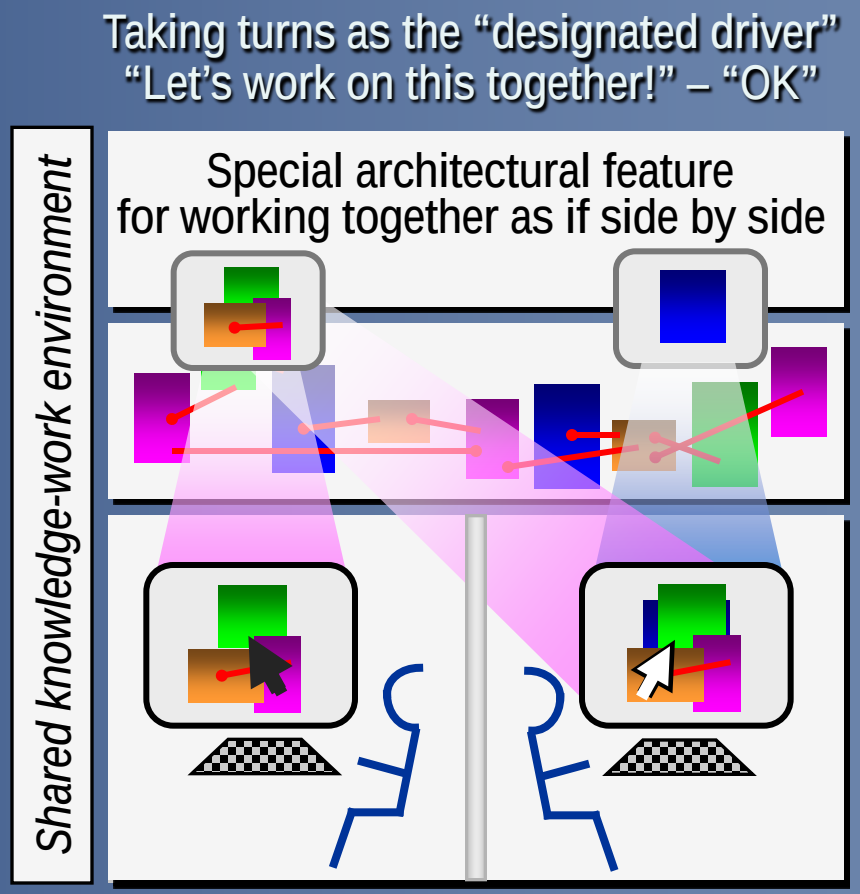
CoDIAK Example



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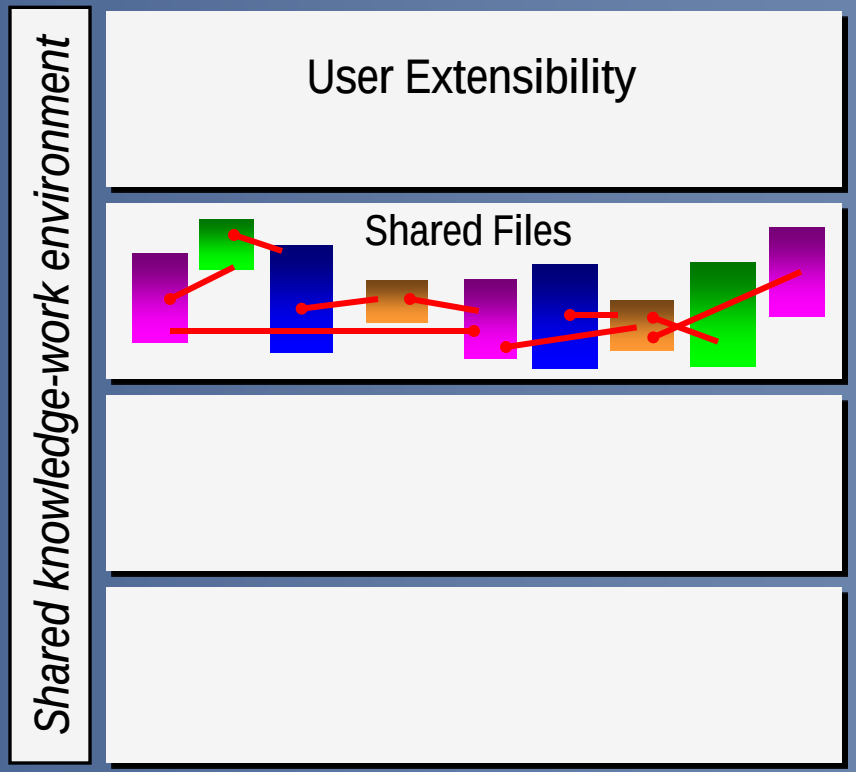

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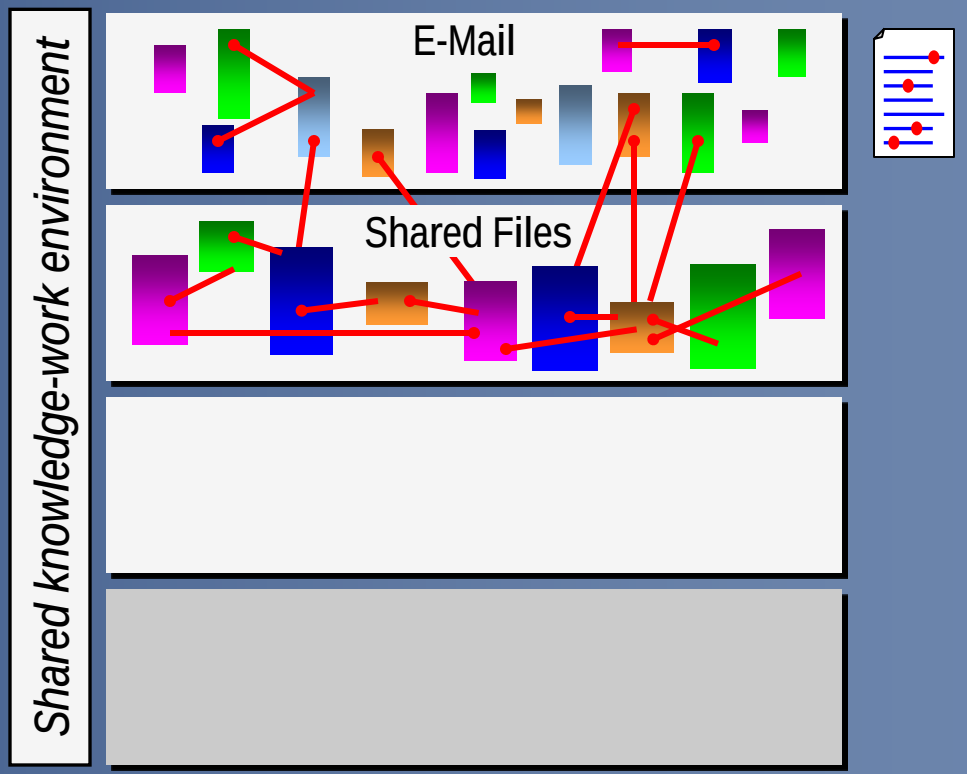


File Edit View Messages Tools Fields

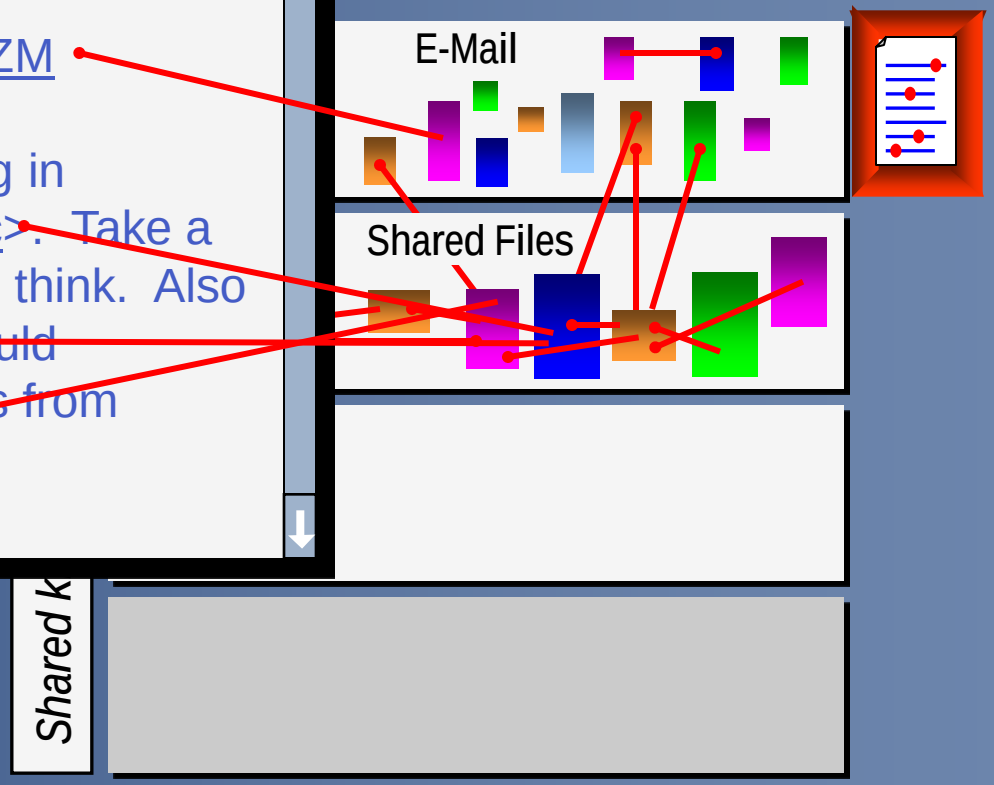
Email Document

In-Box

From: ce.bi
To: dce.bi
Subject: Draft Plan
In-reply-to: BI-DCE-XY4ZM
Message:
OK I added some wording in <engelbart,draft-plan@4c>. Take a look and tell me what you think. Also re: <@5a> I think we should incorporate the key points from <BI,plans,7b>.
- Christina

E-Mail Fully Augmented:

- structured browsing, editing, filtering
- object level manipulation …



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- Structured
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- Browsing
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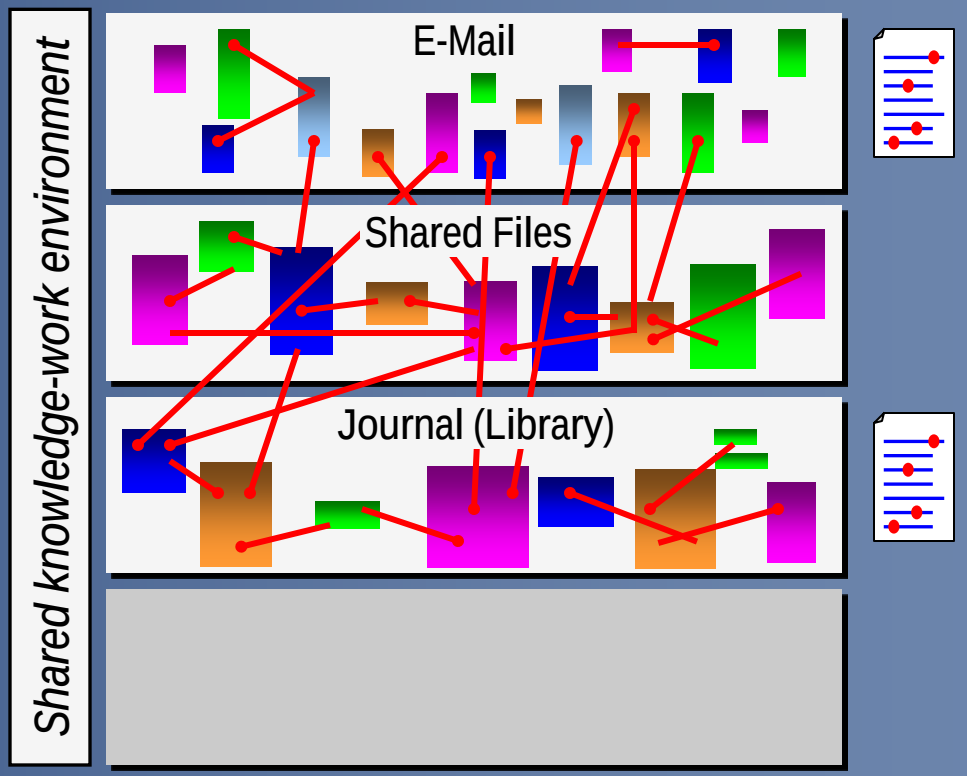

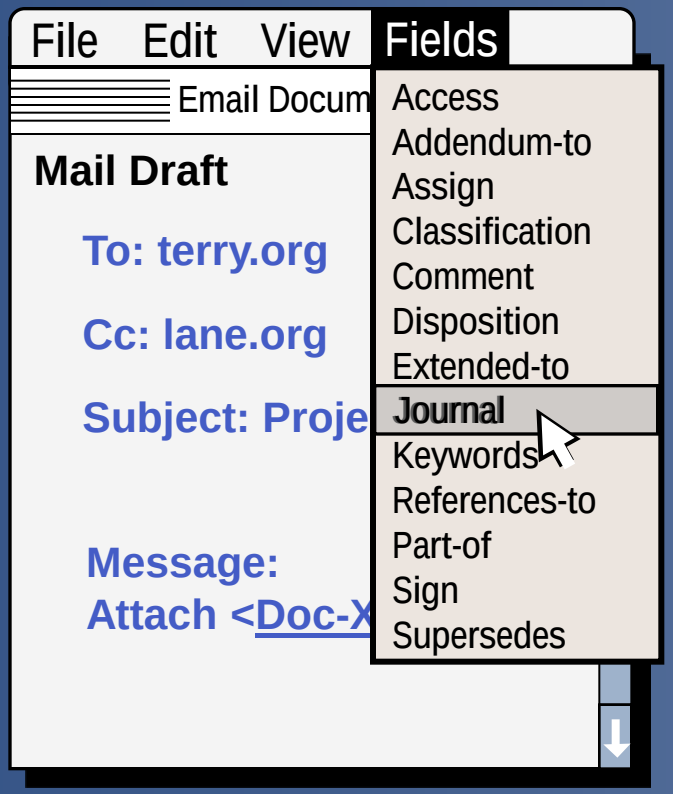

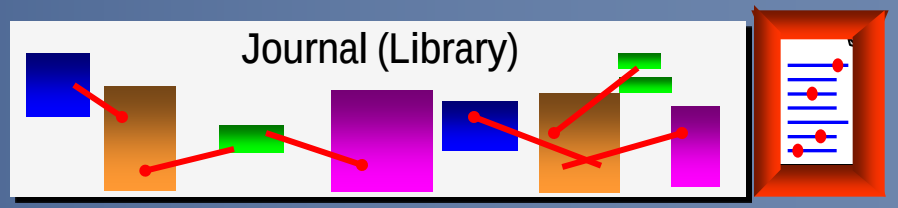

Example:
Posting a document in the Journal

File Edit View Fields

Email Document

Mail Draft Send

To: terry.org

Cc: lane.org

Subject: Project Status

Journal: XYZ

Message:
Attach <Doc-X>

Email Notices

terry.org

Email Document

Mail Draft

To: terry.org

Cc: lane.org

Subject: Project Status

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Message:
Attach <Doc-X>

lane.org

Email Document

Mail Draft

To: terry.org

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Subject: Project Status

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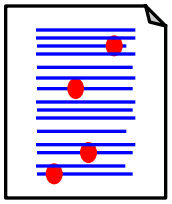
Document X



Example:
Posting a document in the Journal

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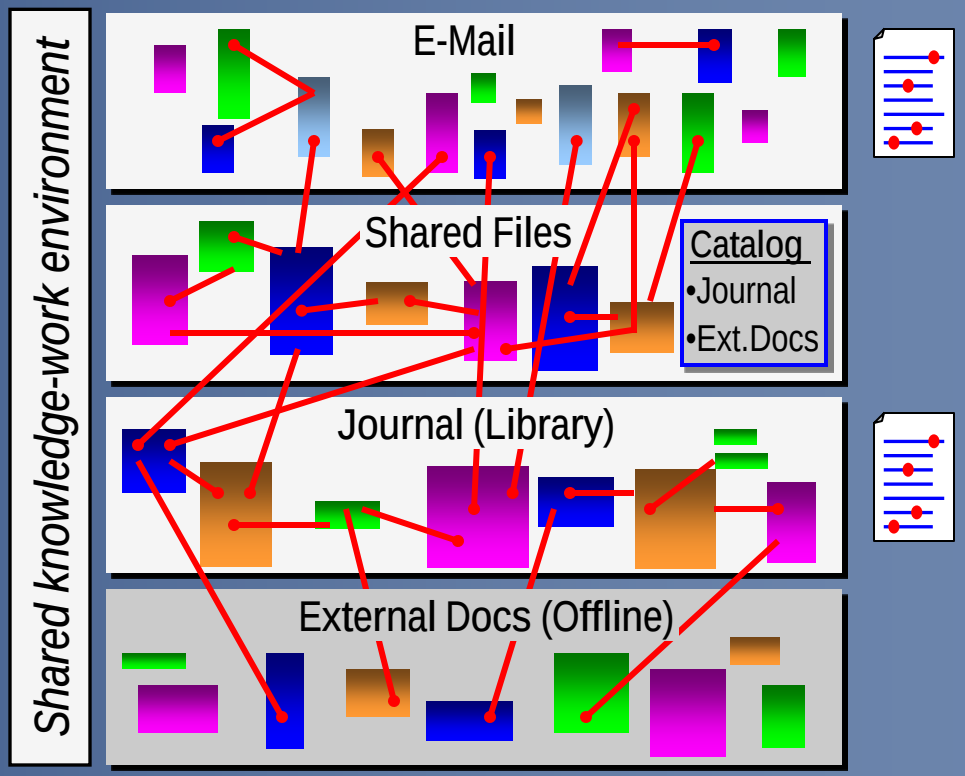

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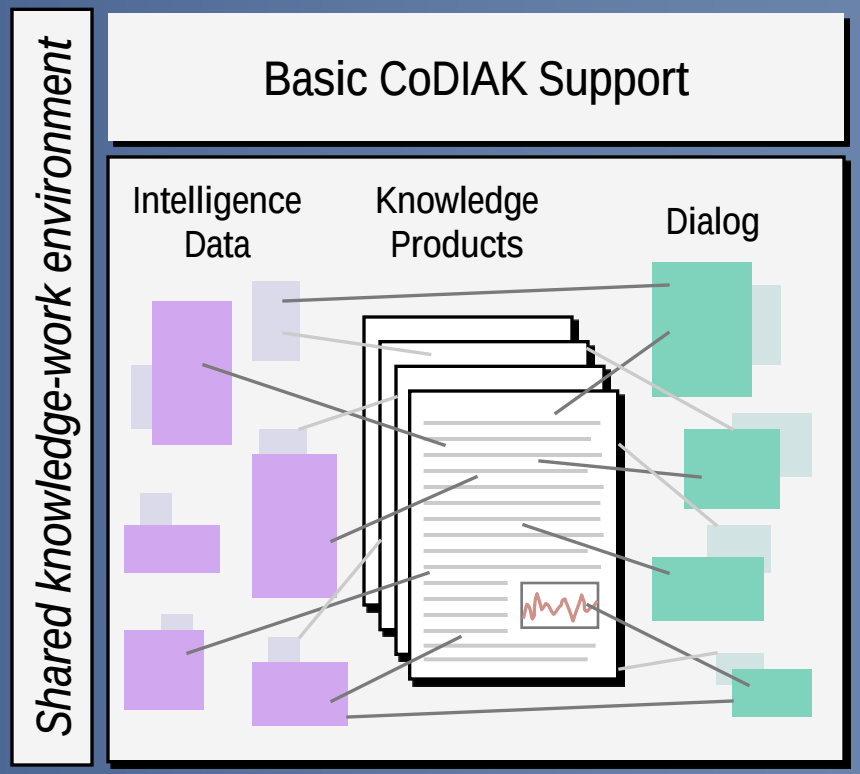

Augmented Knowledge Workshop

Dir File Edit View Window Special Print Help

OHS Overview (2,ALL)

Document Support

For Groups
& Individuals

- Structure
- View Control
- Browsing
- Object-level
- Linking
- Integrated Editor

Journal: oad,2250 (1,1)

Augmented Knowledge Workshop

Dir File Edit View Window Special Print Help

OHS Overview (2,ALL)

Document Support

For Groups
& Individuals

- Structure
- View Control
- Browsing
- Object-level
- Linking
- Integrated Editor

Journal: oad,2250 (2,1)

AUTHORSHIP PROVISIONS IN AUGMENT
ABSTRACT
AUGMENT is a text processing system
INTRODUCTION
AUGMENT designed for analyzing human
Authorship has received a great deal of
We recognize explicitly that highly skilled
In this regard, our design goal was to provide
An explicit sub-goal in AUGMENT's
This paper concentrates upon the development
Studying another's work provides a
SOME BACKGROUND
AUGMENT commands are expressed with
FILE CHARACTERISTICS
CONTROLLING THE TOOLS
ADDRESSING THE WORKING MATERIALS
ADDRESSING THE WORKING MATERIALS
There is a consistent set of addressing features
Many of AUGMENT's unique author-support
In the early stages of our program at SRI, we did
HISTORY

Augmented Knowledge Workshop

Dir File Edit View Window Special Print Help

OHS Overview (2,ALL)

Document Support

For Groups
& Individuals

- Structure
- View Control
- Browsing
- Object-level
- Linking
- Integrated Editor

Journal: oad,2250 (3,1)

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SOME BACKGROUND
AUGMENT commands are expressed with
FILE CHARACTERISTICS
AUGMENT employs explicitly structured files,
(Note: AUGMENT workers generally use the
CONTROLLING THE TOOLS
ADDRESSING THE WORKING MATERIALS
There is a consistent set of addressing
EXPLICIT STATEMENT ADDRESSES
MARKERS

Augmented Knowledge Workshop

Dir File Edit View Window Special Print Help

OHS Overview (2,ALL)

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For Groups
& Individuals

- Structure
- View Control
- Browsing
- Object-level
- Linking
- Integrated Editor

Journal: oad,2250 (all,all)

AUTHORSHIP PROVISIONS IN AUGMENT

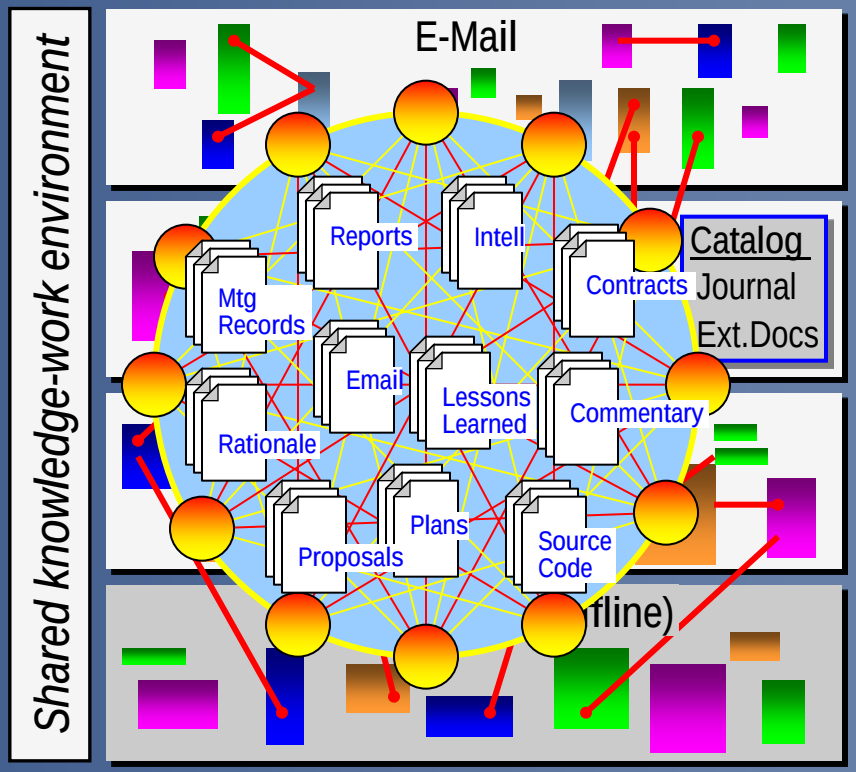
Douglas C. Engelbart
Tymshare, Inc.
Cupertino, California 95014

ABSTRACT

AUGMENT is a text processing system marketed by Tymshare for a multi-user network environment. In AUGMENT's frontend is a User Interface System that facilitates flexible evolution of command languages and provides optional command recognition features. Exceptionally fast and flexible control of interactive operations is enabled by concurrent action of mouse and optional one-handed chord keyset. Files are hierarchically structured, and textual address expressions can flexibly specify any text entity in any file.

INTRODUCTION

OHS: to Support CoDIAK Work Processes and DKRs



OHS Represents a Paradigm Shift

FROM	TO
• Tool-centric system	• Document-centric system
• Function-oriented tool / system	• Integrated end-to-end knowledge management environment
• Authoring and Publishing	• Developing, integrating, & applying knowledge
• Isolated passive libraries and archives	• Active "living" libraries seamlessly Integrated within the organization's work processes
• One user class: "easy to use"	• Many classes of user: Pedestrian to high performance

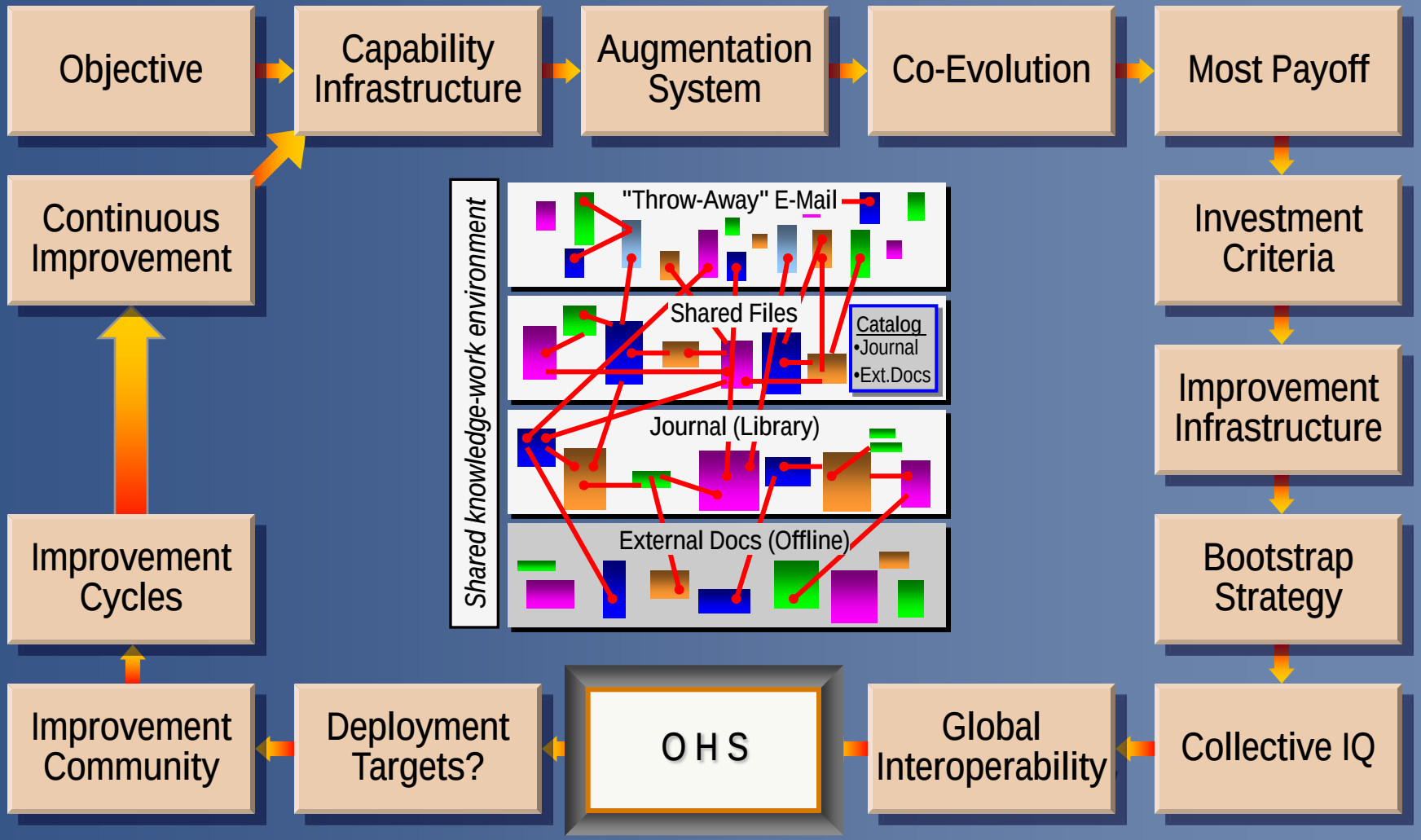
OHS Represents a Paradigm Shift (cont.)

FROM	TO
• File-level addressability	• Object-level addressability
• "Load & scroll browsing" in WYSIWYG or outline view modes	• "Precision browsing" Jumping directly to any object in any file with on-the-fly custom views
• Windows tied to a file and to the application used	• Windows are a portal onto a file repository; a variety of applications may be used on any file
• Each application has unique file design	• Applications use common file design

Potential OHS Applications
To Support and Integrate CoDIAK-intensive Work

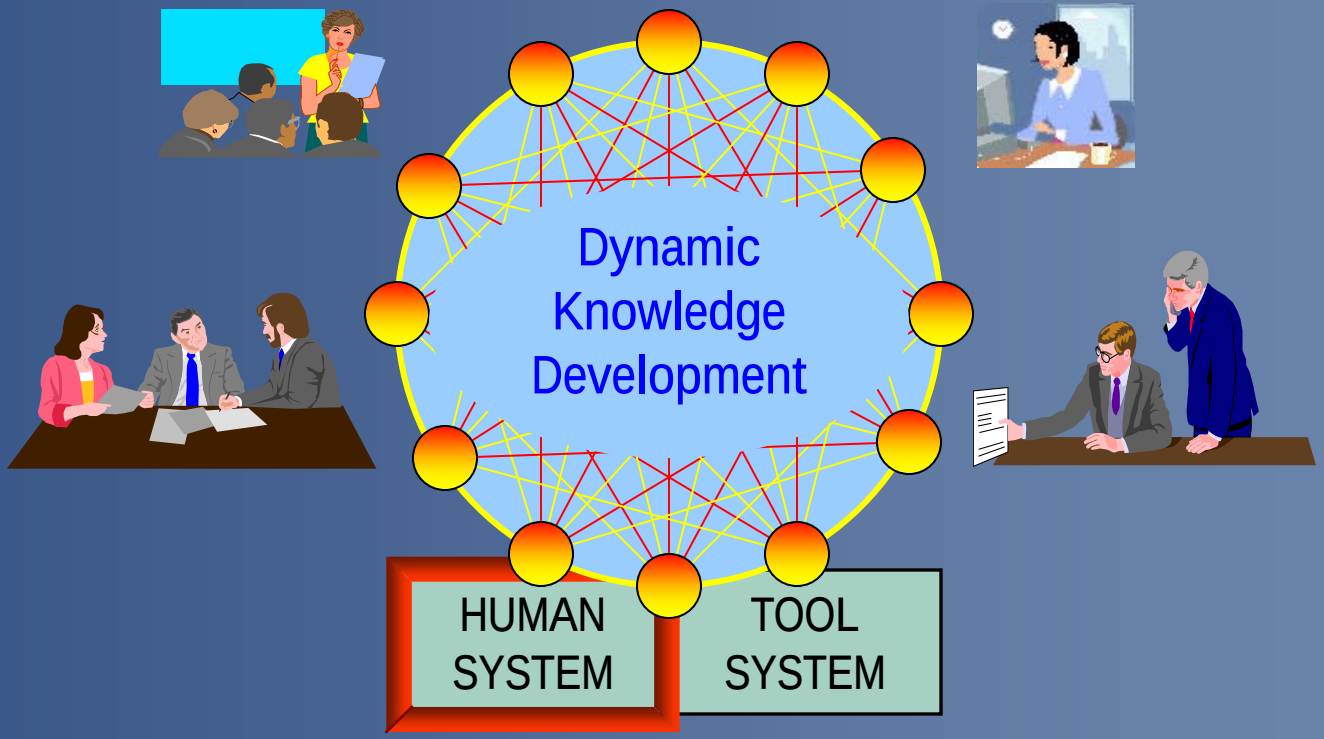
- Program Management
- Collaborative Planning & Tracking
- Command and Control
- Concurrent Engineering
- Software Engineering (CASE)
- Acquisitions Support (CALS)
- CA - Integrated Architectures
- Contracts Management
- World Wide Web (WWW)
- Records Management
- Digital Libraries
- Tele-commuting
- Online Document Delivery
- Groupware, CSCW
- Enterprise Integration
- Total Quality Management (TQM)
- Continuous Process Improvement
- Re-Engineering
- Organizational Learning
- Distance Learning
- Technology Transfer
- Networked Improvement Communities
- etc...

The Bootstrap "Paradigm Map"



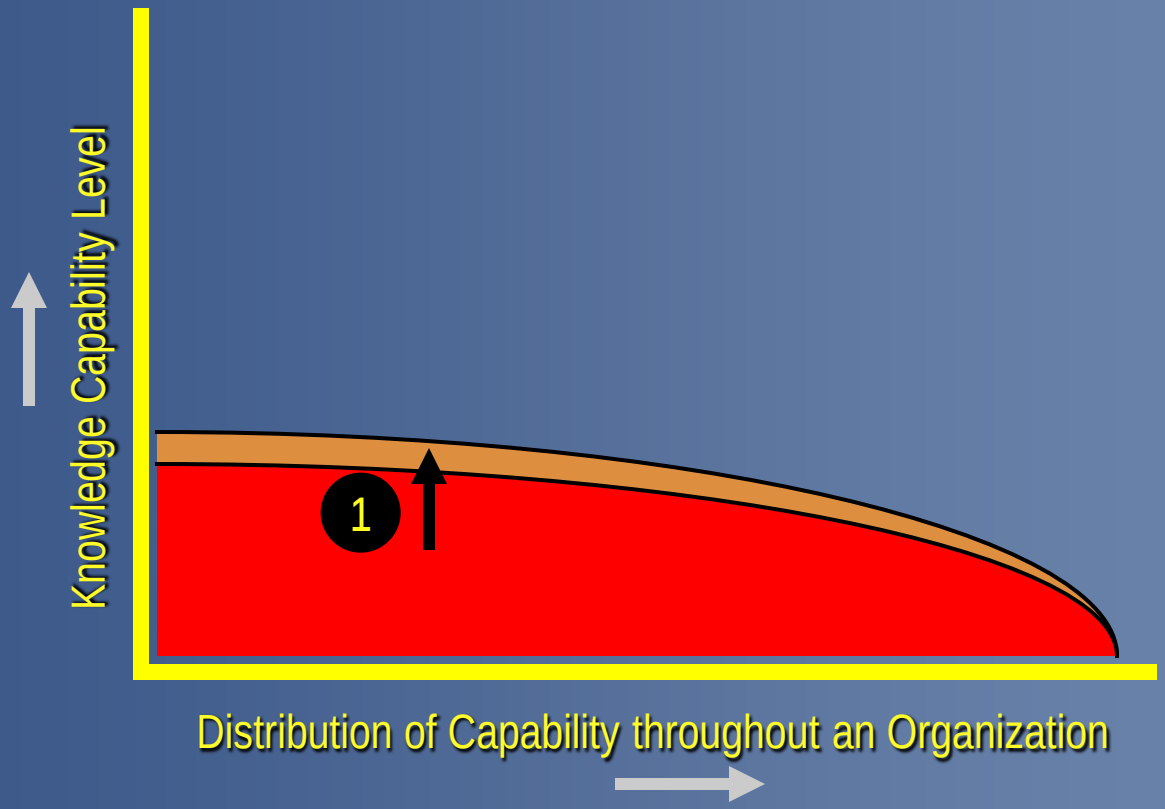
The Bootstrap "Paradigm Map"

Pushing the Frontier Requires Aggressive Co-Evolution



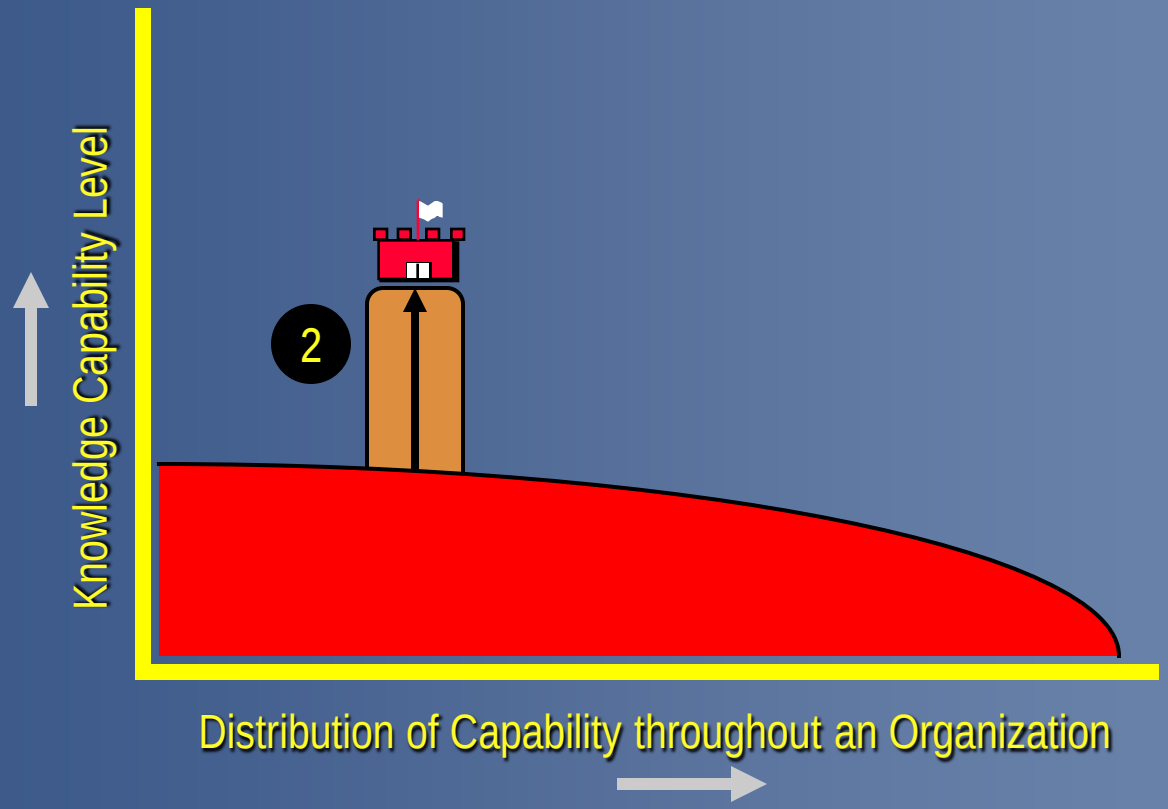
Increasing Organizational Capability

Mode 1



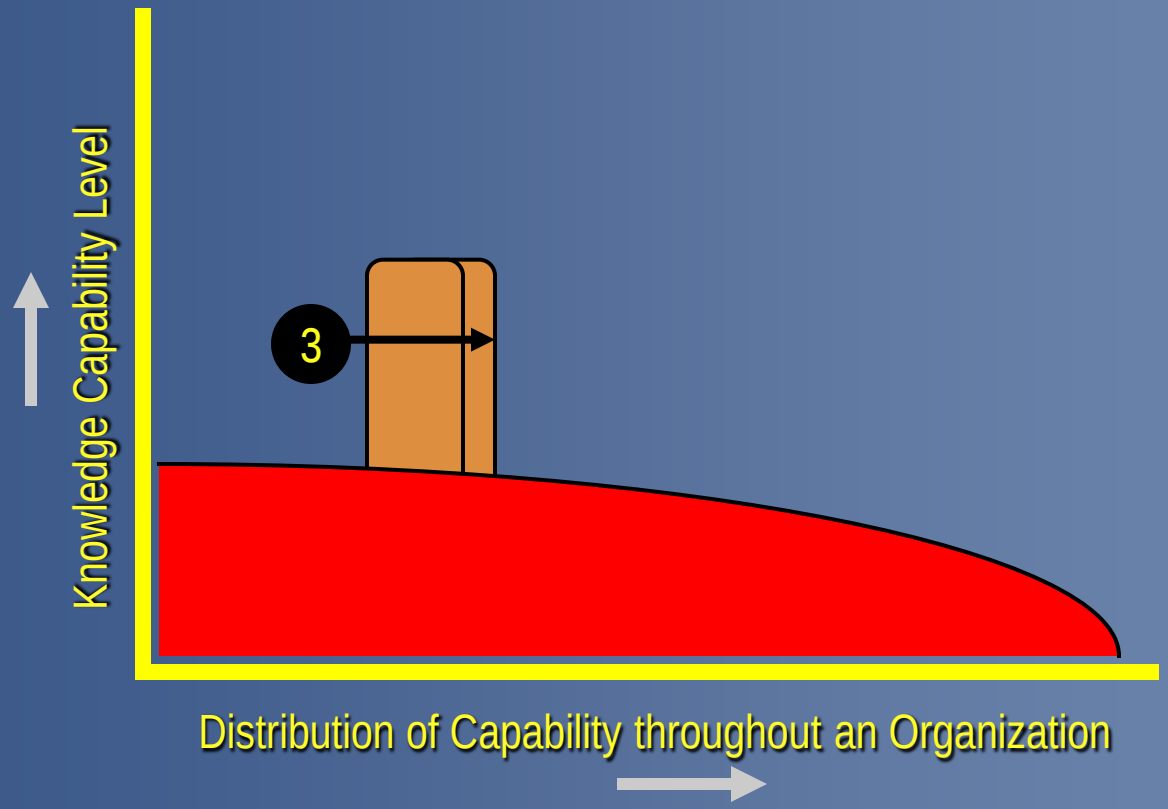
Increasing Organizational Capability

Mode 2



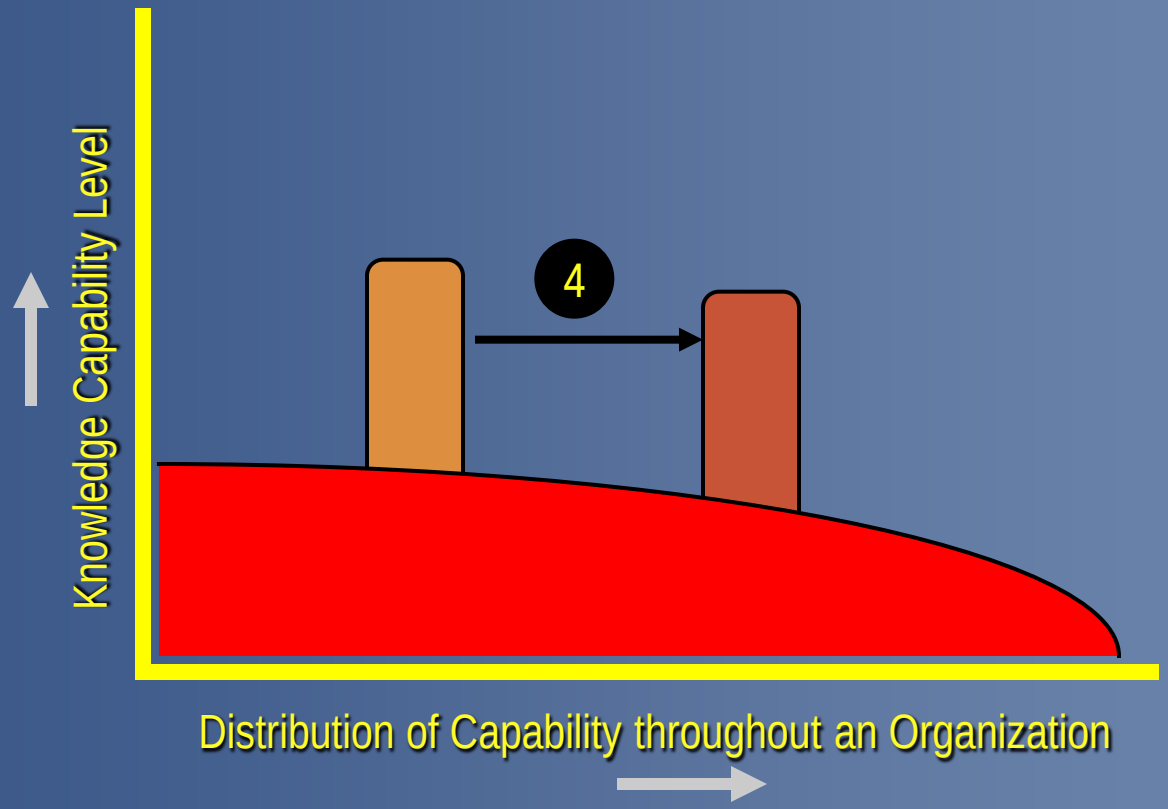
Increasing Organizational Capability

Mode 3

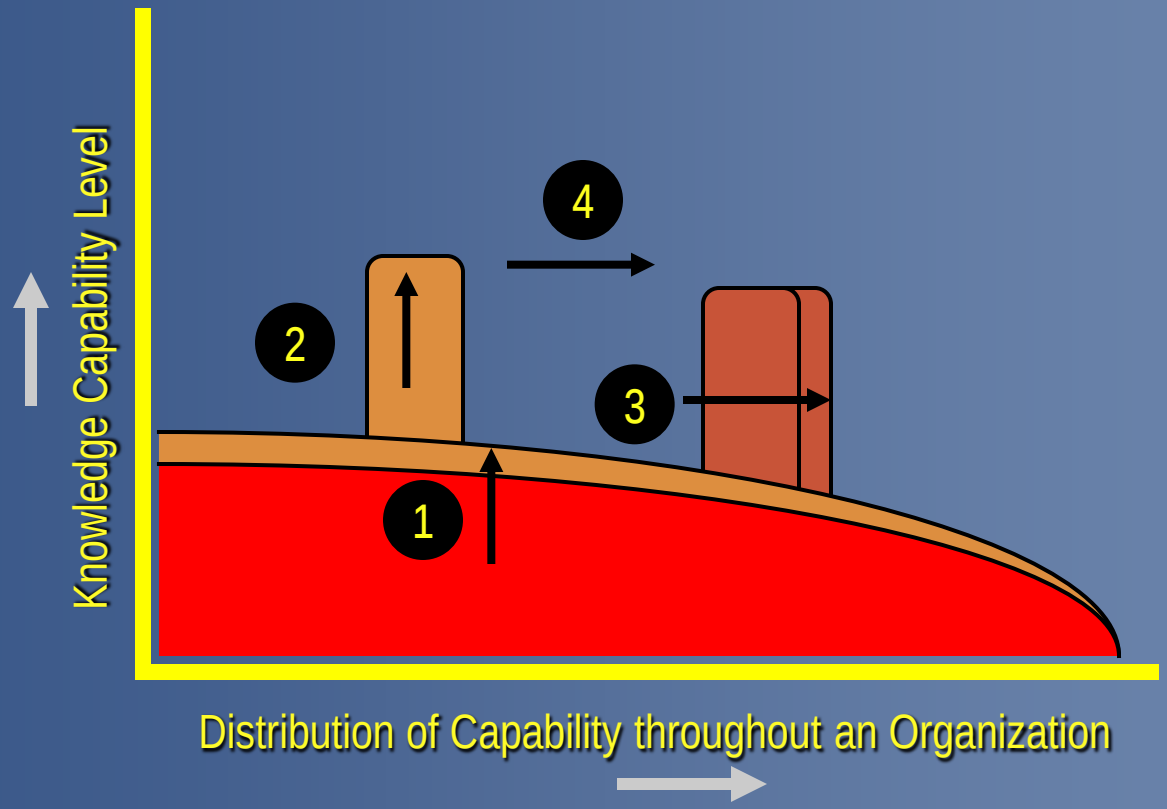


Increasing Organizational Capability

Mode 4



Multi-Faceted Deployment Strategy



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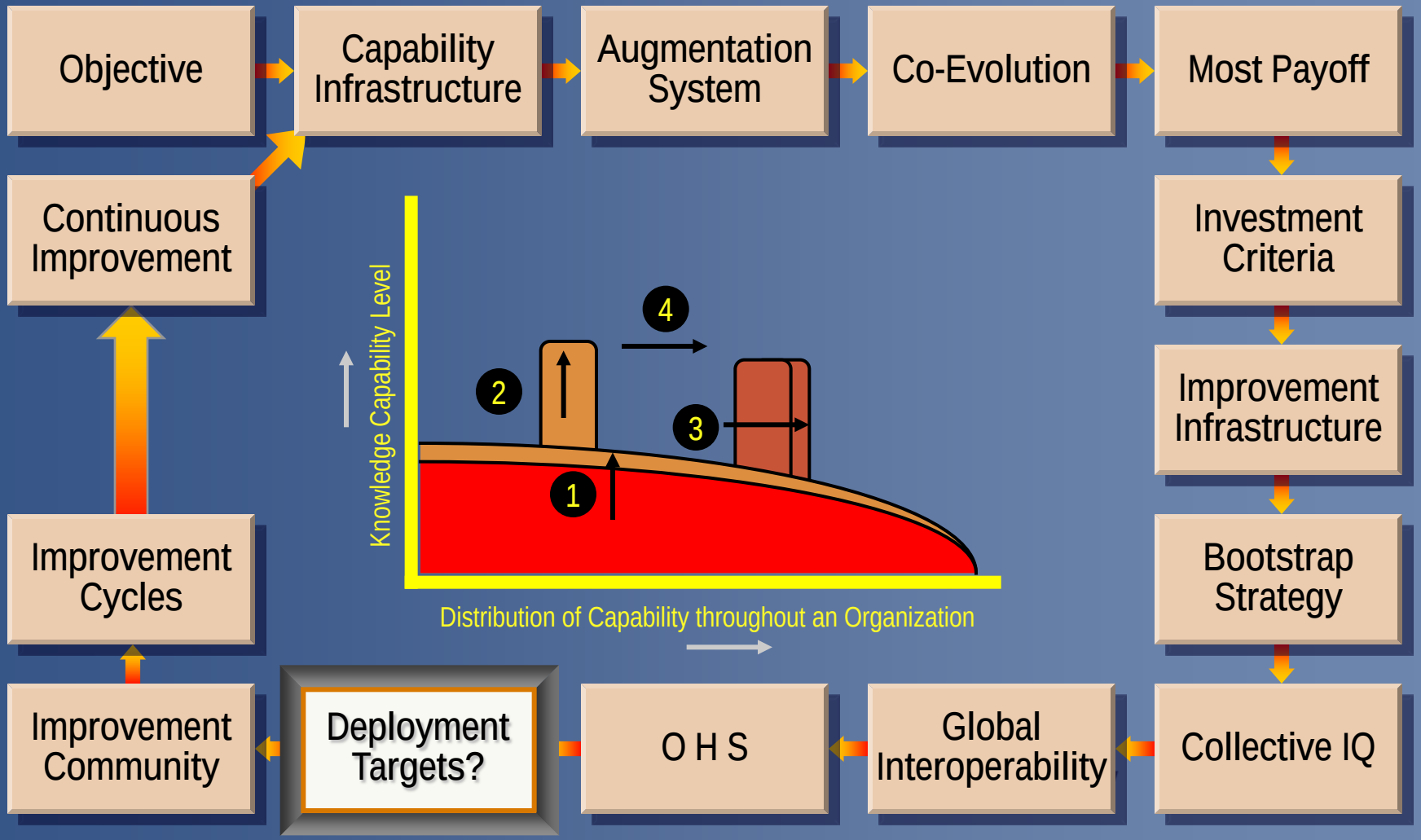

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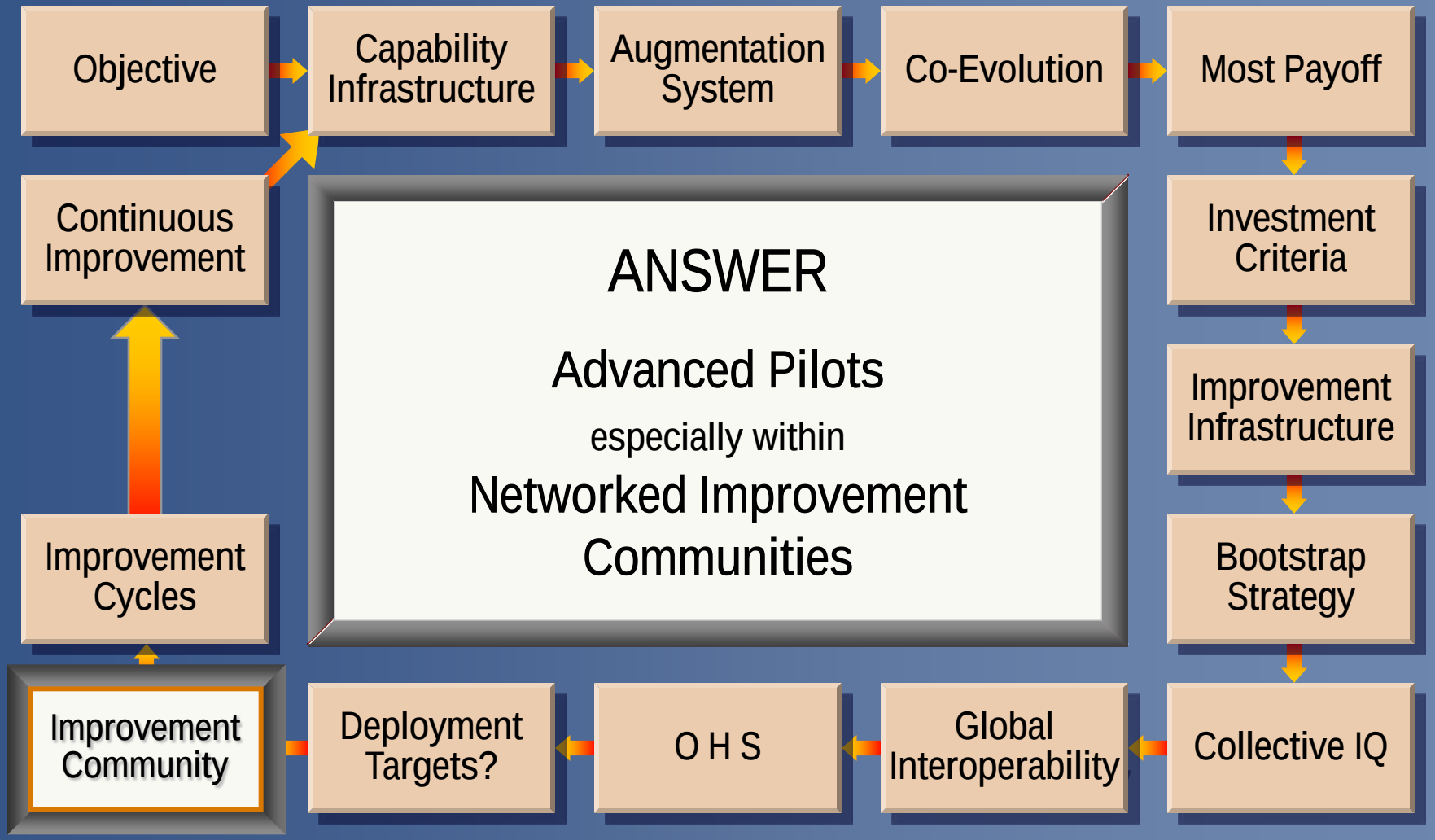
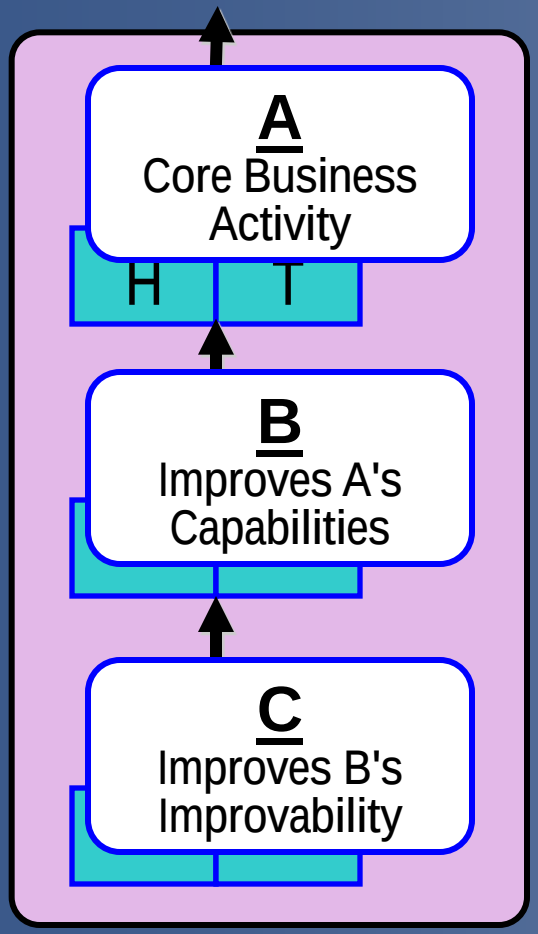
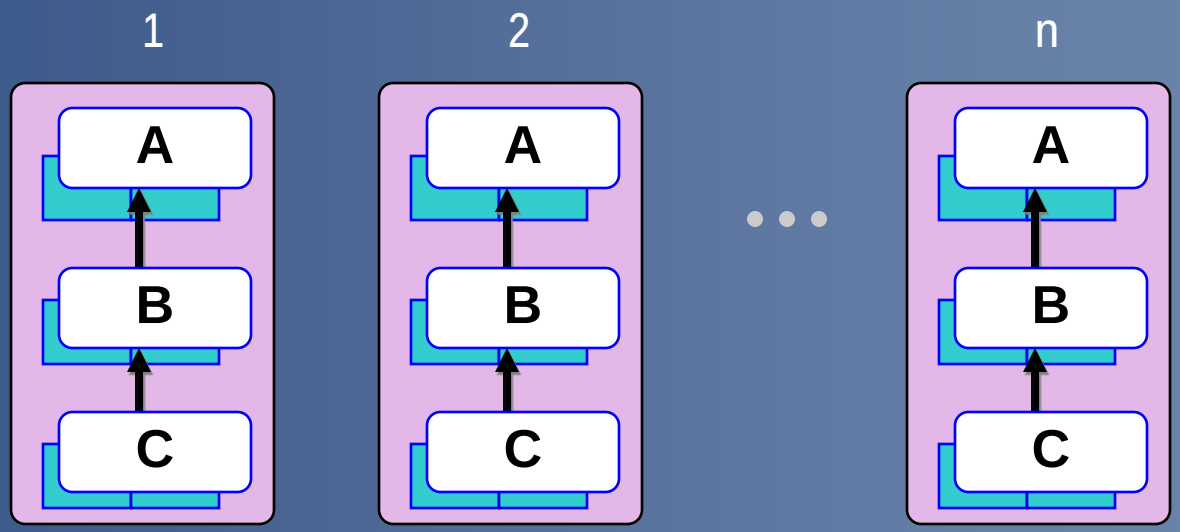


Goals of B and C Activities

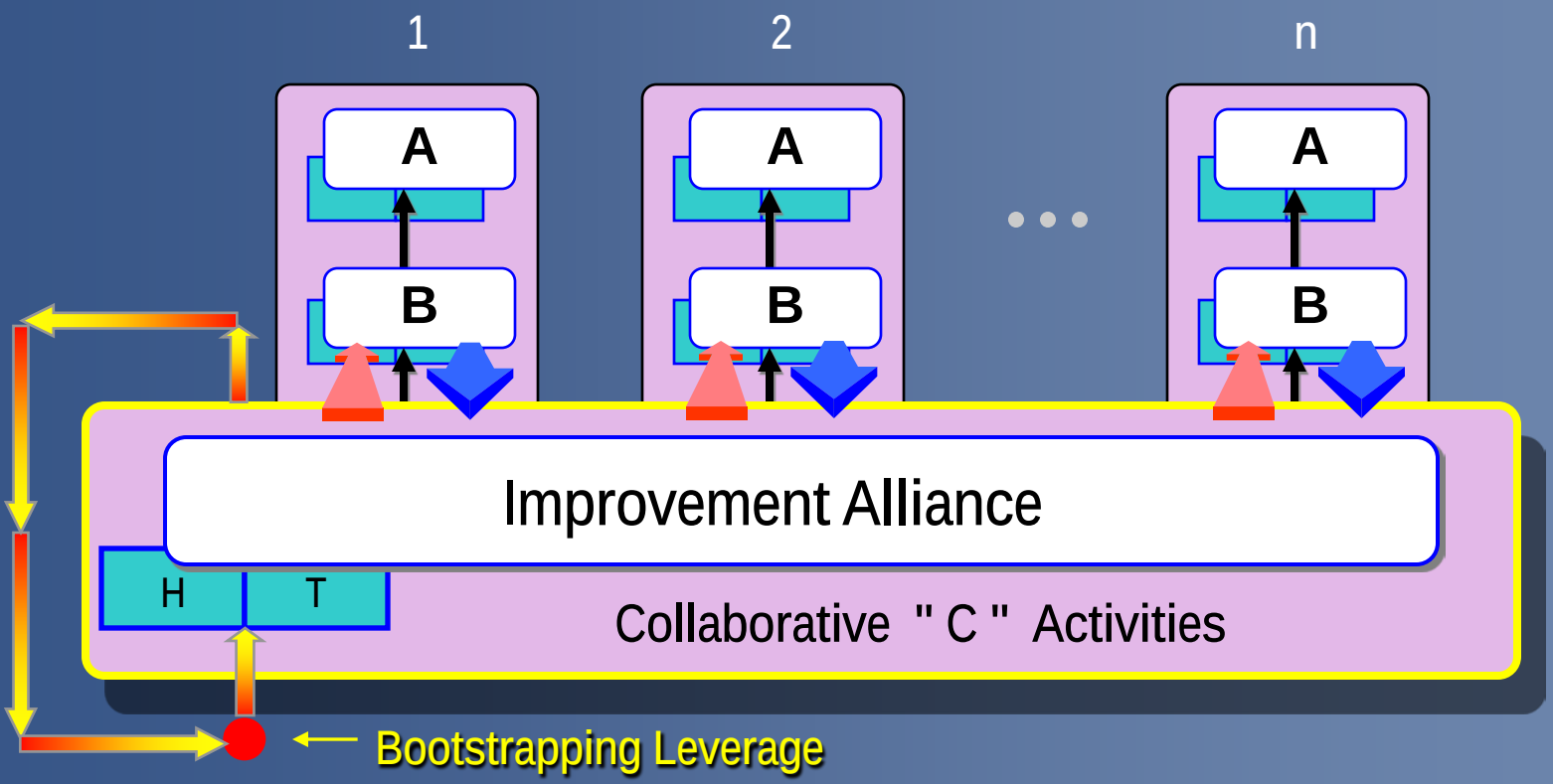


Improving Product Cycle

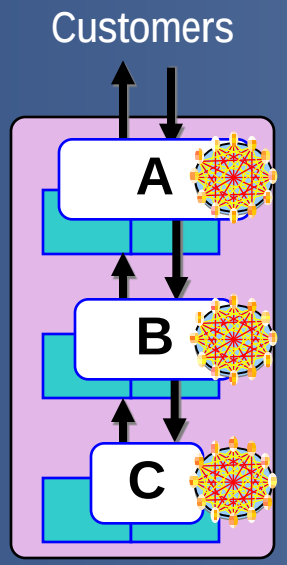
Improving Improvement Cycle


1
2
n
A
B
C
A
B
C
A
B
C

Networked Improvement Communities



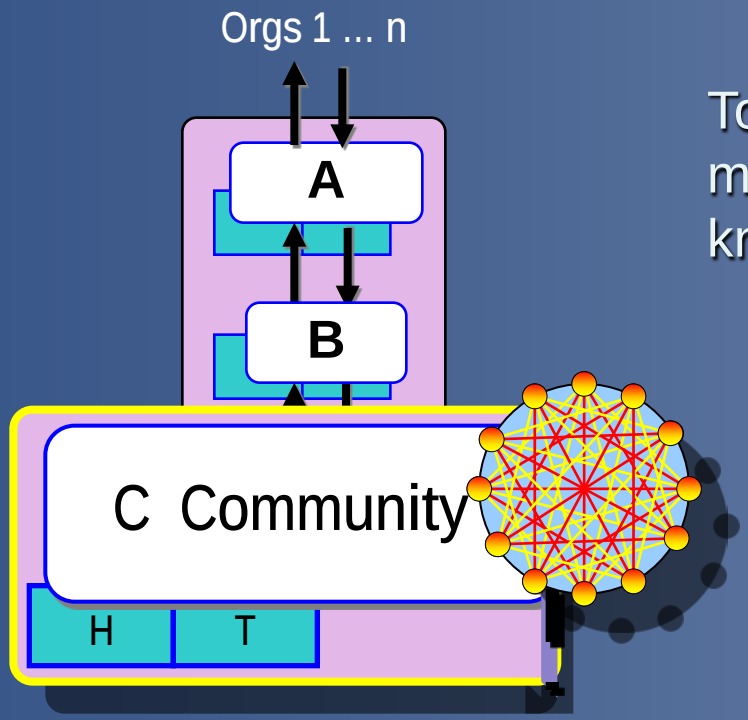
Bootstrapping: Strategic Investment Criteria



What to Improve?

1. Doing Group Knowledge Work
2. Transferring (↑)
3. Integrating (↓)

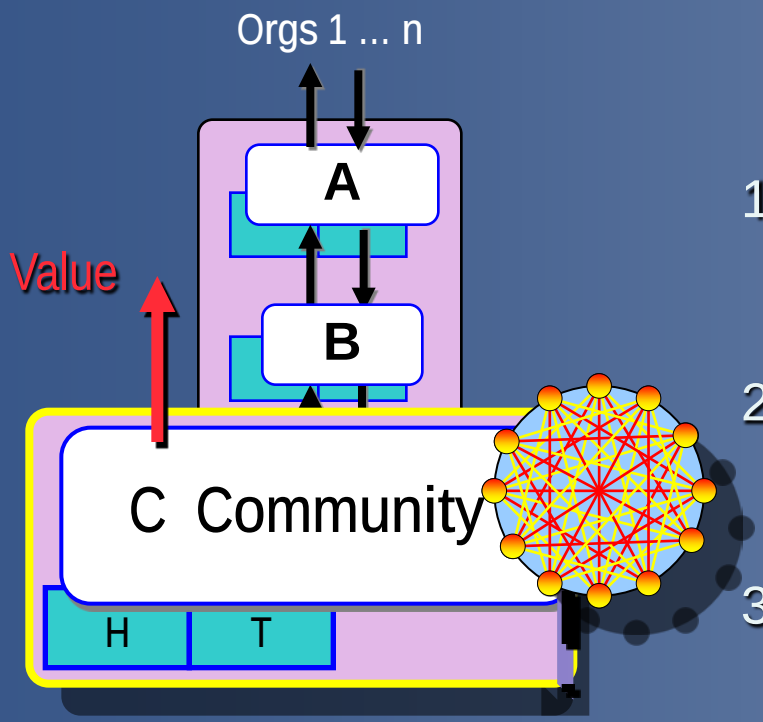
Core C-Community Capability



To integrate, analyze, and portray multiple-source contributions to its knowledge base

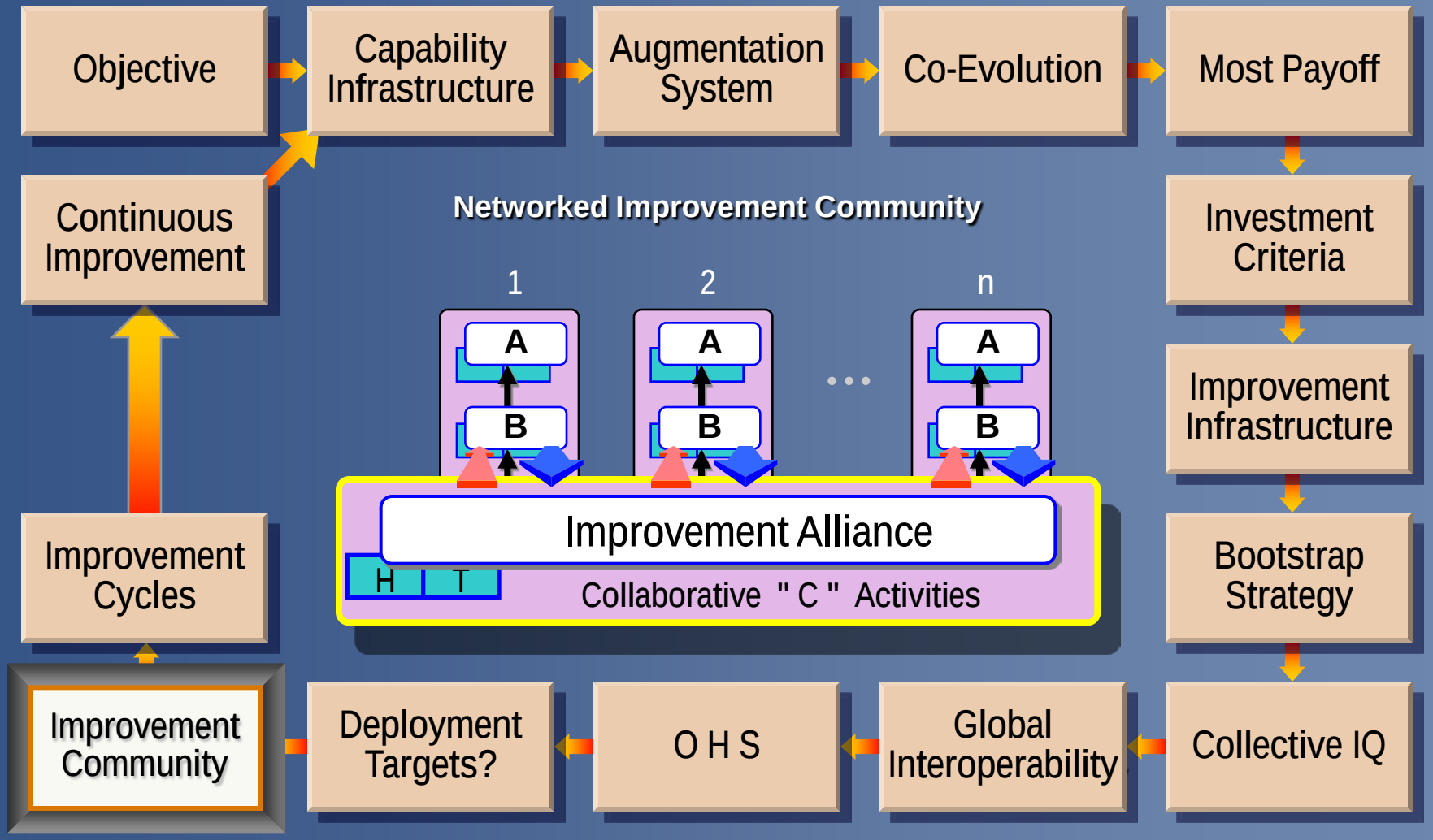
- From their B & A activities
- From External Environment
- From Internal C Community

Partner Orgs Get Unique Value



1. Direct experience with an advanced pilot activity.
2. Direct online access to extensive knowledge base.
3. Continuous dialog and knowledge transfer.

The Bootstrap "Paradigm Map"



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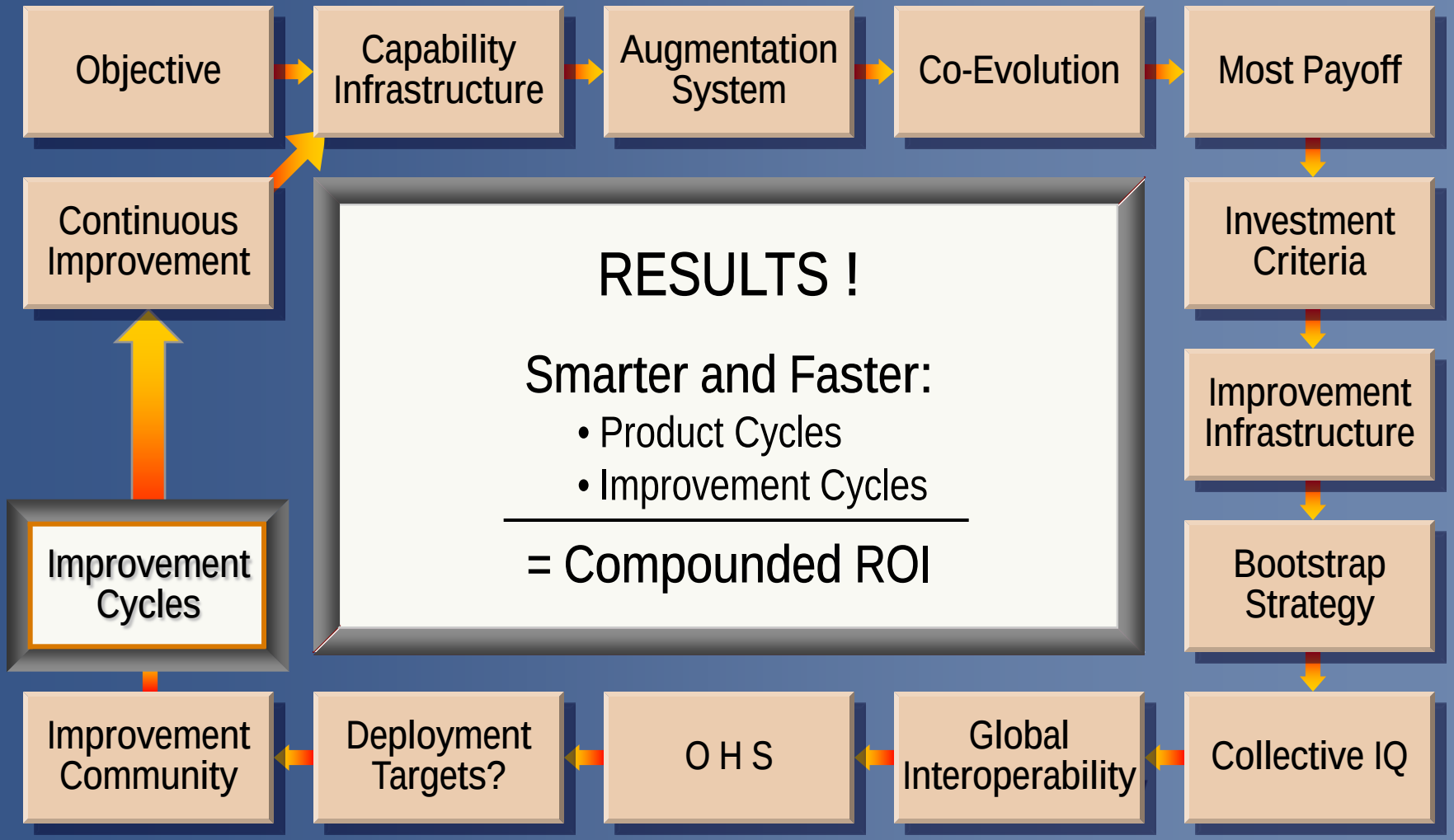

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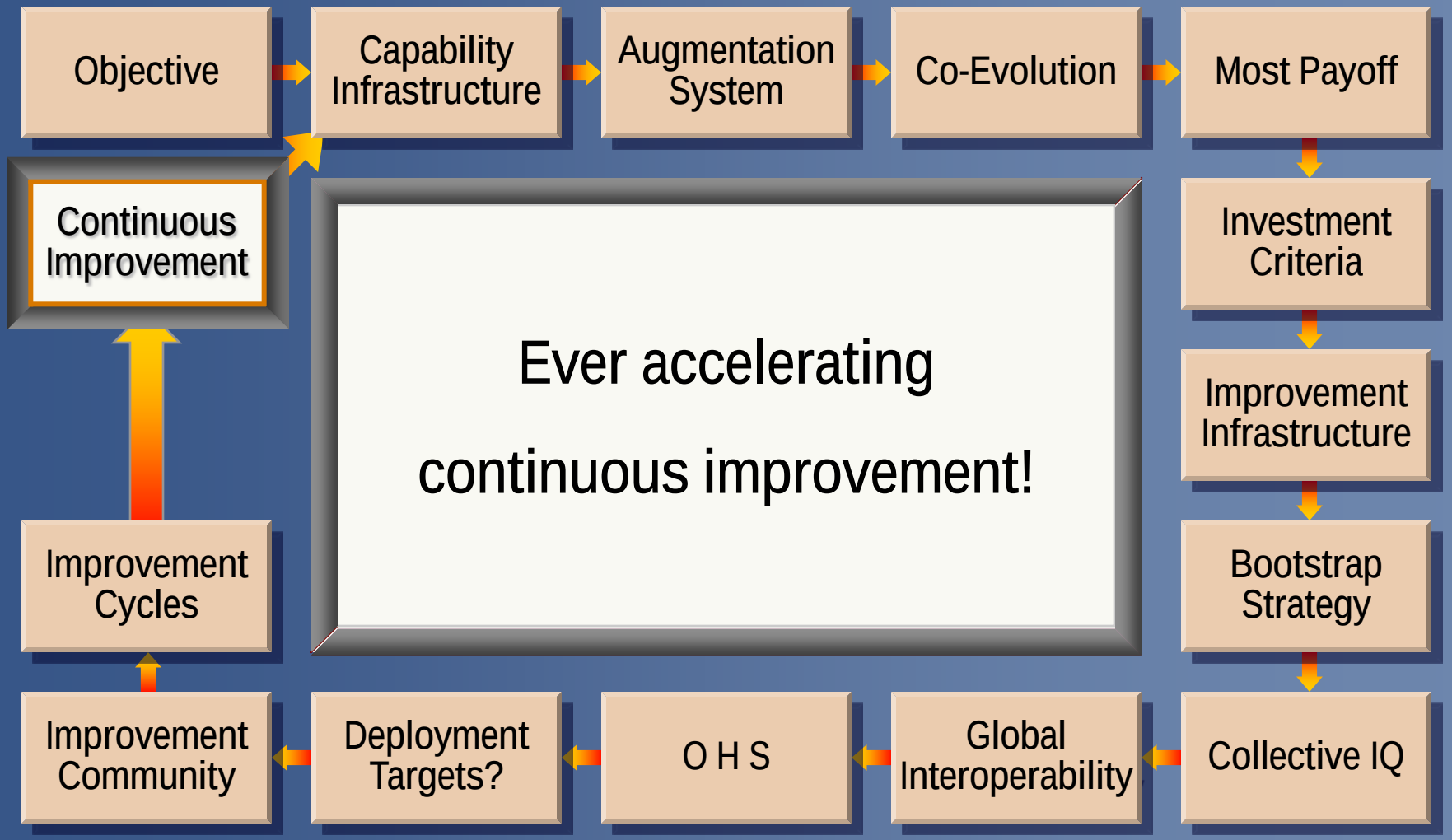

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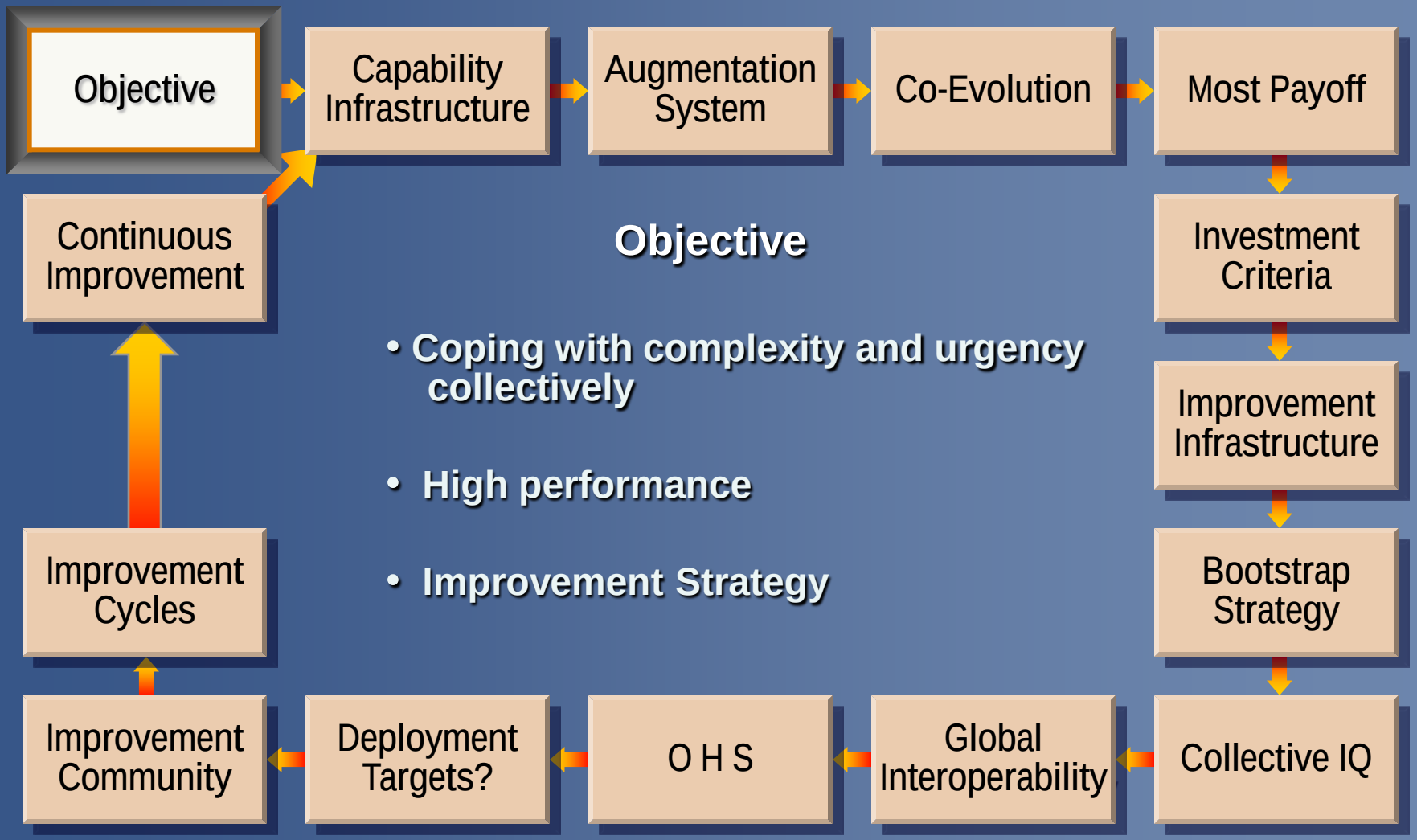


The Bootstrap "Paradigm Map"

Objective

Capability Infrastructure

Augmentation System

Co-Evolution

Most Payoff

Investment Criteria

Improvement Infrastructure

Bootstrap Strategy

Collective IQ

Global Interoperability

O H S

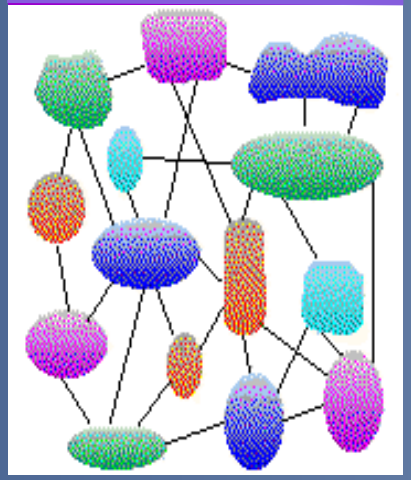
Deployment Targets?

Improvement Community

Improvement Cycles

Continuous Improvement

Capability Infrastructure



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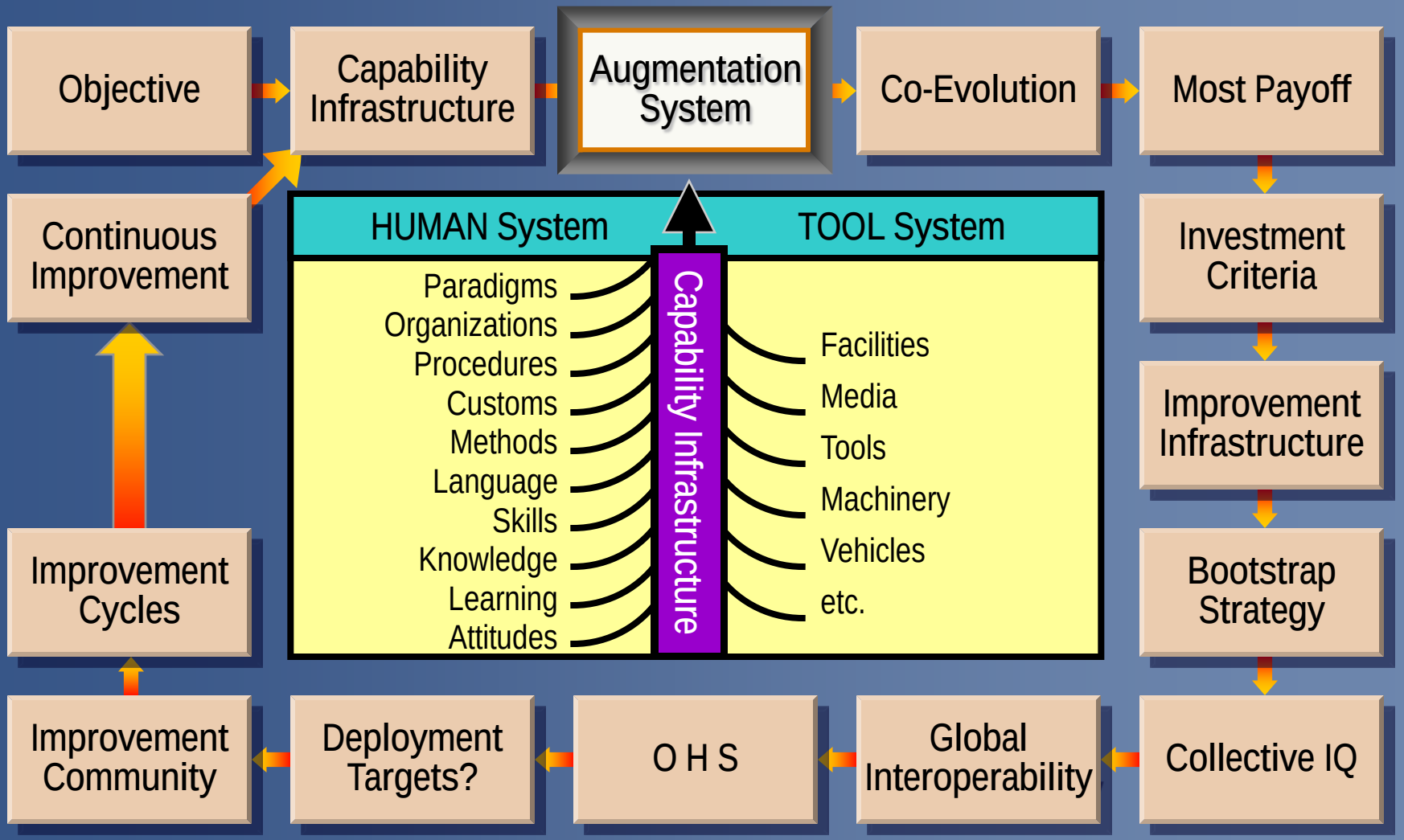

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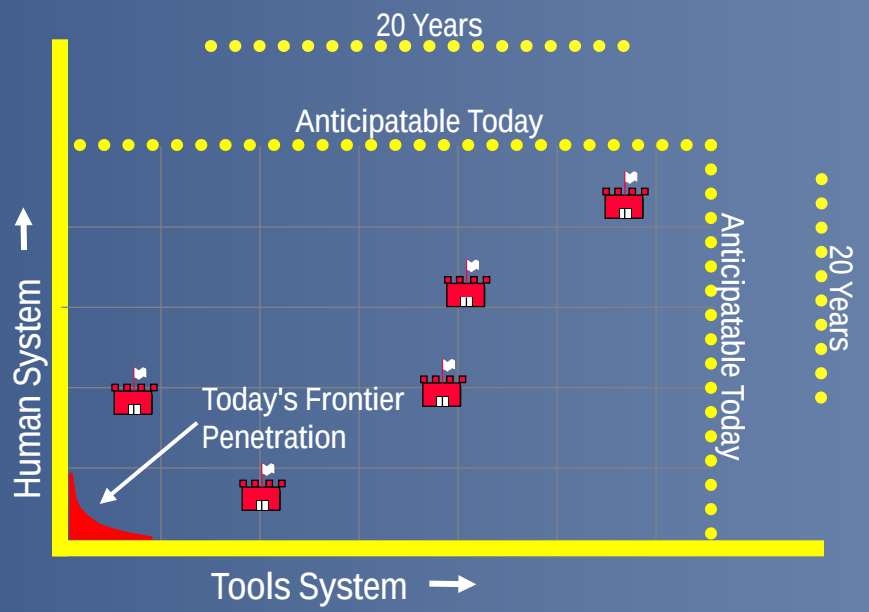

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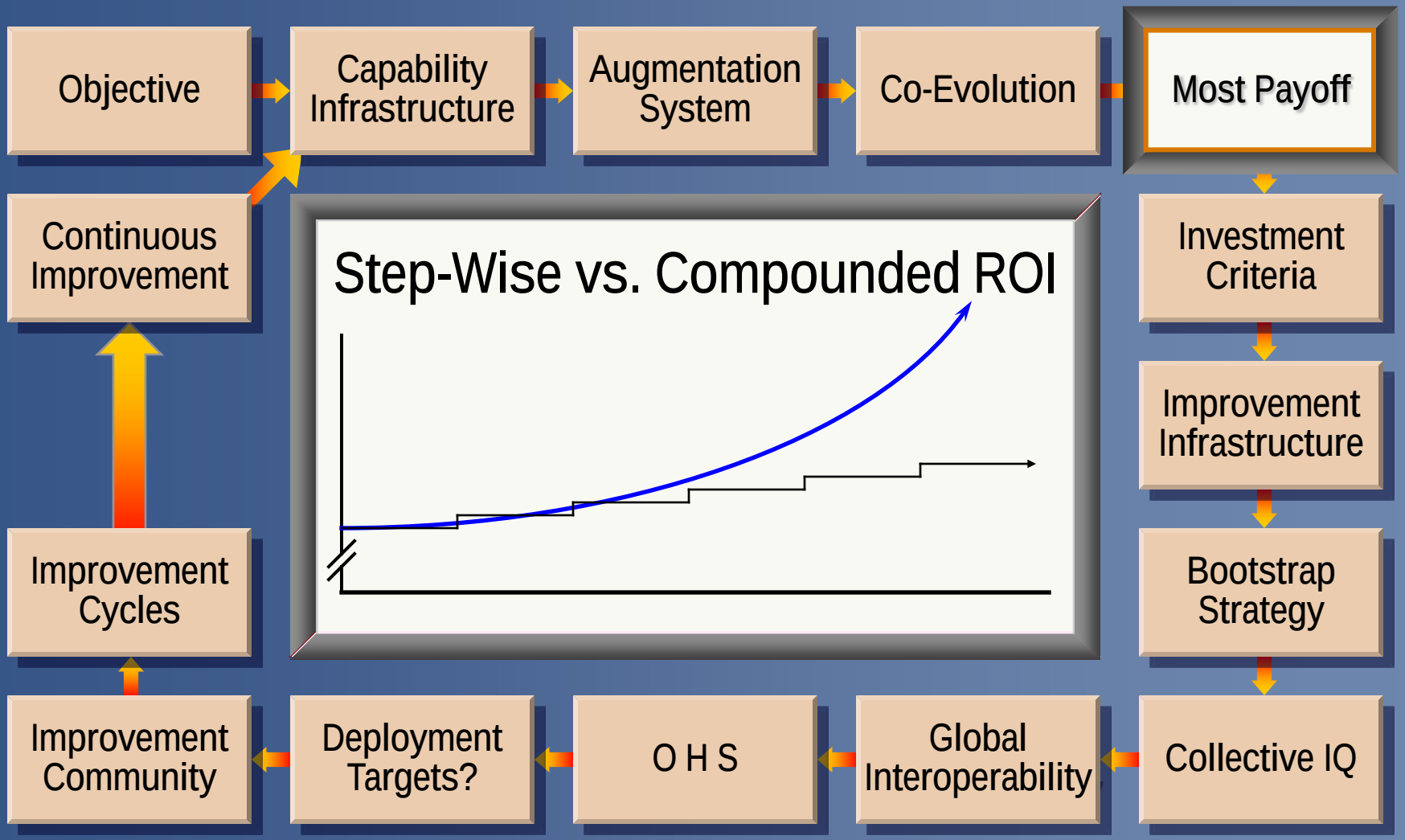

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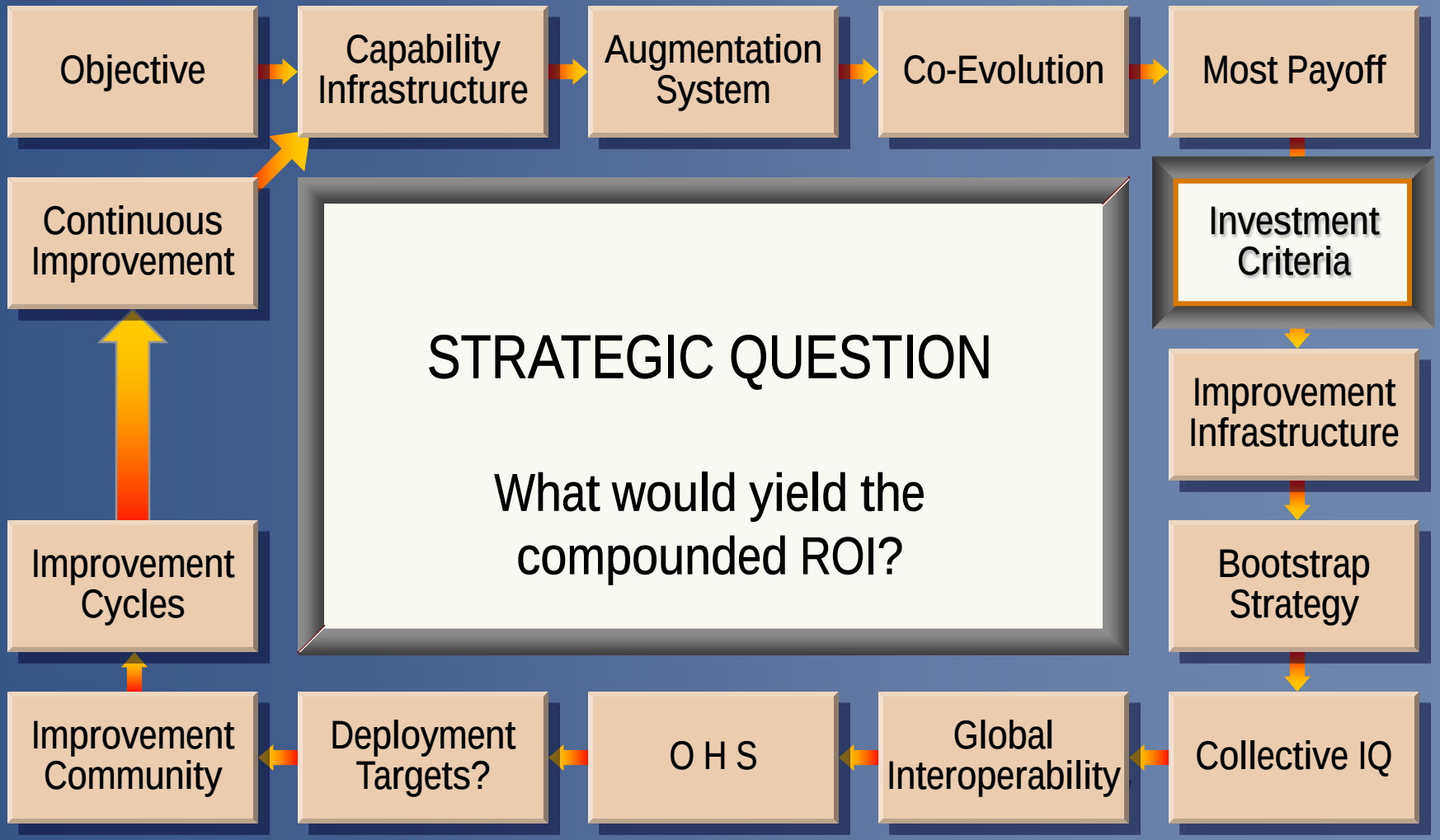

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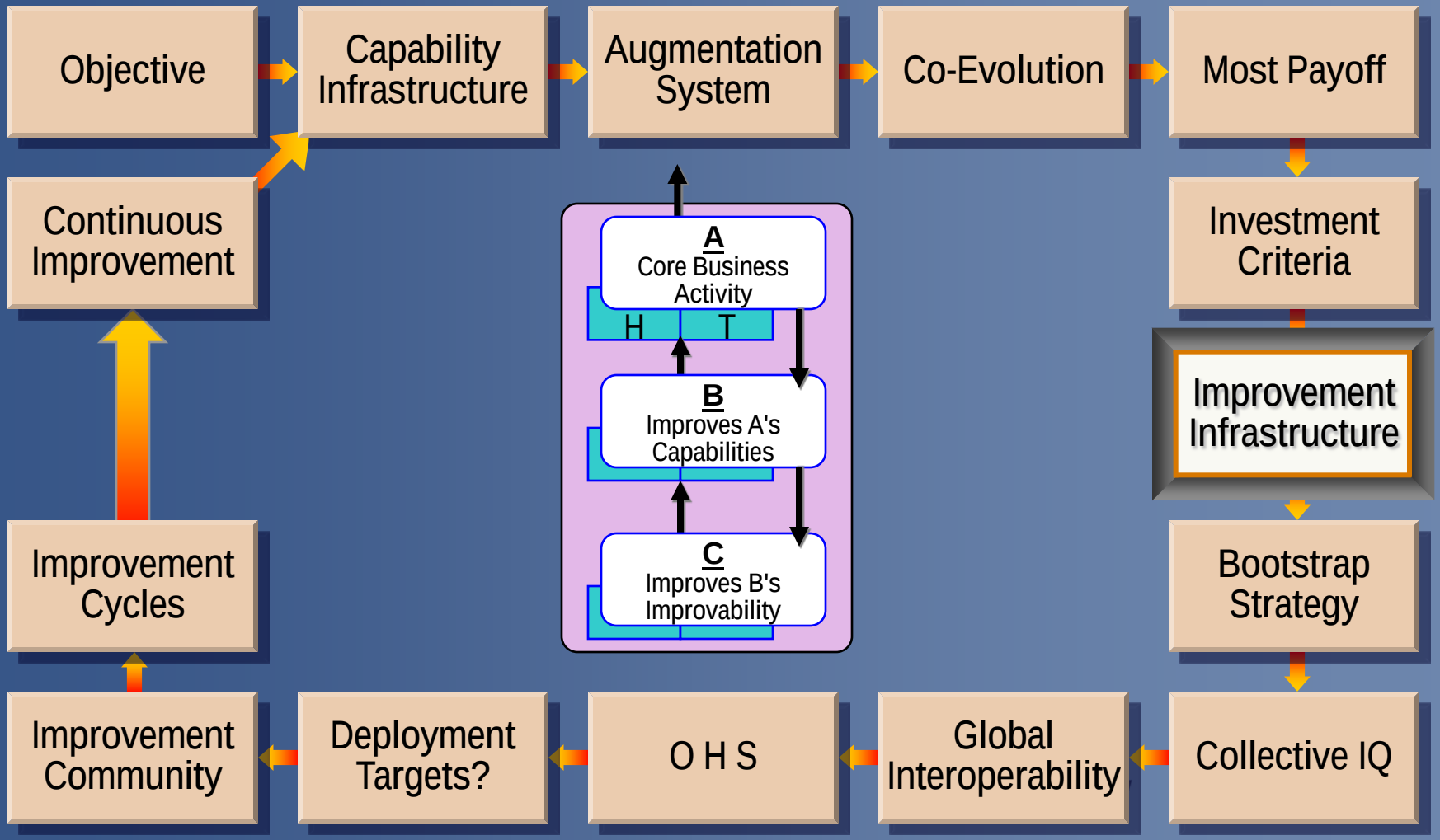

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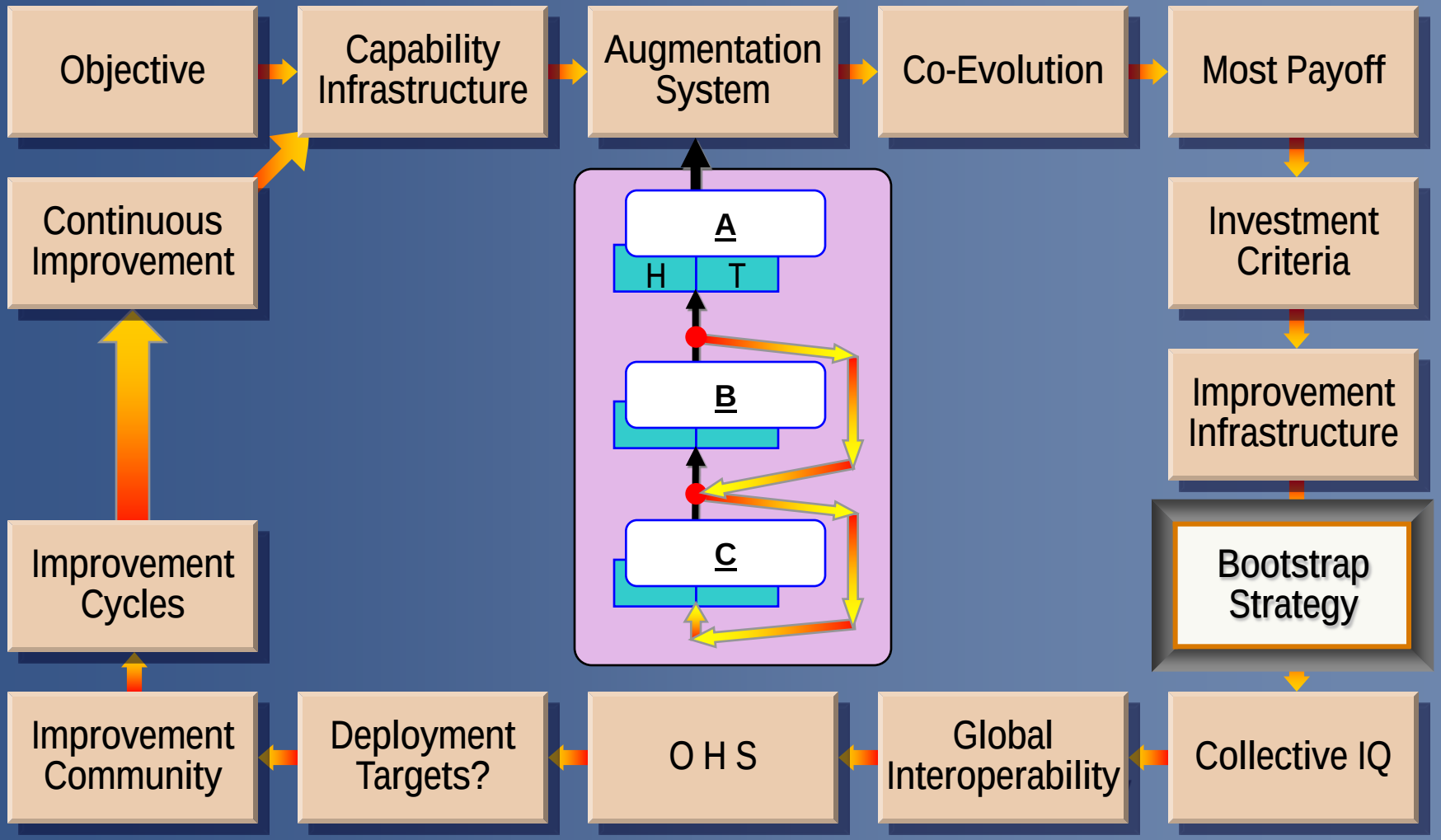

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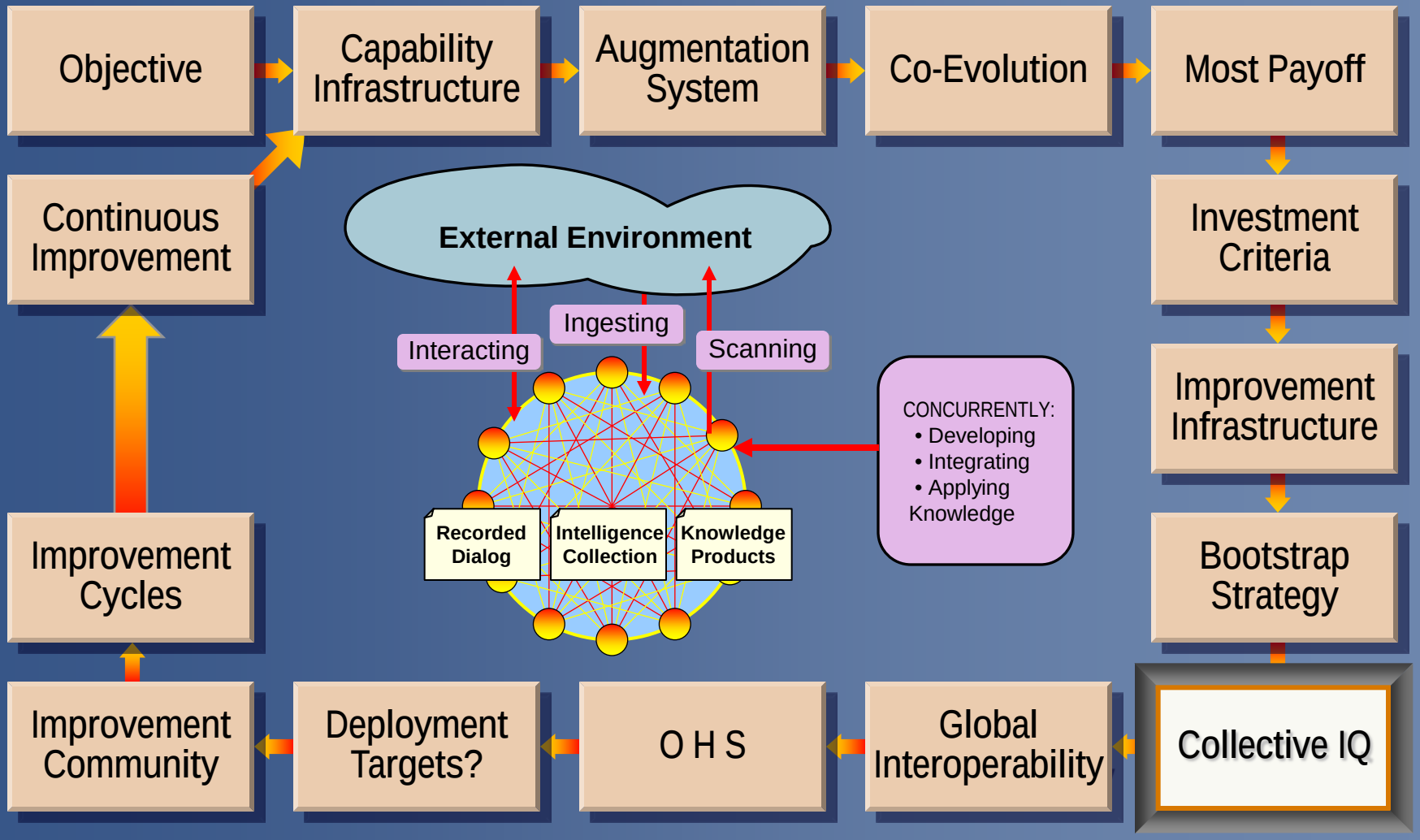

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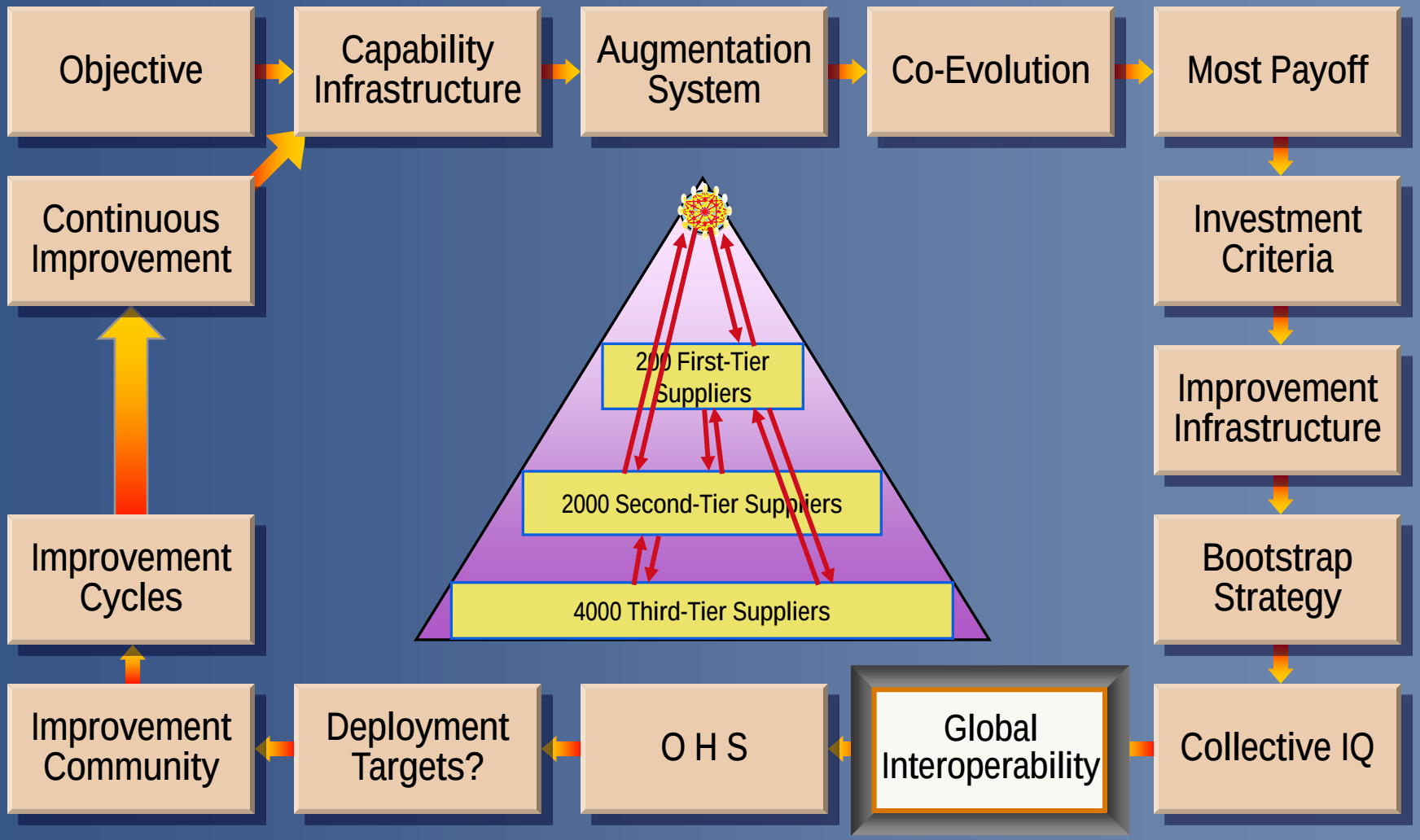
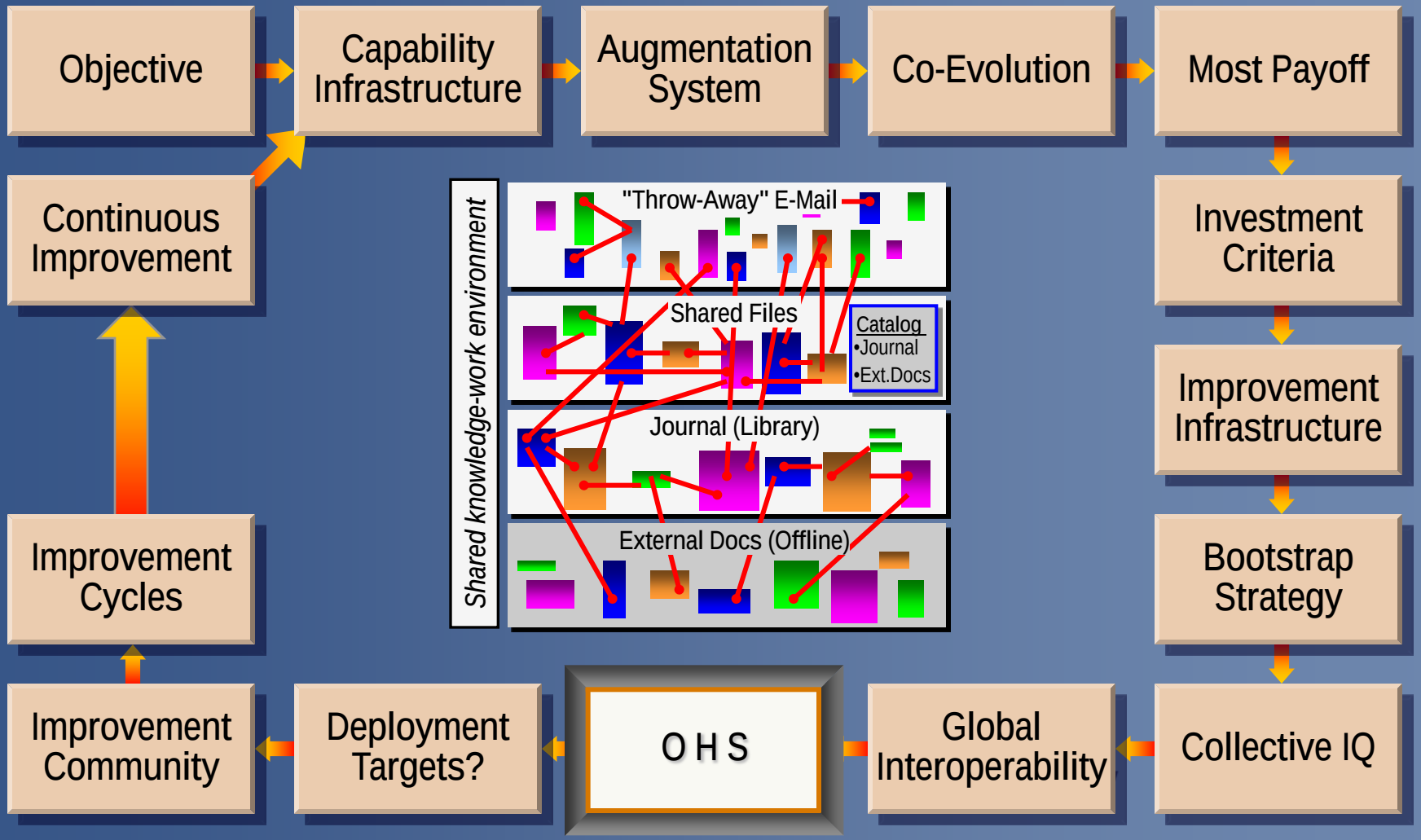


The Bootstrap "Paradigm Map"



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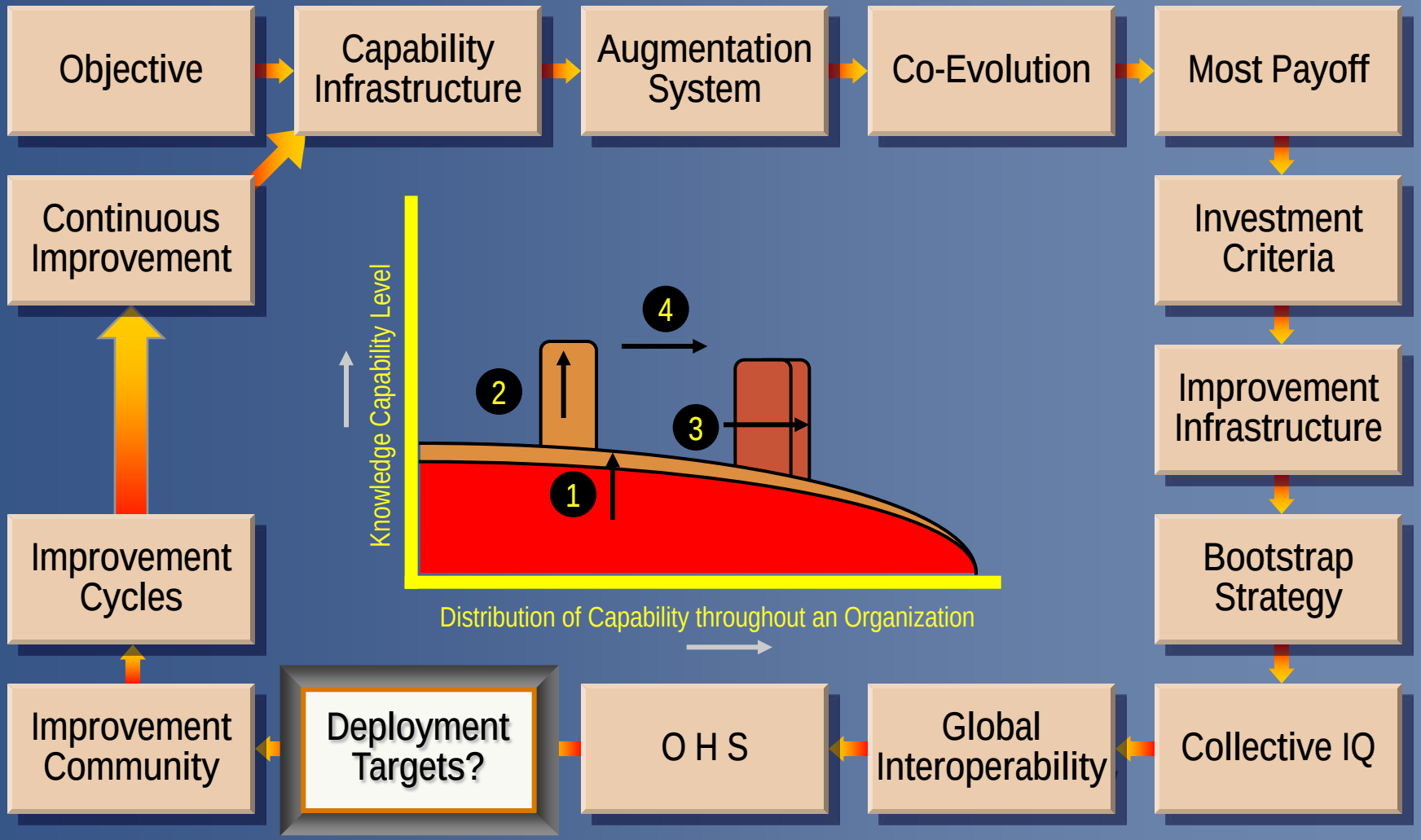

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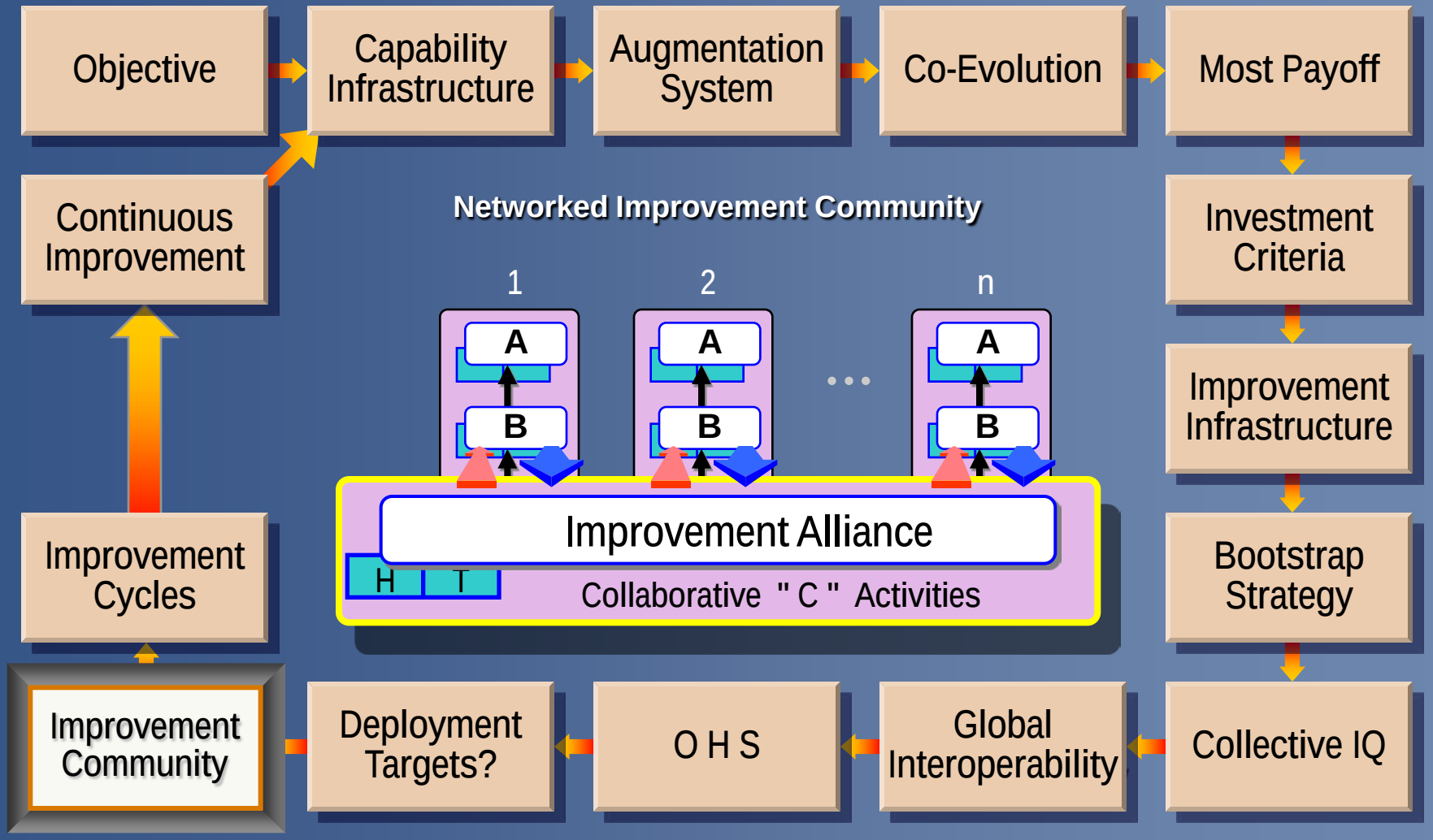

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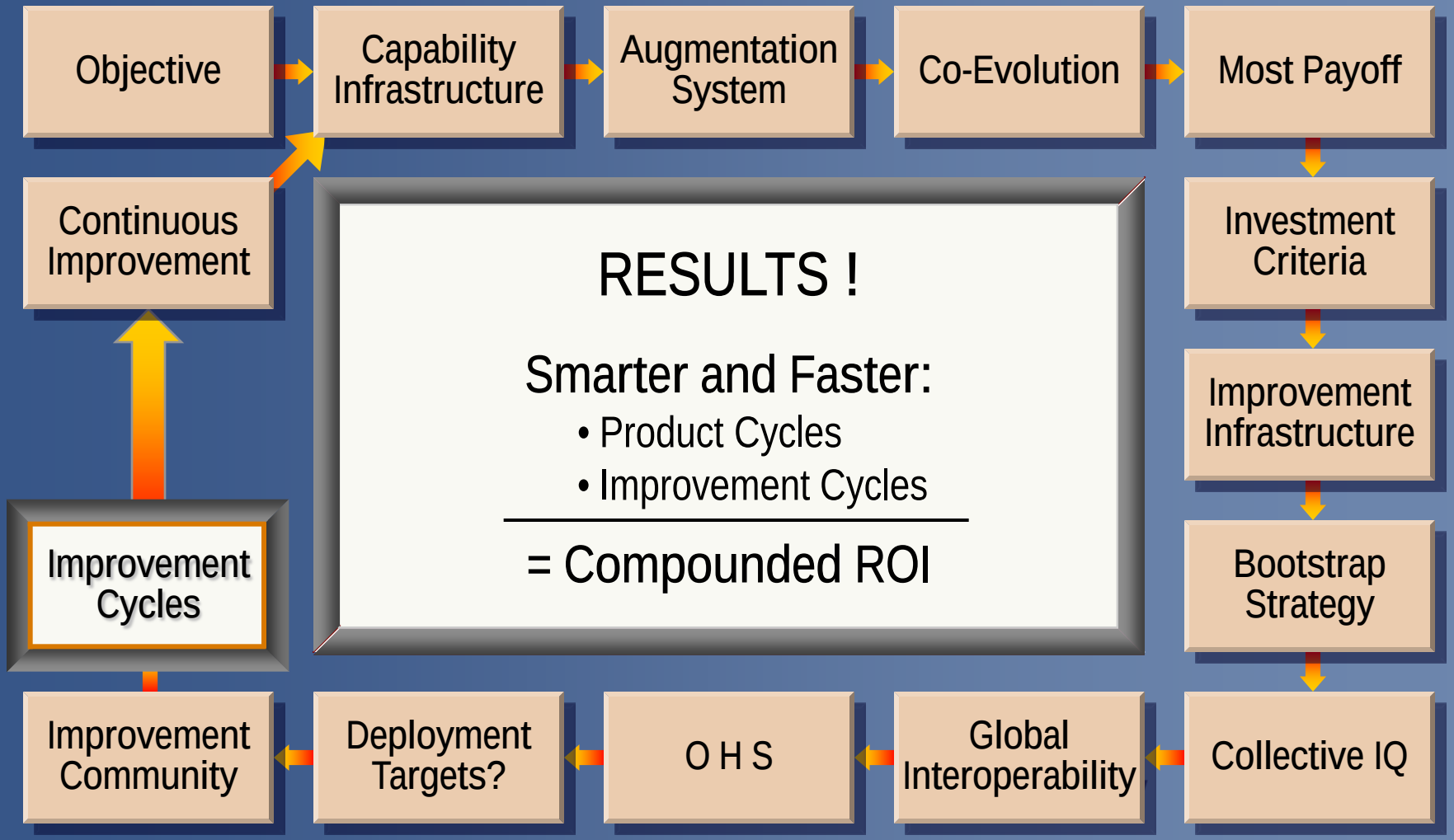

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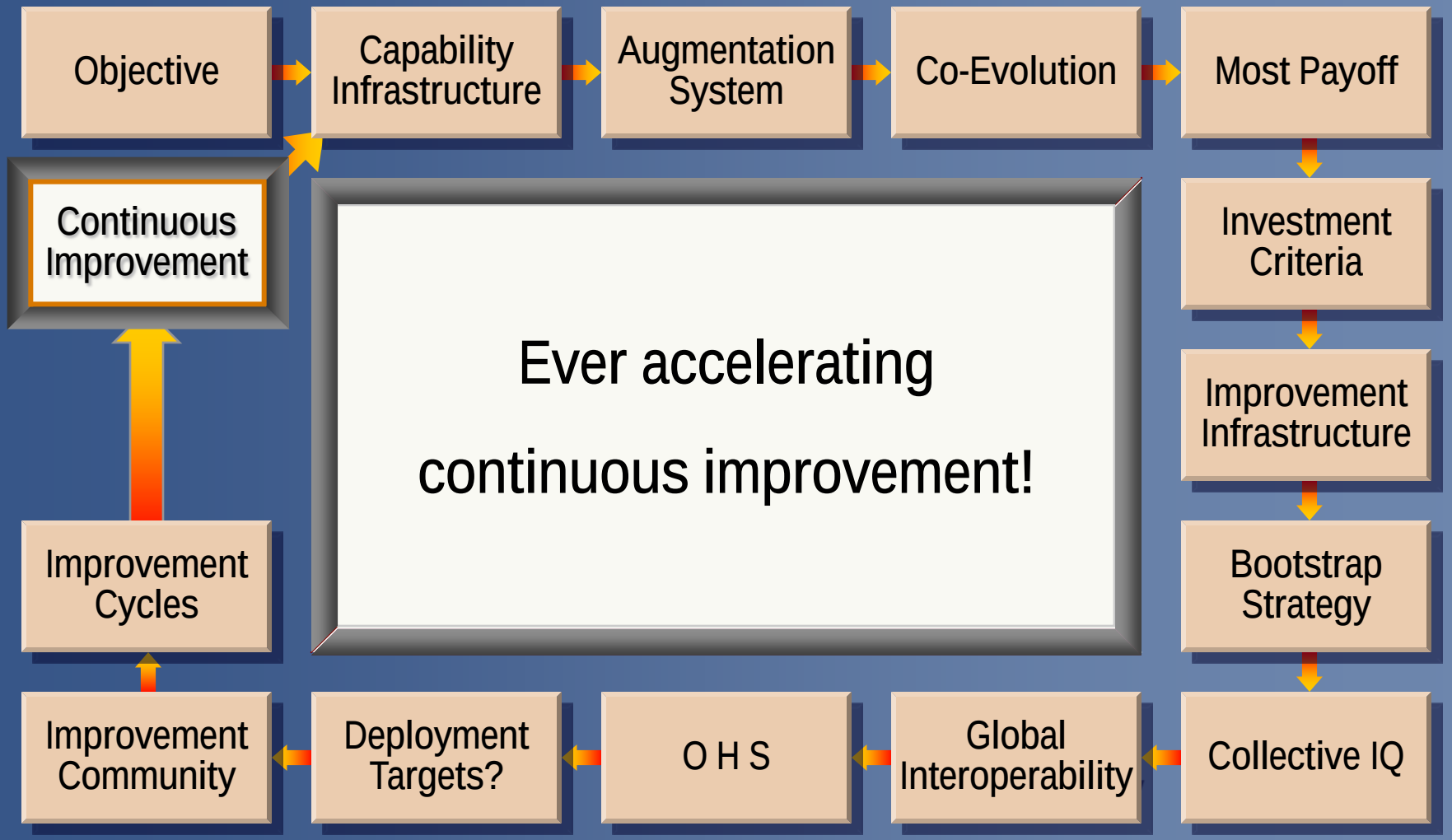

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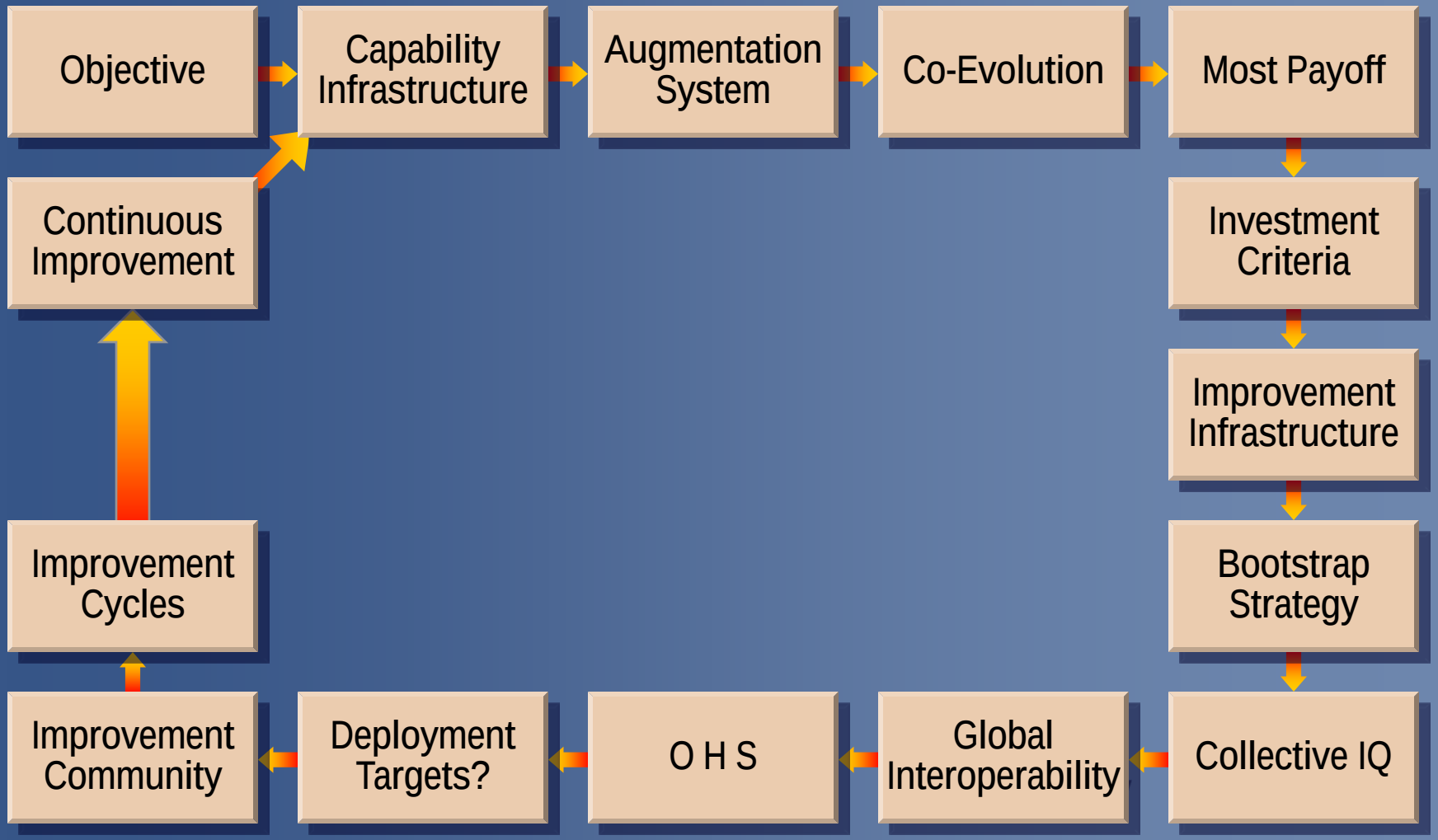


End of Slideshow

Extra Slides and Photos Follow

Candidate NICs Targeting Improvements In:

- External Intelligence: gathering; integration
- Comprehensive Scenario Development
- Enterprise Process Modeling
- Knowledge Management / Intellectual Capital
- Full-Enterprise CoDIAK -- and Global OHS
- Total Quality

Pilot Deployment Candidates

- Communities of agencies cooperating toward improving capabilities of, e.g.:
- Procurement
- Budgeting
- Large-Project Management
- Generic Knowledge-Work
- AND ESPECIALLY: Planning and implementing internal capability improvements

And what does the Bootstrap Alliance propose to do?

- Evolve into a NIC that supports a (growing) community of NICs -- a TurboNIC (MetaNIC, SuperNIC)
- With a smallest core of fixed staff
- Developing this as a high-performance virtual organization

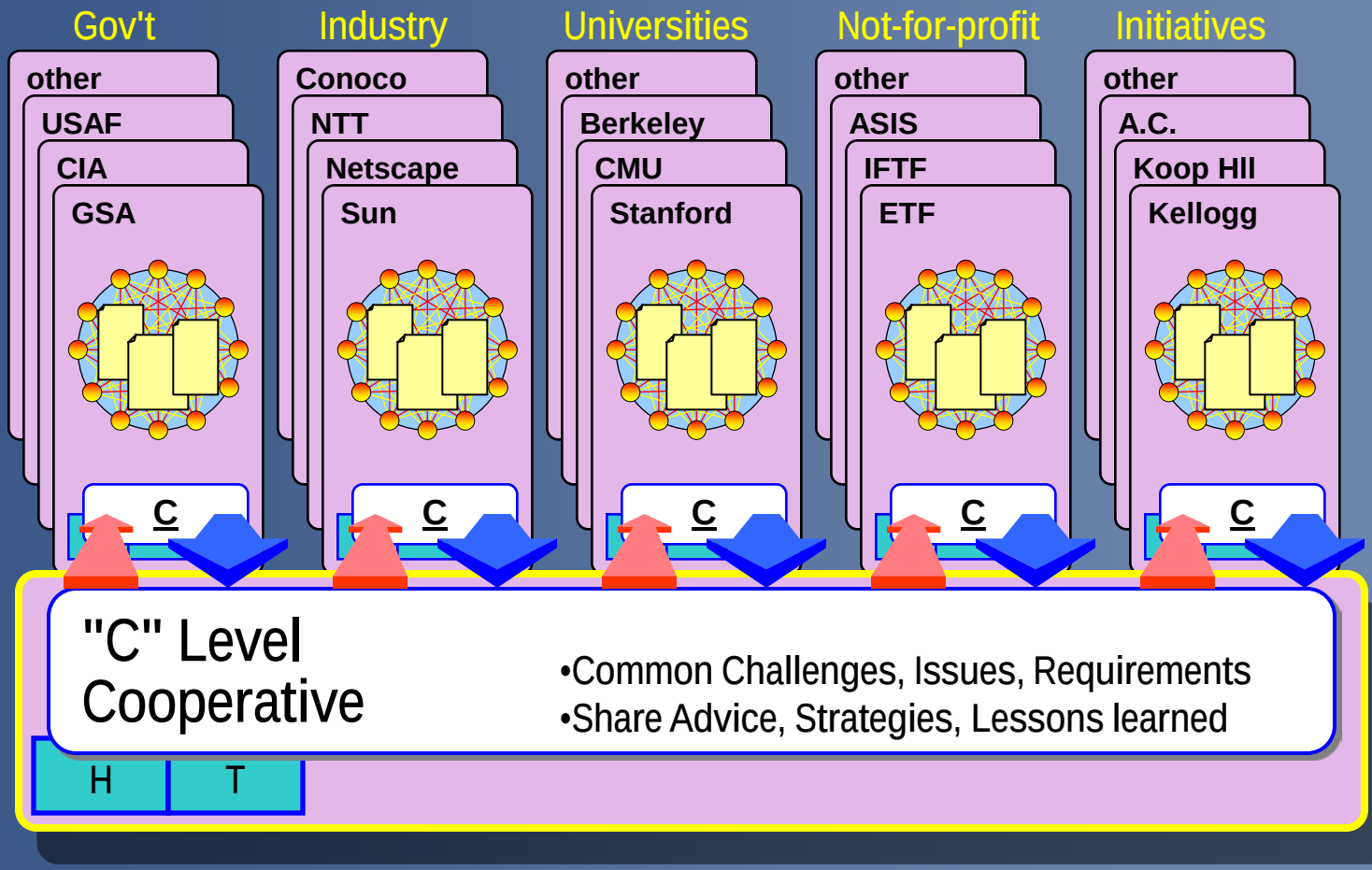
Bootstrap Alliance Website

Where to find us on the World Wide Web:

http://www.bootstrap.org

The Alliance Idea

Sharing Solutions:



Note: Representative organizations that have indicated an interest in this approach.

Photos

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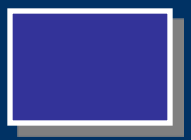
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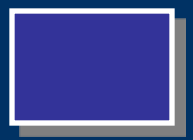
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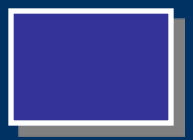
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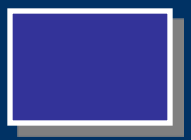
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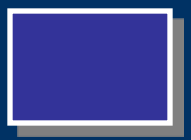
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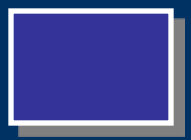
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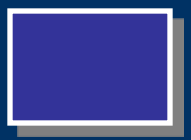
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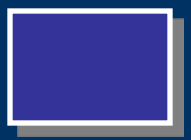
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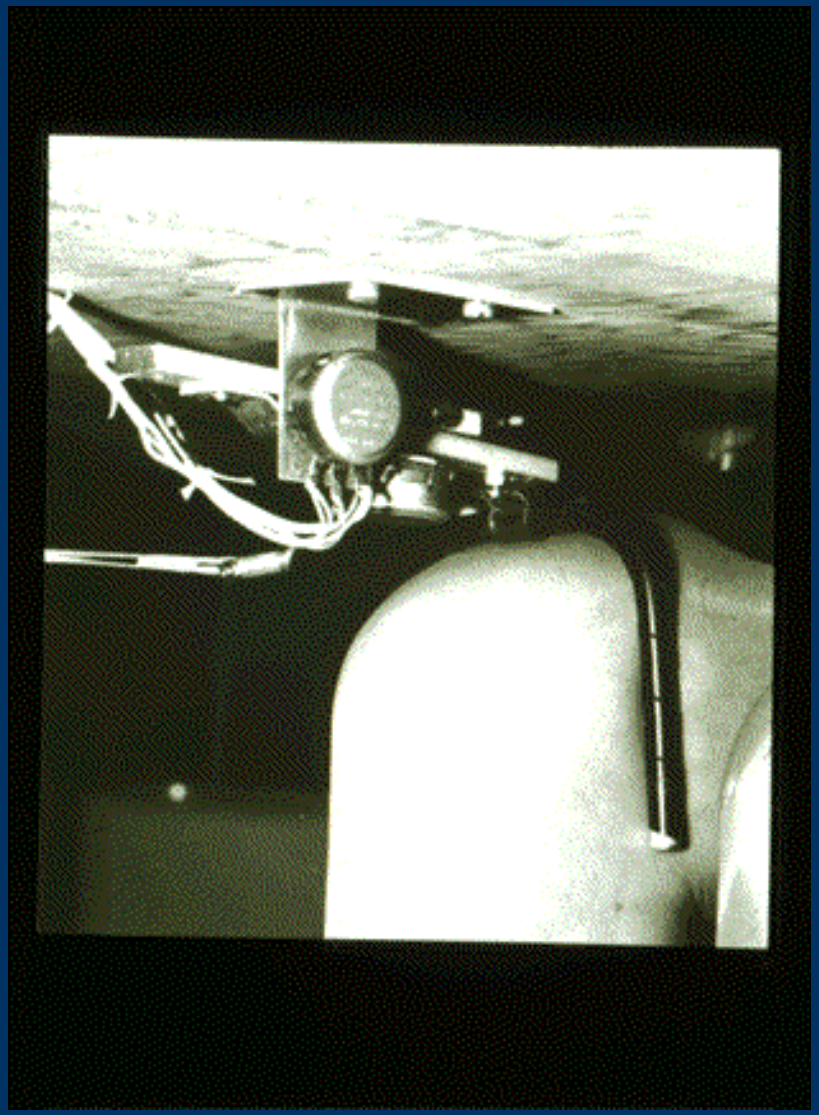
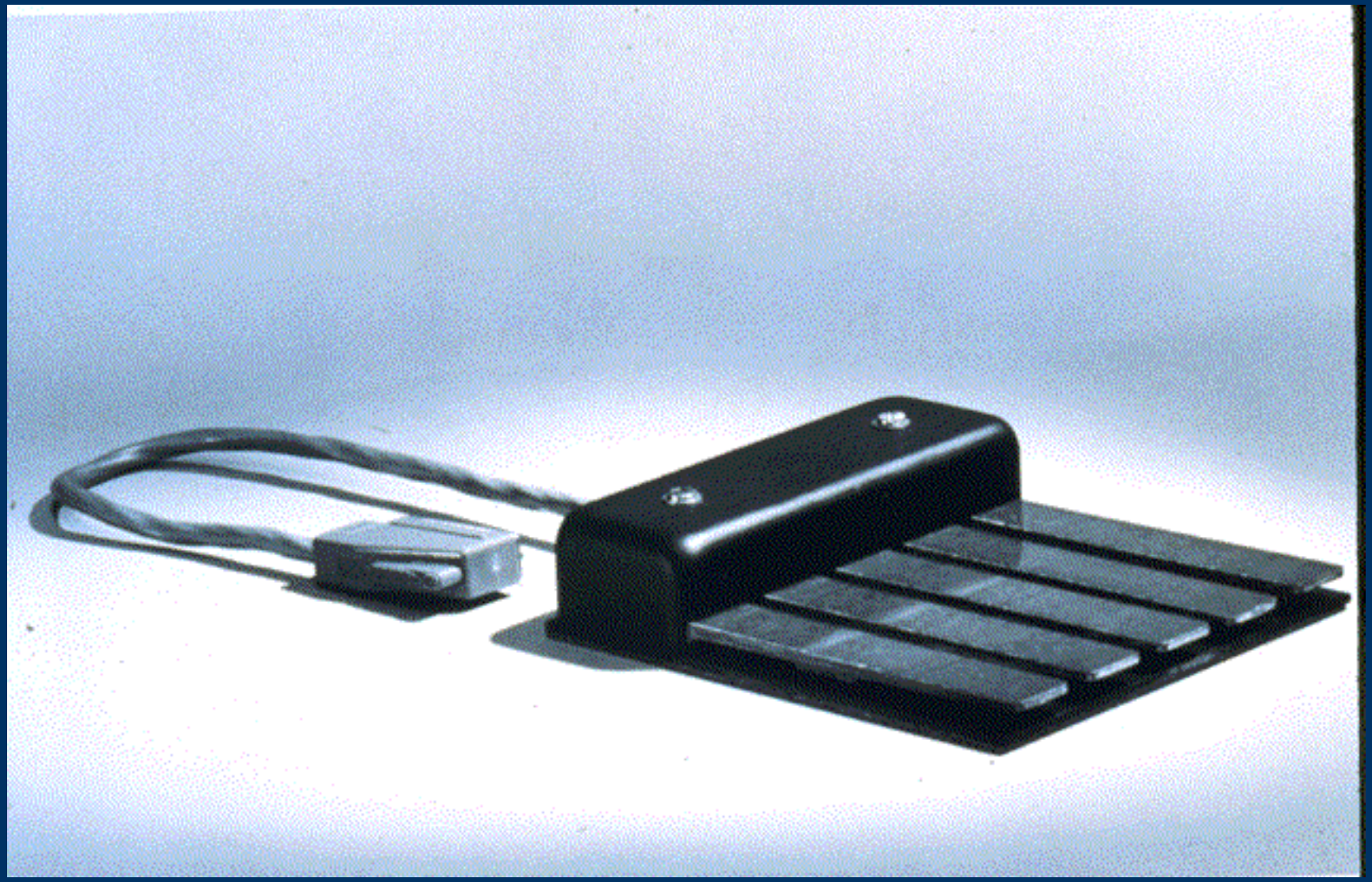
1. Judy at Workstation (1964)

2. First Mouse

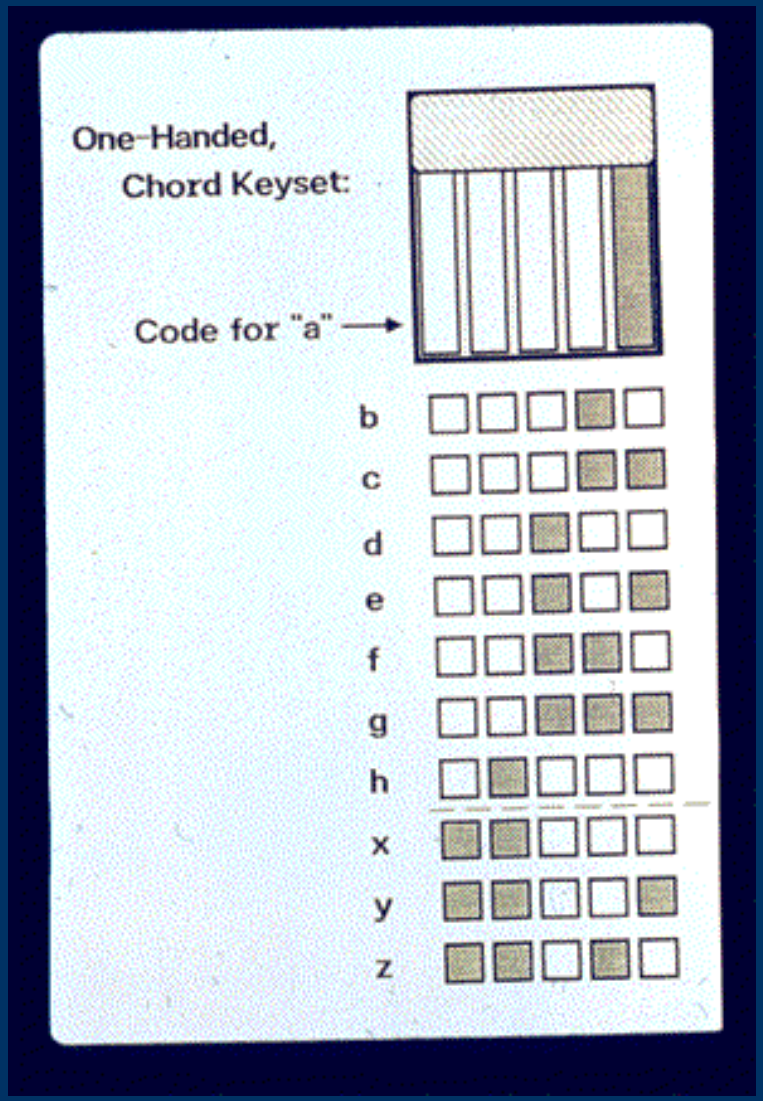
3. Knee Control



4. Keyset

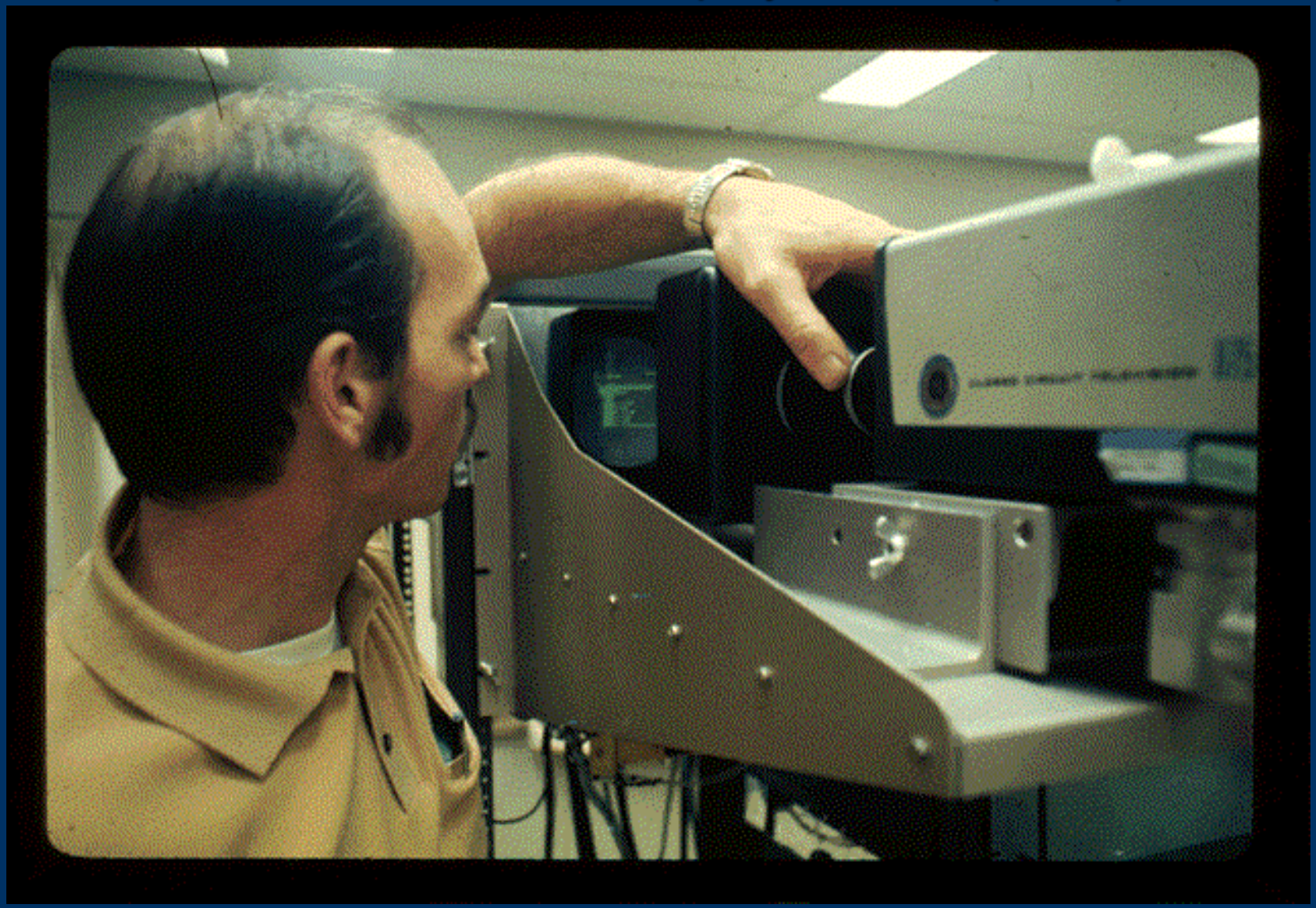


5. Keyset Code

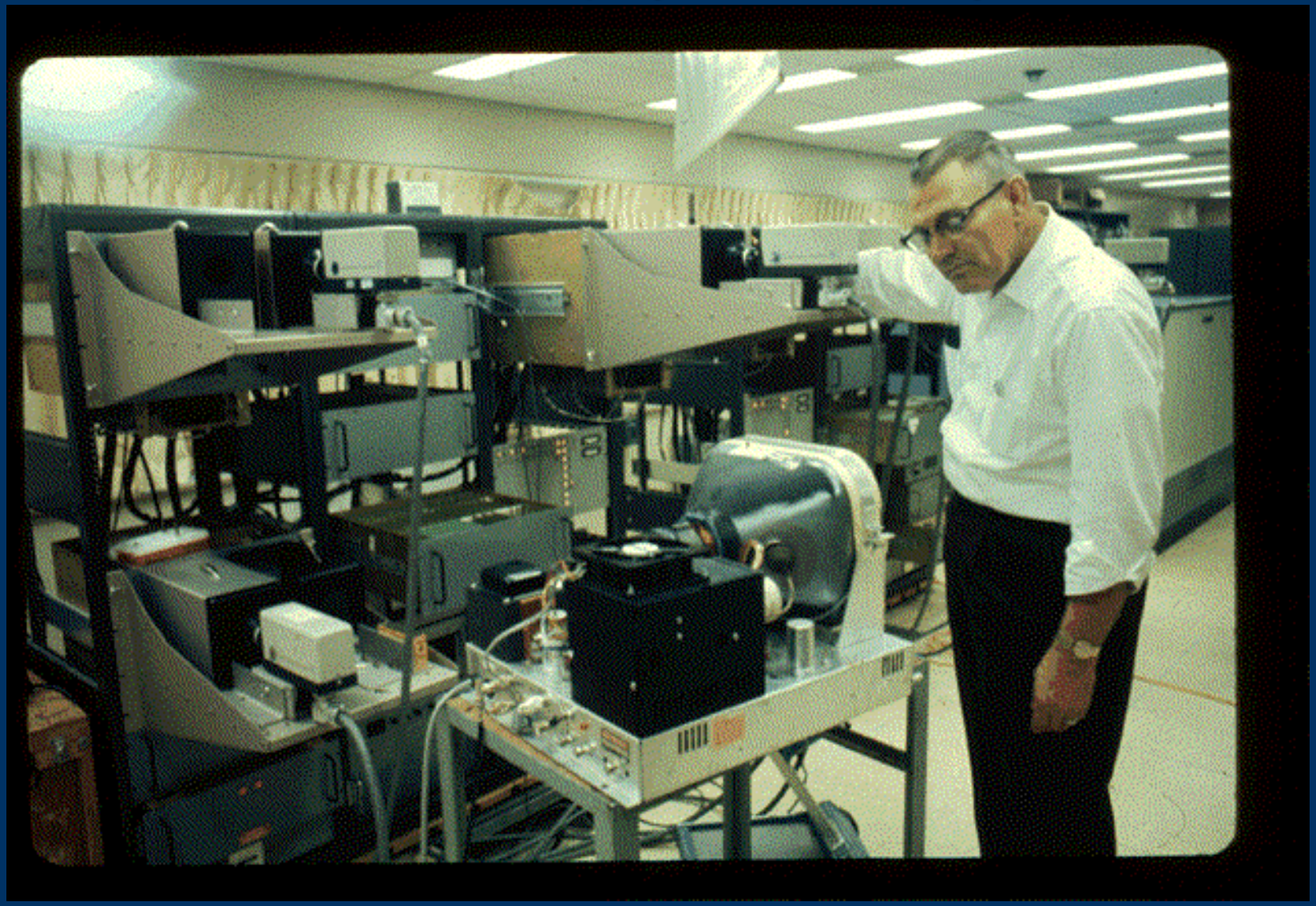


6. C-supported Meeting (1967)

7. Martin with CRT Display Module (1968)



8. Jake with Display Generator System

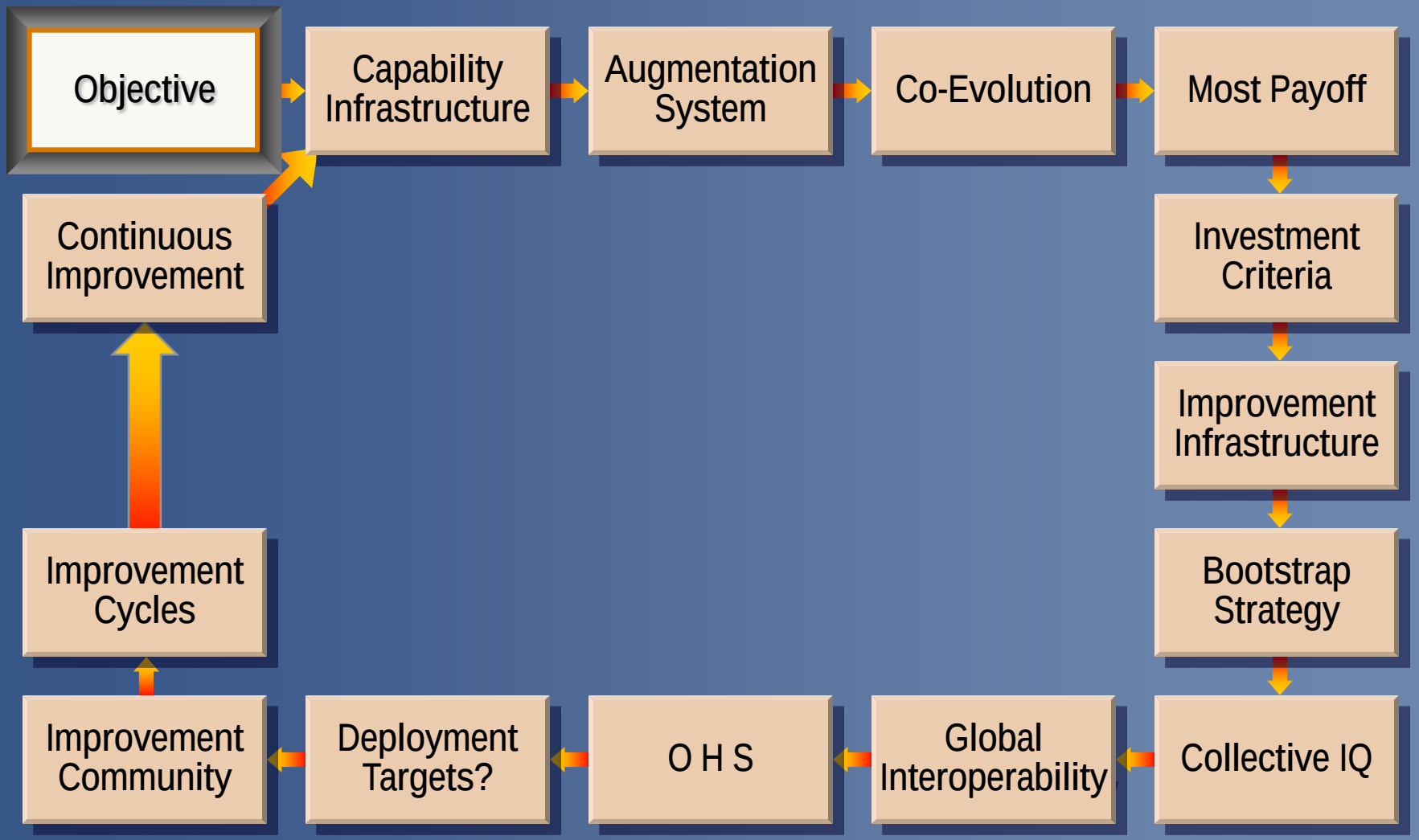


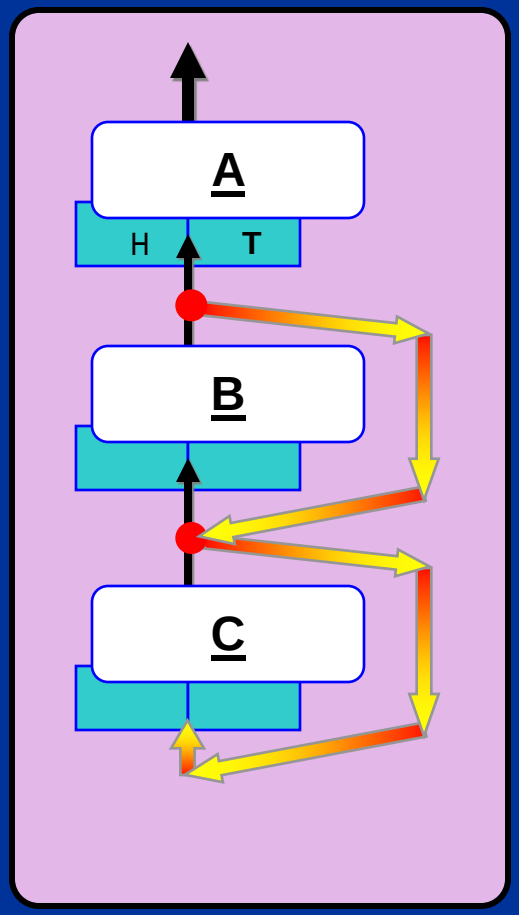
9. Lab-type Workstation

10. Duvall at "Yoga" Workstation

Last slide @ 122

The Bootstrap "Paradigm Map"





I redrew this slide, thought to keep a copy here just in case.

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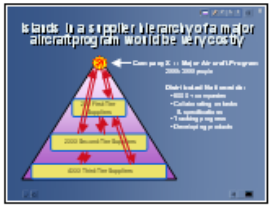

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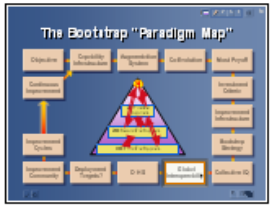

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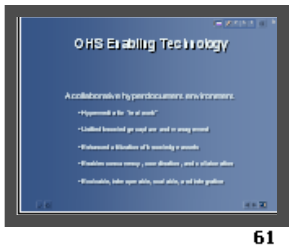

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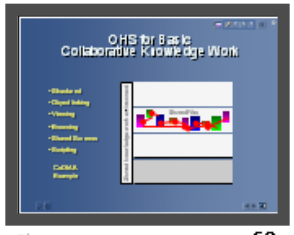

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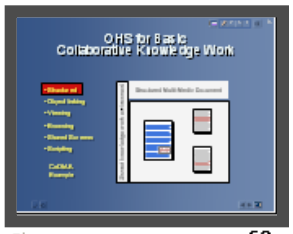

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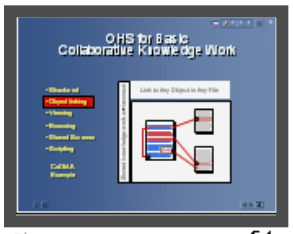

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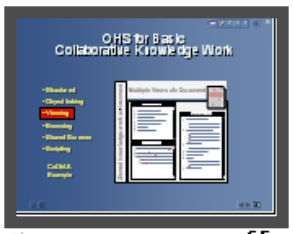

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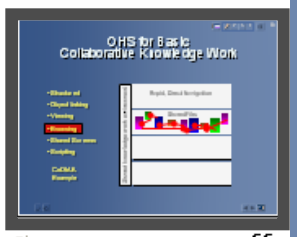

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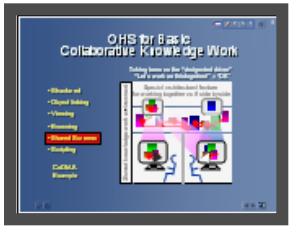

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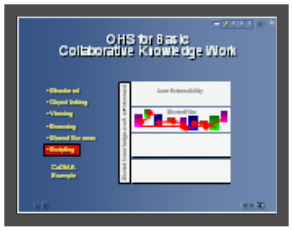

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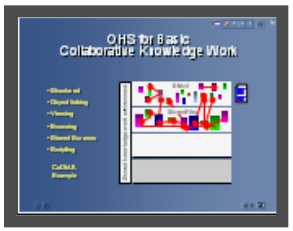

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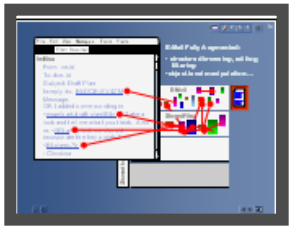
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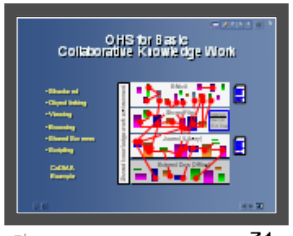

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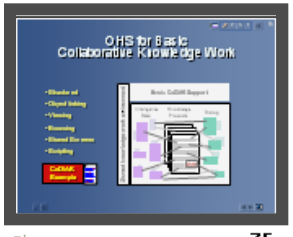

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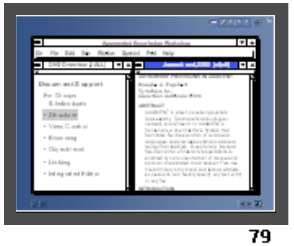
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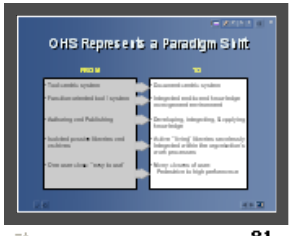

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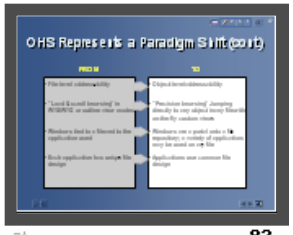

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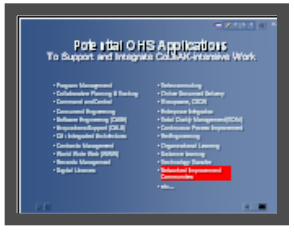

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