Knowledge & IT for Development
The GSSD Case

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Harnessing and Distributing
e-Knowledge for Supporting Sustainability

Outline

I.   Challenges of Sustainable Development –

II.   The IT Connection – Why e-IT?

III.   Identifying Problems & Creating Solutions –
         GSSD Strategy

IV.   What does GSSD "Do"?

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I. Challenges of Sustainable Development

How 'normal' human activities create significant social & environmental problems.

How such problems call for 'solutions' of various kinds – ranging from technological & scientific 'solutions' to political, strategic, & regulatory

How 'solutions' can create new problems

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Knowledge for Sustainability

Sustainability is global challenge of major cross-disciplinary proportions

A serious problems facing decision-makers, scholars, & analysts is inability to access to the body of relevant and contextually rich knowledge.

Simply locating knowledge of relevance often among to a serious problem

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Knowledge for Transitions to Sustainability

- From 'supply chain' to 'knowledge chain'
- From material production to meeting social needs
- From isolated understanding to increased value due to knowledge deployment
- From knowledge creation to knowledge diffusion through networking practices

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II. The IT Connection – Why e-Tools?

Supporting Sustainability
- de-materialization;
- de-spacialization;
- de-centralization &
- de-massification

Reducing Disconnects
- Information & Use
- Stakeholders & Government
- Planning Agencies & Activities
- Policies & Feedback

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Connectivity Clusters : mid-1997

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Image removed due to copyright restrictions.

MIDS. "The Matrix Jan 1997. Connectivity Clusters: mid-1997."
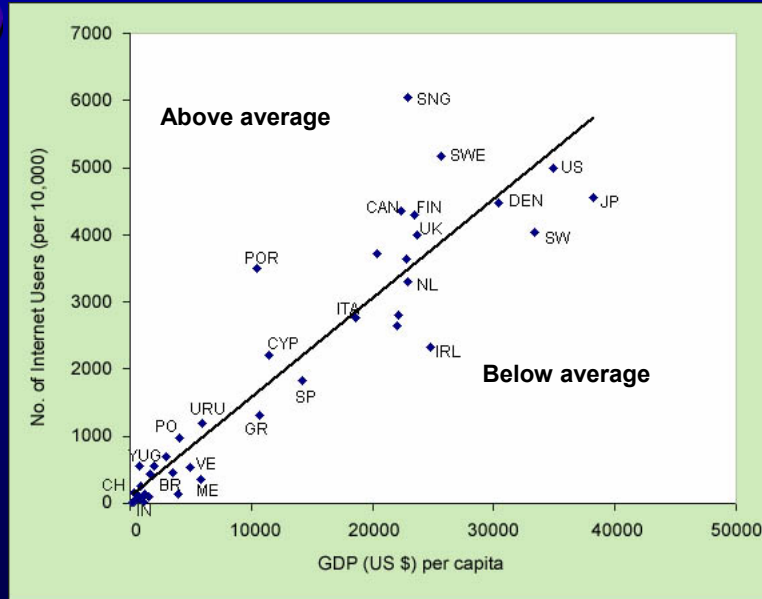
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The World Today

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350 million people speak English as their native language

5.7 Billion Speak Something Else

MIT *Source***:** The World Bank

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Graph courtesy of Farnaz Haghseta. Used with permission. Data courtesy of the World Bank (2000) and International Telecommunications Union (2001).

Six C's of Knowledge and IT for Sustainability

Content	Data & knowledge
Context	Interpretation
Capability	Use & utility
Constituencies	Stakeholders
Customization	Selectivity
Connectivity	Communication

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GSSD

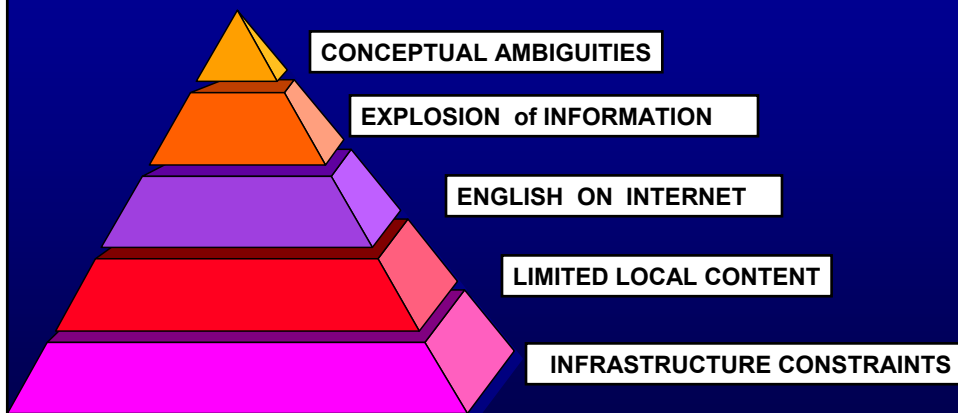# III. Identifying Problems & Creating Solutions – Select Issues

- What 'problems'?
- What 'solution' strategies?
- Ontology Matters – Knowledge & its Organization
- Knowledge Provision, Sharing, Management and Distribution

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The Problems:
Barriers to e-Knowledge for Sustainability

CONCEPTUAL AMBIGUITIES

EXPLOSION of INFORMATION

ENGLISH ON INTERNET

LIMITED LOCAL CONTENT

INFRASTRUCTURE CONSTRAINTS

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GSSD - Strategies to Reduce e-Barriers

- **Coherent Conceptual Framework**
  - **Multidisciplinary views**
  - **diverse aspects of 'sustainability'**

- **Explosion of Information**
  - **Knowledge screening for quality**
  - **Cross indexing of content**

- **Multi-lingual Systems and Local Content**
  - **Mirror sites**
  - **Partnerships & in-kind contributions**

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What is GSSD?

- **G**lobal meta-knowledge networking process

- **S**tructured knowledge on sustainability

- **S**ystem for using "state-of-the-art" knowledge management

- **D**ecision, teaching, & research supports

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What does this mean?

A.   Knowledge Network and Networking

B.   Ontology of Sustainability – Structuring and Framing

C.   Evolving Knowledge Base

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A.   Knowledge Network

- Organized systems of discrete actors with knowledge producing capacity

- Combined through common organizing principles

- Whereby actors retain their individual autonomy

- Networks enhance value of knowledge to actors & motivate further knowledge expansion

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B. Ontology of Sustainability

- Domains – topics
- Dimensions – issues
- Connectivity – linkages
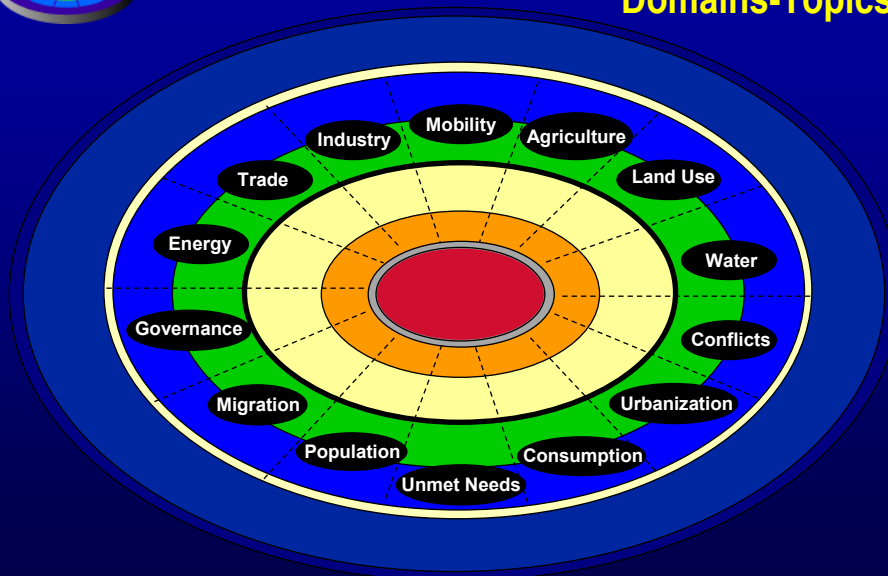- Frames – skeletons & slots to fill out
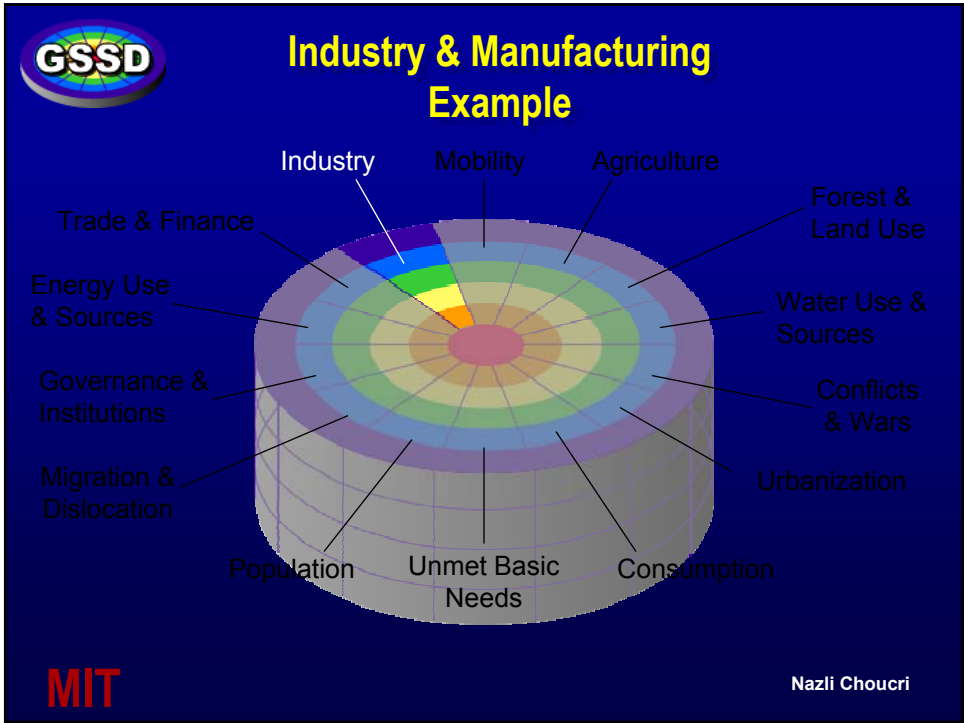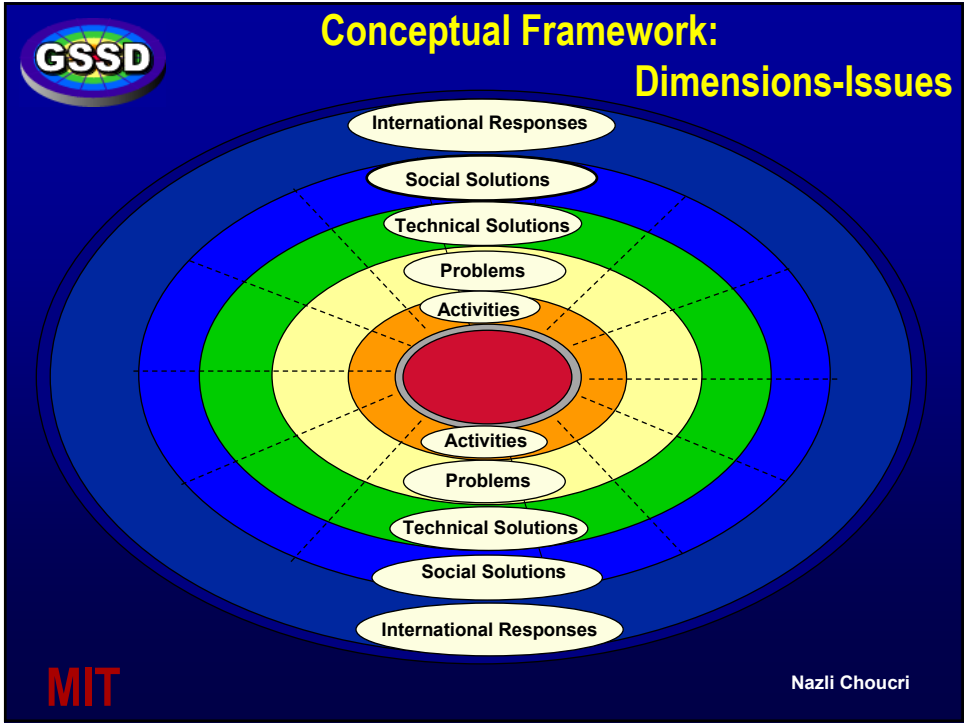- Knowledge base – e-library'

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Conceptual Framework:
Domains-Topics

Mobility
Industry
Agriculture
Trade
Land Use
Energy
Water
Governance
Conflicts
Migration
Urbanization
Population
Consumption
Unmet Needs

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Conceptual Framework: Dimensions-Issues

Industry & Manufacturing Example
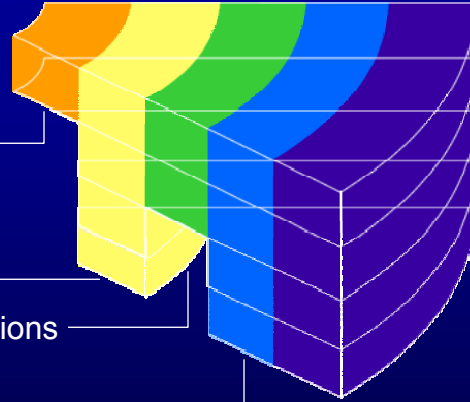
Connectivity — **Domain - Industry**

Issues

Activities & Conditions

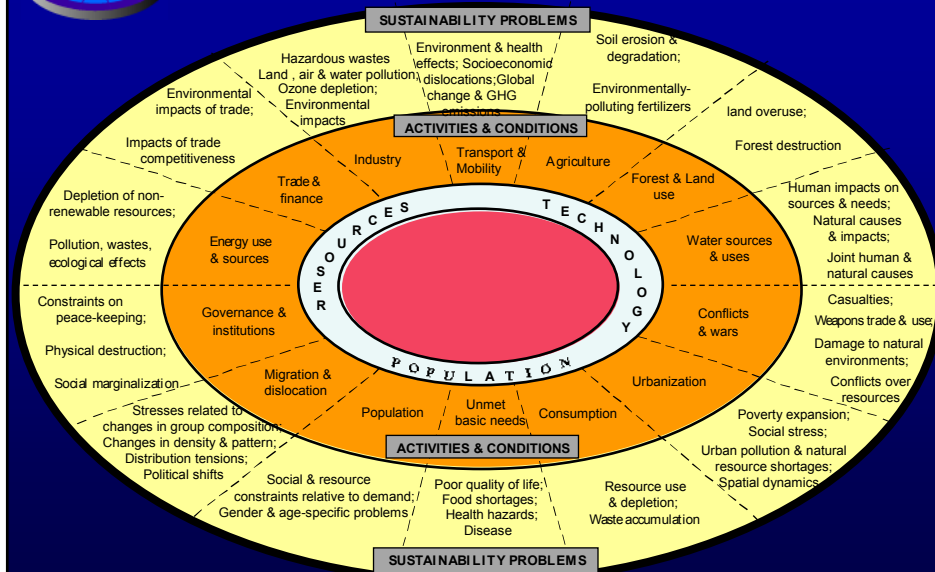Sustainability Problems

Scientific & Technical Solutions

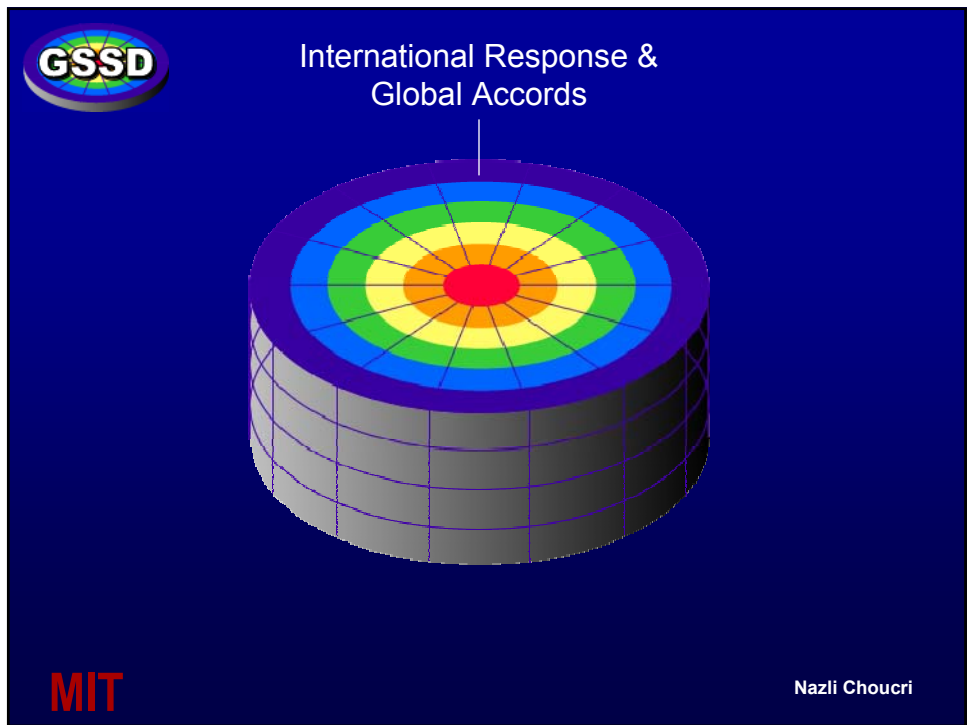Social, Economic, Political, & Regulatory Solutions

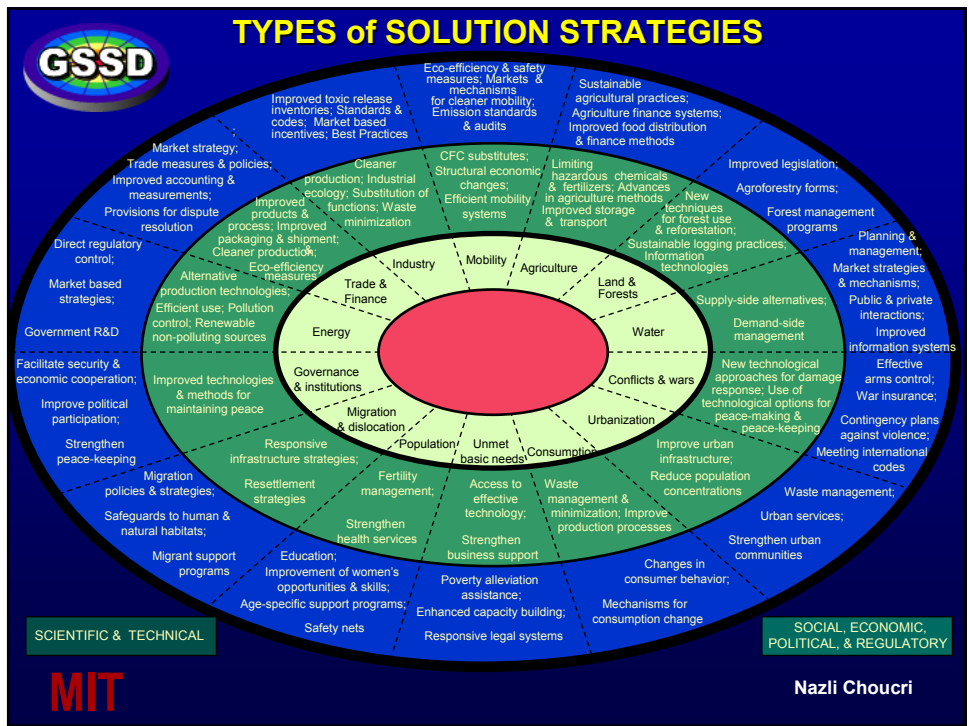MIT — Nazli Choucri

FRAMES – 'FILLING the SLOTS"
From Activities & Conditions to Sustainability Problems

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TYPES of SOLUTION STRATEGIES

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Eco-efficiency & safety measures; Markets & mechanisms for cleaner mobility; Emission standards & audits

Sustainable agricultural practices; Agriculture finance systems; Improved food distribution & finance methods

Improved toxic release inventories; Standards & codes; Market based incentives; Best Practices

Market strategy; Trade measures & policies; Improved accounting & measurements; Provisions for dispute resolution

CFC substitutes; Structural economic changes; Efficient mobility systems

Limiting hazardous chemicals & fertilizers; Advances in agriculture methods; Improved storage & transport

Improved legislation; Agroforestry forms;

New techniques for forest use & reforestation; Sustainable logging practices; Information technologies

Forest management programs

Cleaner production; Industrial ecology; Substitution of functions; Waste minimization

Improved products & process; Improved packaging & shipment; Cleaner production;

Direct regulatory control;

Eco-efficiency measures

Alternative production technologies;

Efficient use; Pollution control; Renewable non-polluting sources

Industry Mobility Agriculture

Trade & Finance

Land & Forests

Energy

Water

Market based strategies;

Government R&D

Planning & management;

Market strategies & mechanisms;

Public & private interactions;

Improved information systems

Supply-side alternatives;

Demand-side management

Governance & institutions

Conflicts & wars

New technological approaches for damage response; Use of technological options for peace-making & peace-keeping

Effective arms control;

War insurance;

Facilitate security & economic cooperation;

Improved technologies & methods for maintaining peace

Migration & dislocation

Urbanization

Improve political participation;

Contingency plans against violence;

Meeting international codes

Strengthen peace-keeping

Responsive infrastructure strategies;

Population Unmet basic needs Consumption

Improve urban infrastructure;

Reduce population concentrations

Migration policies & strategies;

Resettlement strategies

Fertility management;

Access to effective technology;

Waste management & minimization; Improve production processes

Waste management;

Urban services;

Safeguards to human & natural habitats;

Strengthen health services

Strengthen business support

Strengthen urban communities

Migrant support programs

Education; Improvement of women's opportunities & skills;

Age-specific support programs;

Poverty alleviation assistance;

Enhanced capacity building;

Changes in consumer behavior;

Mechanisms for consumption change

Safety nets

Responsive legal systems

SCIENTIFIC & TECHNICAL

SOCIAL, ECONOMIC, POLITICAL, & REGULATORY

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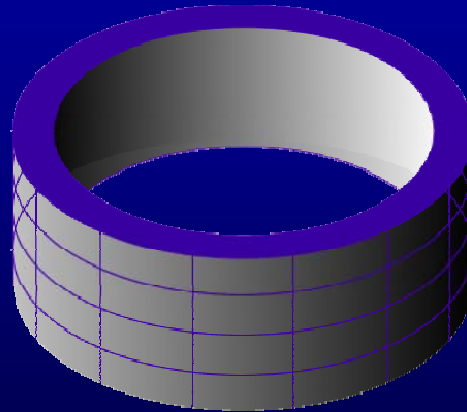## International Response & Global Accords

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International Response &
Global Accords

Conventions

Trade Regimes

Tech. Agreements

Agenda 21

Population Policies

Dev. Mechanisms

Peace Strategies

Environment Accords

Private-Public
Partners

Economic
Adjustments

Monitoring

Investment
Modes

Institutional
Strategies

Codes of Conduct

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C. Knowledge Base

- **Selected from evolving Internet Materials
  of roughly 250 Institutional Holdings**

- **Over 3000 Indexed Content, with
  with Multi-disciplinary & Diverse Views**

- **Include concepts & theories, indicators & measures,
  models & cases, agreements & organizations,
  policy, strategy & decision**

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What does GSSD 'Do'?

1. Web-based system of hierarchical, nested, domain representation for complex systems

2. Selective portable knowledge base, multi-disciplinary perspectives, updated as needed

3. Diverse Navigation & Search Options

4. Customized workflow for multilingual knowledge networking and management

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Why Strategic Partnering, Multi-lingual & Mirror-Sites?

World population is non-English speaking

Market potentials driven by demography

Global firms operate in multi-cultural contexts

Strategic partnering & supportfacilitates provision,& influence in global policy forums

Examples include China, Sony-Europe, Lotus-IBM, MISTRA, AT&T, AGS-MIT etc.

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Current Strategic Partnerships

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全球可持续发展系统

新消息　　　　搜索 GSSD

使用GSSD　　　GSSD 报告

与GSSD联系　　向站点提交

咨询机构

决策知识网络

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Graphical Options

GSSD in China

URL://gssdchina.acca21.edu.cn/gssd/gssdzh.nsf

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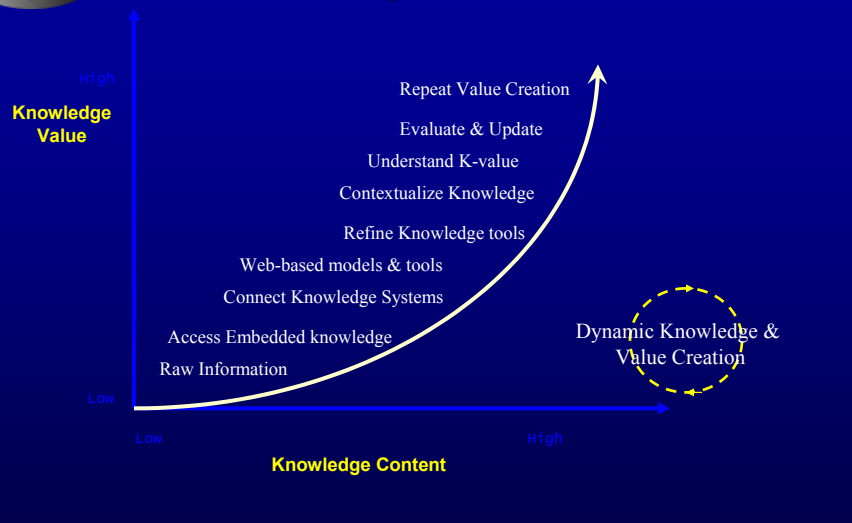MIT

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What have we done?

- Glossary translation   (2500 items)
- Mirror site building
- Abstract translation
- Report translation
- Web page translation
- GSSD searching functions
- Publish to Web
- Collection of Chinese web site information

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Knowledge Value-Chain

Knowledge Value

High

Repeat Value Creation

Evaluate & Update

Understand K-value

Contextualize Knowledge

Refine Knowledge tools

Web-based models & tools

Connect Knowledge Systems

Access Embedded knowledge

Raw Information

Low

Dynamic Knowledge & Value Creation

Low   High

Knowledge Content

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Next Steps-
Toward Improved ……

- Transitions to Endogenous Ontology Change
- Extending Mirror-Site Locations
- Improving Collaborative Knowledge Management
- Exploring uses for Education
- Strengthening Multiple Language Provision & Search Capability

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