Information Explosion and the Creation of a New Network Society

#2 A New Social System Using Networks

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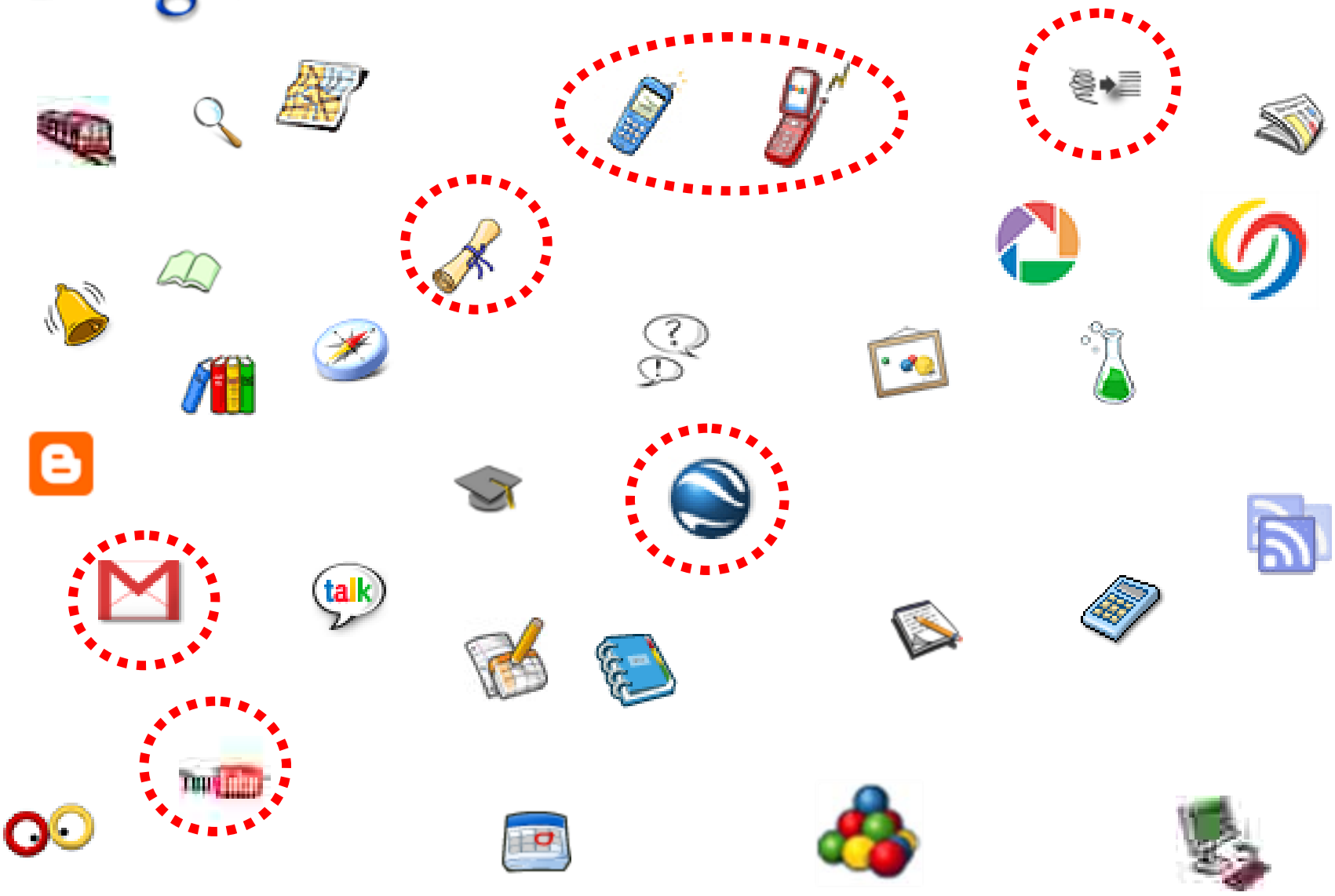
Problem 2

- What will be the future of ICT's?
- What will happen to a network society in the future?

Google's impact: a new business model



How will Microsoft confront this situation?

Picture removed due to copyright restrictions

With Bill Gates and Prof. Haruo Shimada（Beijing, Apr. 2007）
We were all drunk.

Research for New IT Fundamental Technology - Toward the Age of Information Explosion

Representative for the field

Institute of Industrial Science

Prof. Masaru Kitsuregawa

Specific Area Research"i-explosion IT foundation"

i-explosion 情報爆発

Incubation of IT core technology from Japan in the age of information explosion

＜Next Generation Search Dealing with Information Explosion＞

A01 chief: Masaru Kitsuregawa （University of Tokyo）

＜Secure and Stable System Basis for Information Explosion

A02 chief: Satoshi Matsuoka （Tokyo Institute of Technology）

＜New Generation Interactive Engine not to be Troubled By Information Explosion＞

A03 chief: Ryuji Matuyama （University of Kyoto）

＜Governance of High-Technology and Society in the Age of Information Explosion＞

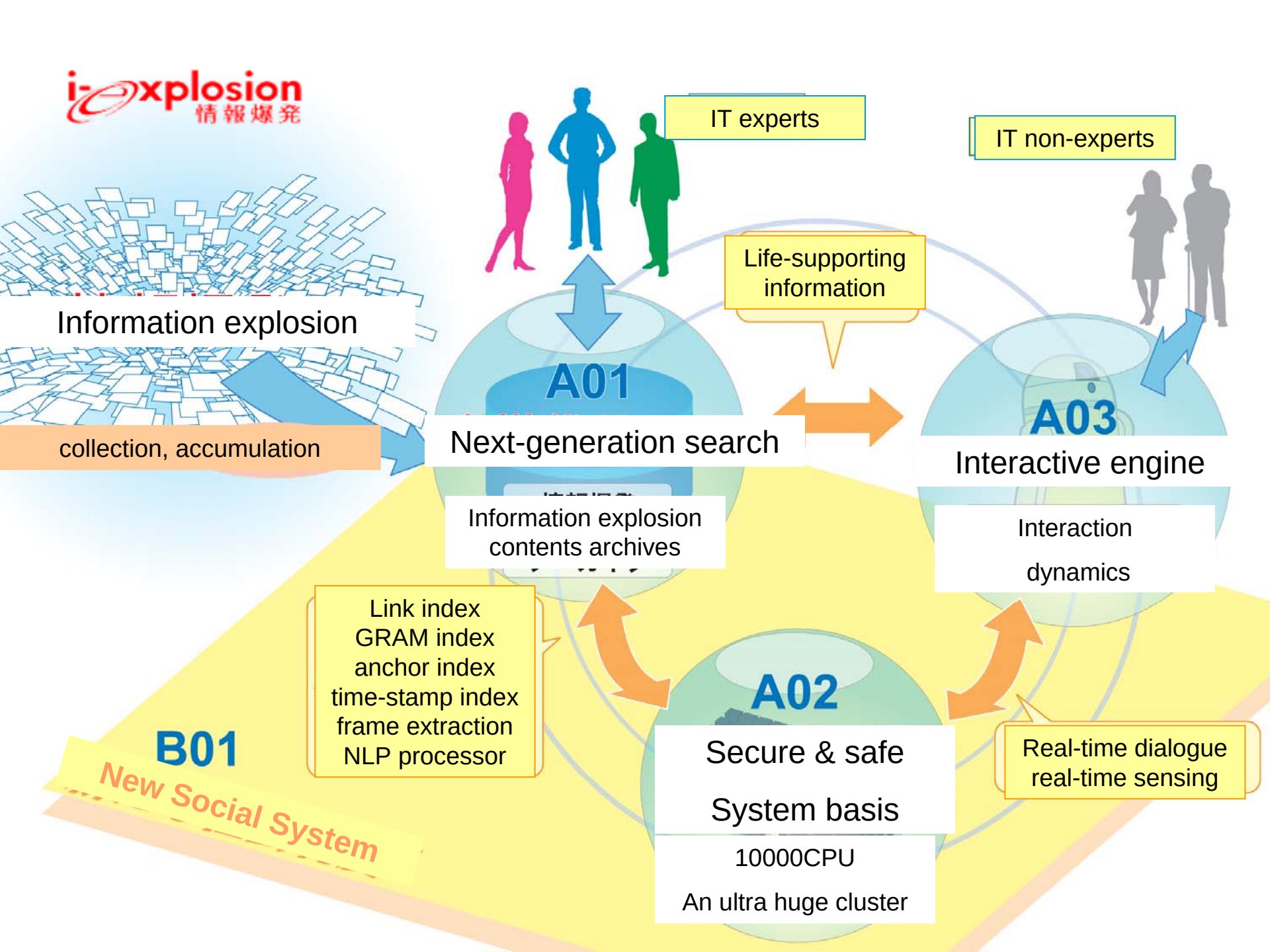
B01 chief: Osamu Sudoh （University of Tokyo）

＜High-Speed Computing Support＞

Supporting Chief: Jun Adachi （National Institute of Informatics）

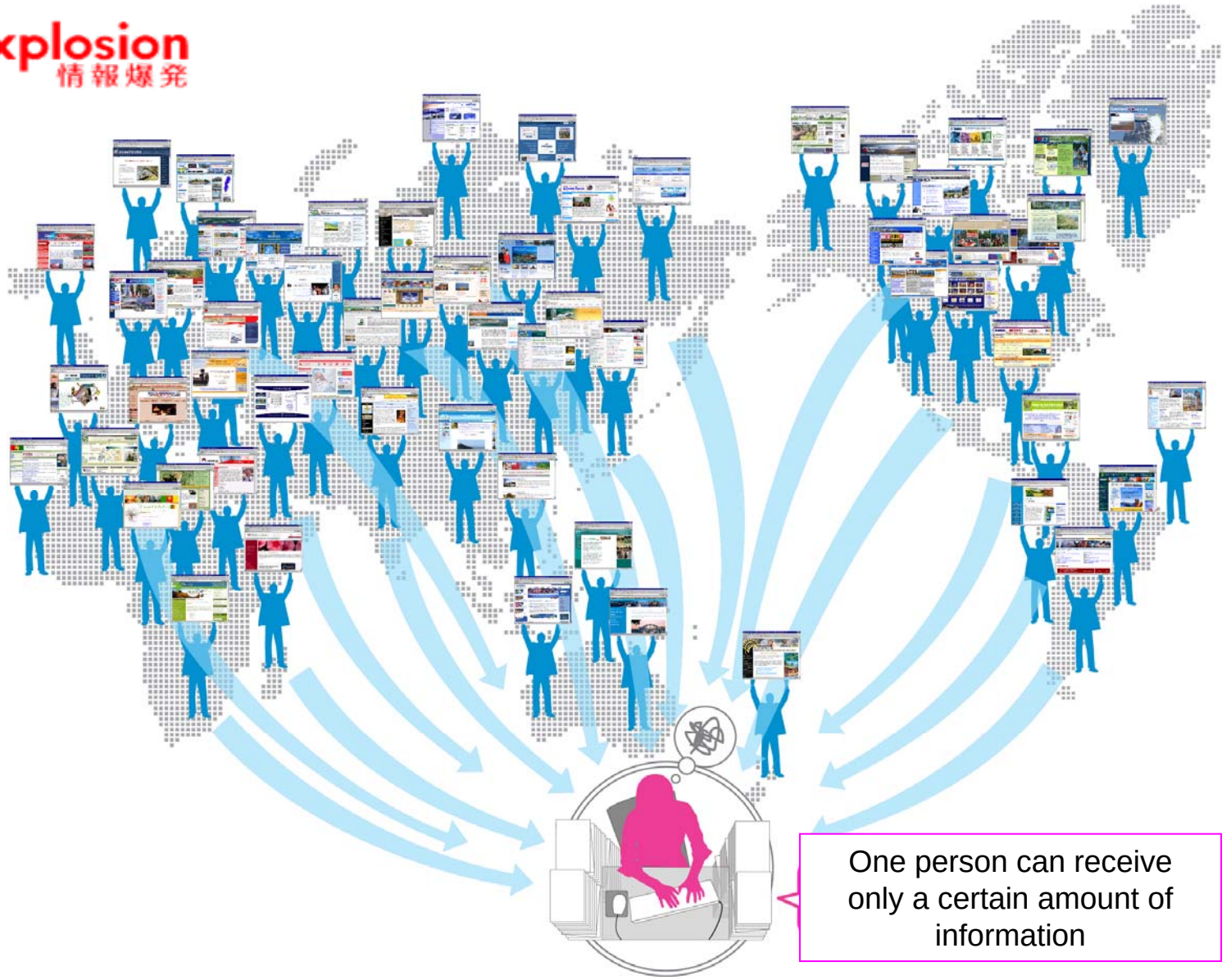
Specific Area Research”i-explosion IT foundation”

i-explosion 情報爆発


i-explosion
情報爆発
IT experts
IT non-experts
Information explosion
Life-supporting information
A01
A03
collection, accumulation
Next-generation search
Interactive engine
Information explosion contents archives
Interaction dynamics
Link index
GRAM index
anchor index
time-stamp index
frame extraction
NLP processor
A02
Secure & safe
System basis
10000CPU
An ultra huge cluster
Real-time dialogue
real-time sensing
B01
New Social System

All Humans Communicate Information

i-explosion 情報爆発

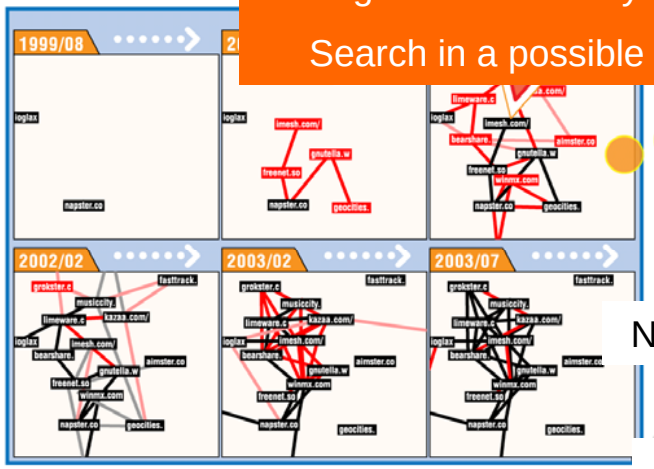


One person can receive only a certain amount of information

A01 New Generation Search

Changes in the society are grasped

Search in a possible time-axis



Natural words

database

algorithm

Information search

Minorities can be searched

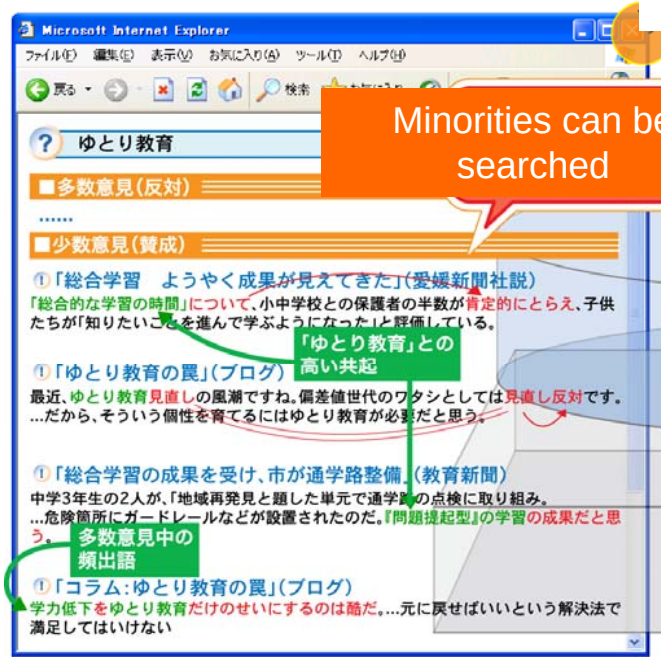
Mechanical learning

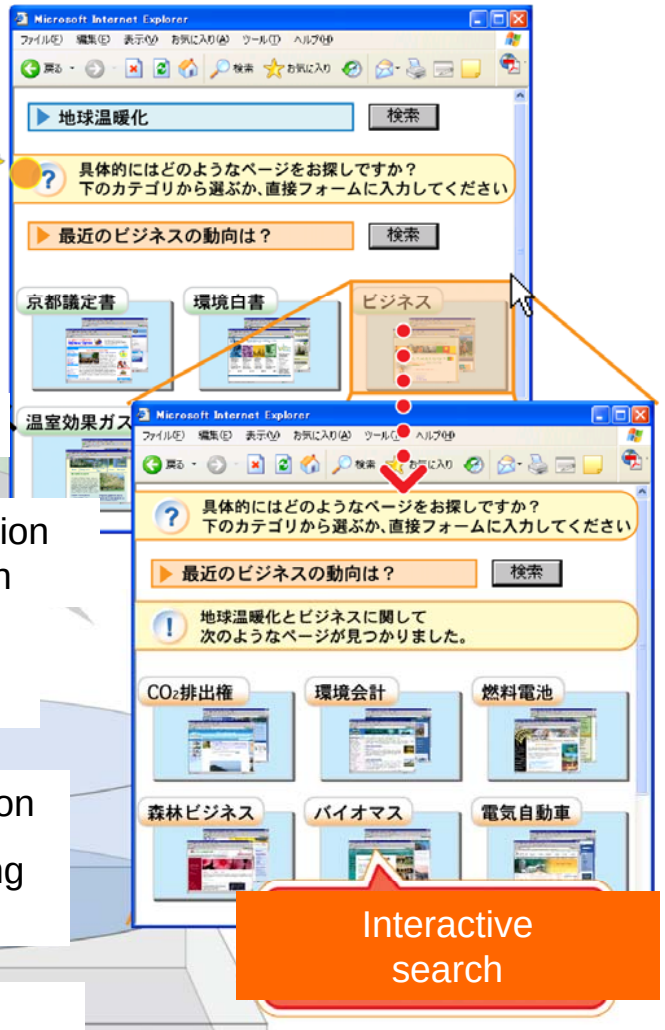
Information explosion

Quantum evaluating basis

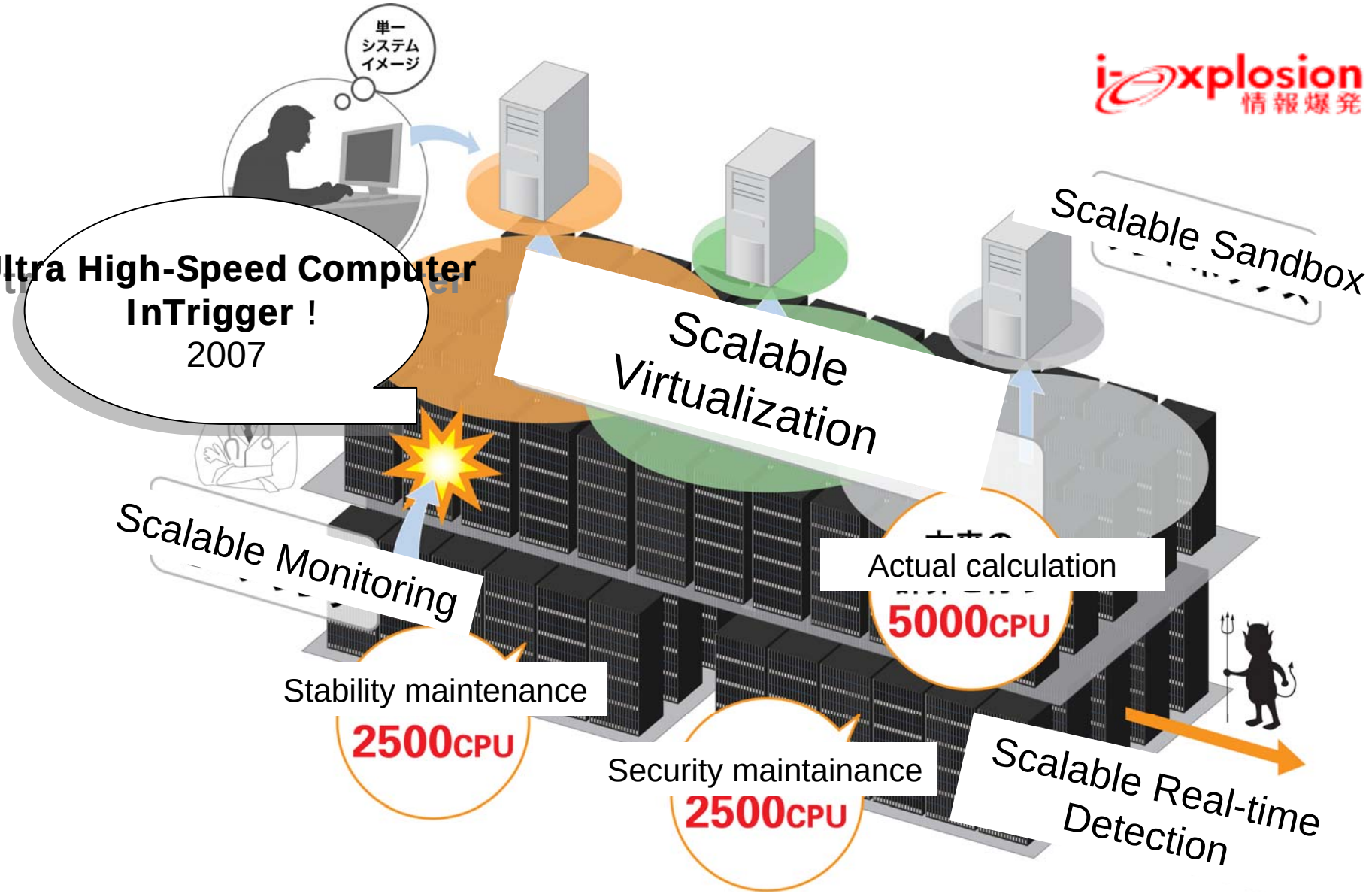
Information management by 10000 processors

Interactive search

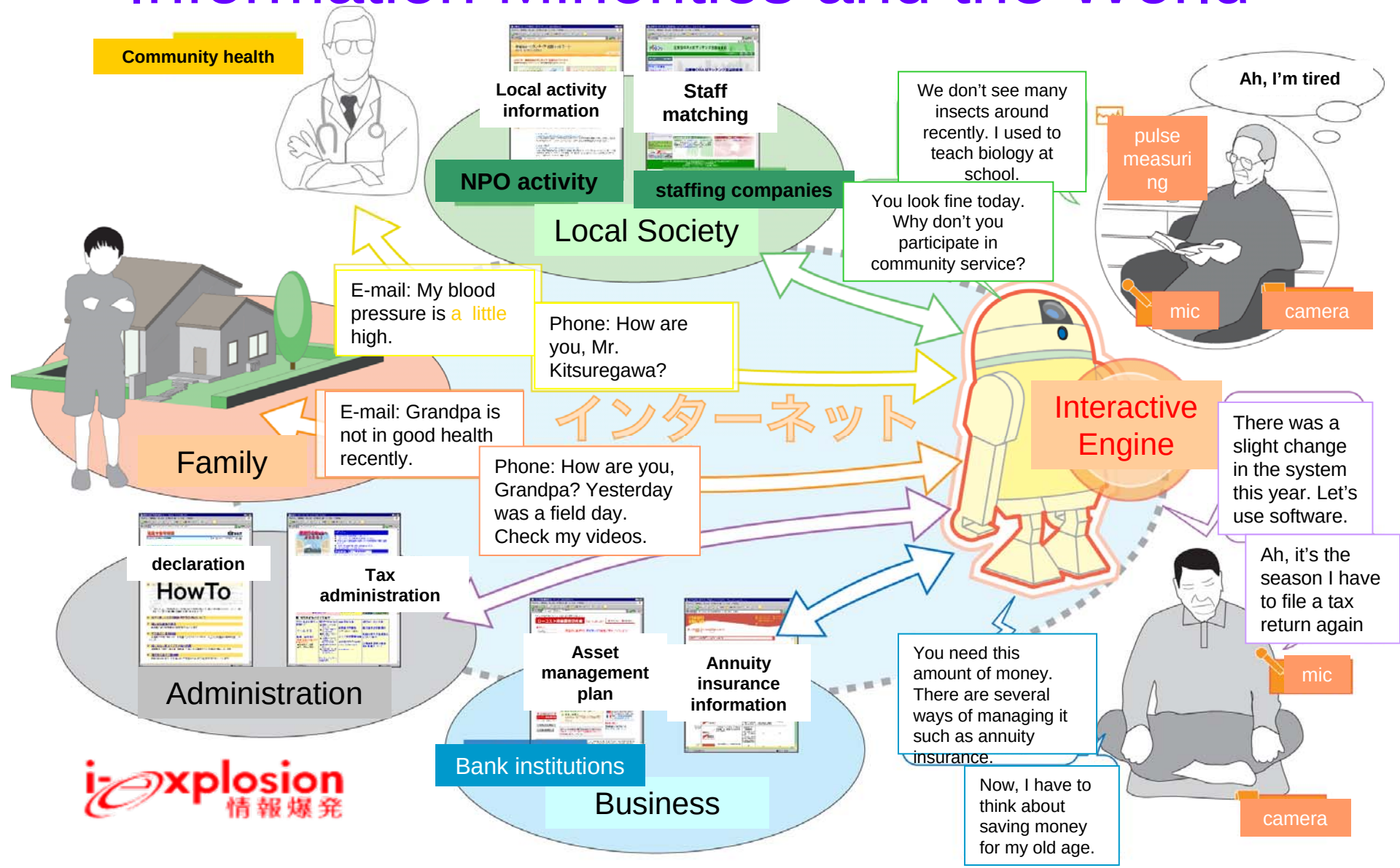




A02 Secure and Stable Systems



A03 Interactive Engine to Unite Information Minorities and the World



i-explosion 情報爆発

B01 Promotion of Research Closely Related to Society

i-explosion 情報爆発

medical information network

nursery support information network

Data Center

e-community

residents

administration

small companies

care and custodial responsibility for manufactures

personal information protection

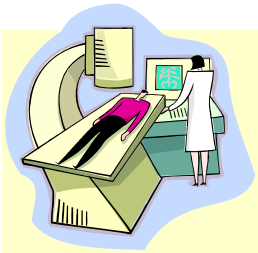
intellectual property management

security management

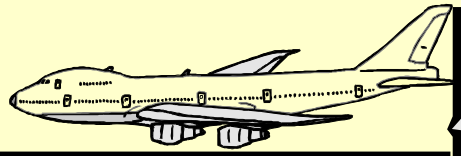
New system planning focusing on informed consent

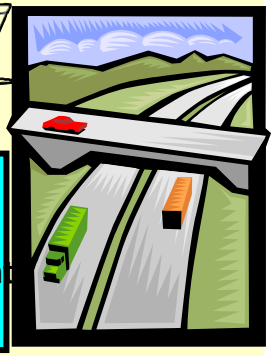
Collaborative economic development

B01 New Technology and New Governance

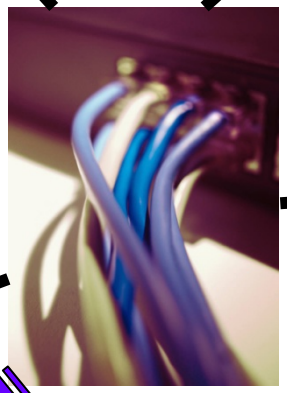


Medical information network
Custody ・manufacturing management





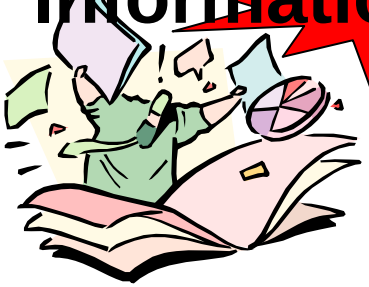
Transportation information network
Custody/ manufacturing management



Nursery support network
Custody - manufacturing management

Personal information protection
intellectual property management
security management

Information explosion



New system planning focusing on
informed consent

Techno-Social Paradigm

◆1st Stage (late 18th – early 19thc)

Railway infrastructure（iron and steel, steam engines）

◆2nd Stage (end of the 19th –early 20thc)

Road infrastructure（electricity, internal combustion engines）

◆3rd Stage (late 20th-21stc)

Information communication infrastructure（digital information processing, semi-conductors）

◆4th Stage（21stc）

Global environment science：nano-technology, biotechnology, and ICT are the foundations of development！

Sustainable development and information analysis

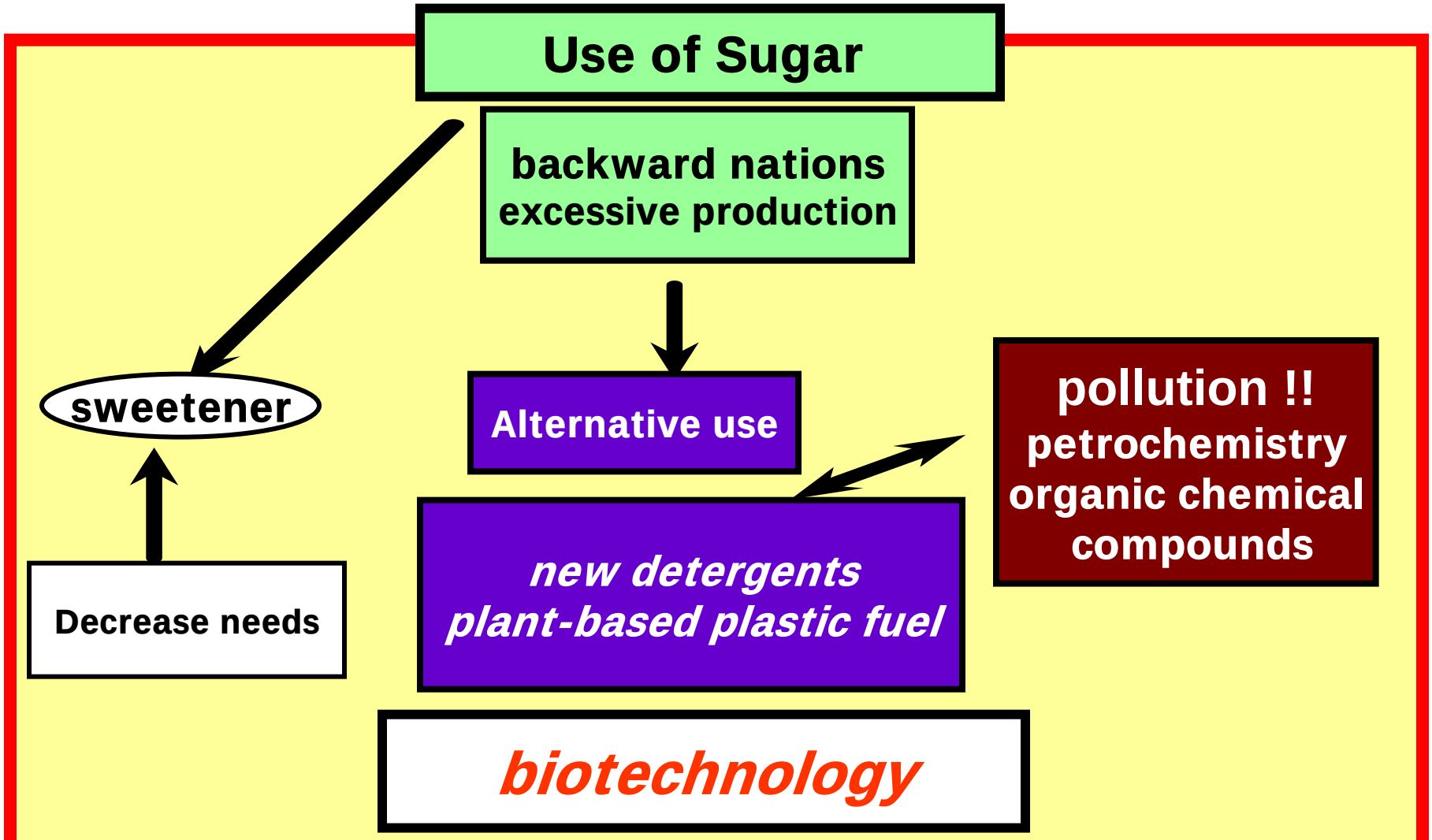
- ✓ We have to build a new socioeconomic system based on the notion that the growth of a network society is deeply concerned with ecological problems.

Zero Emissions

- The United Nations University presented the Zero Emissions Research Initiative.
- “For industries to survive the 21st Century, they must aim at reconstructing manufacturing processes, using recyclable raw materials, and, finally, reducing emissions to zero.”
- Definition of Zero Emissions

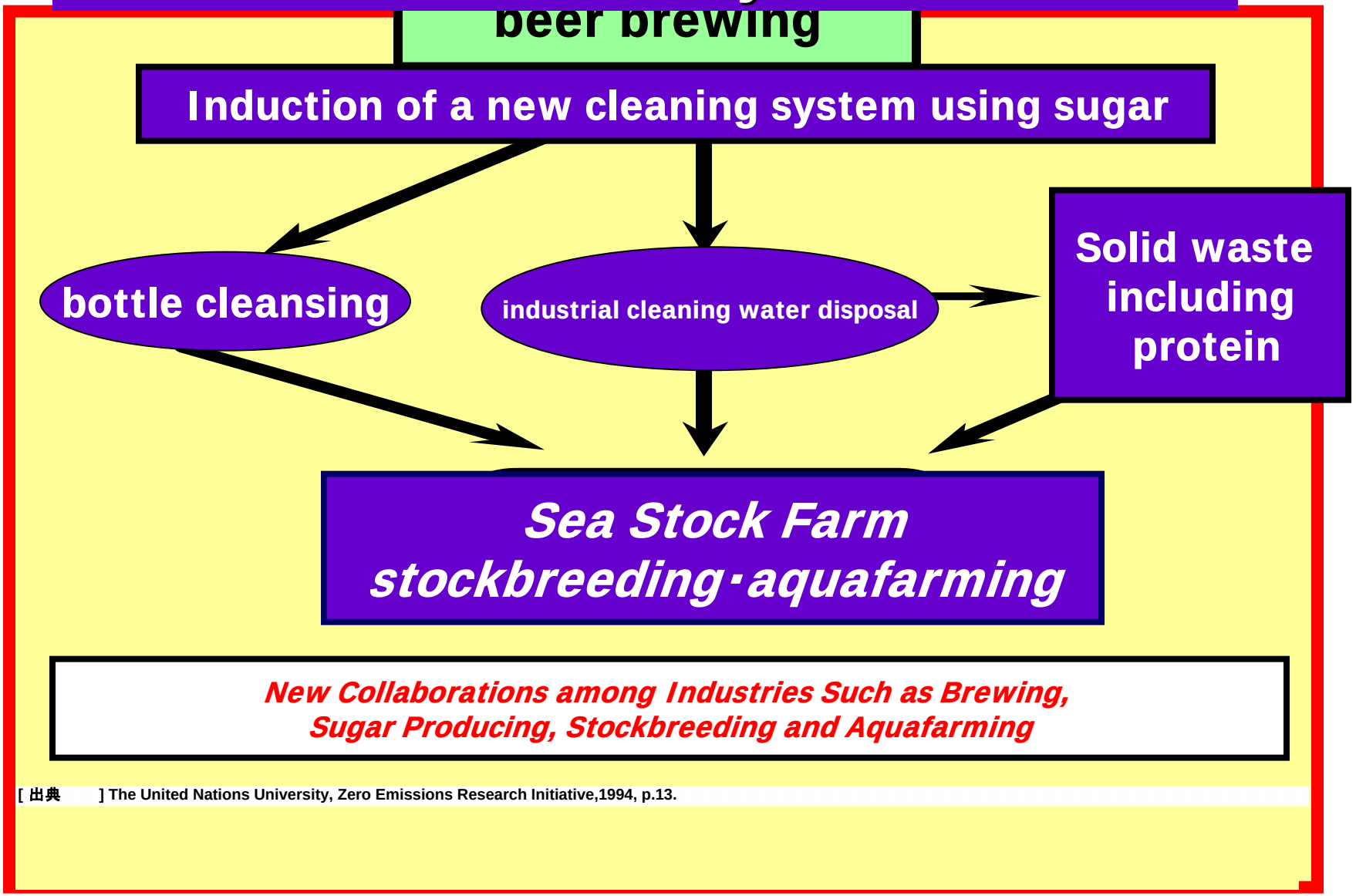
  “To eliminate all emissions into the hydrosphere and aerosphere. Wastes in one field of industry becomes recyclable raw material in another industry.”

Alternative Use of Sugar



[出典] The United Nations University, Zero Emissions Research Initiative,1994, p.18.

New Development in the Brewing Industry

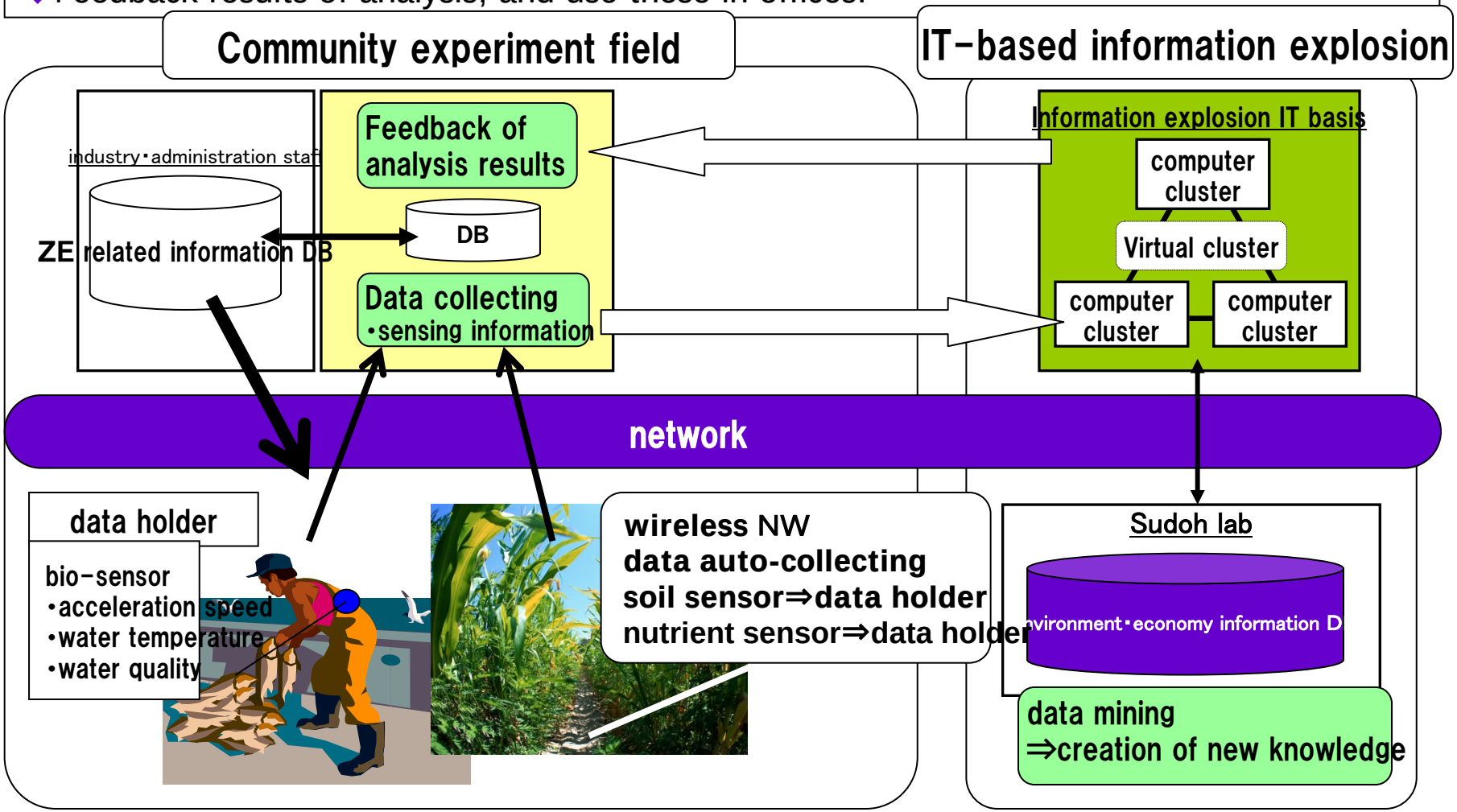


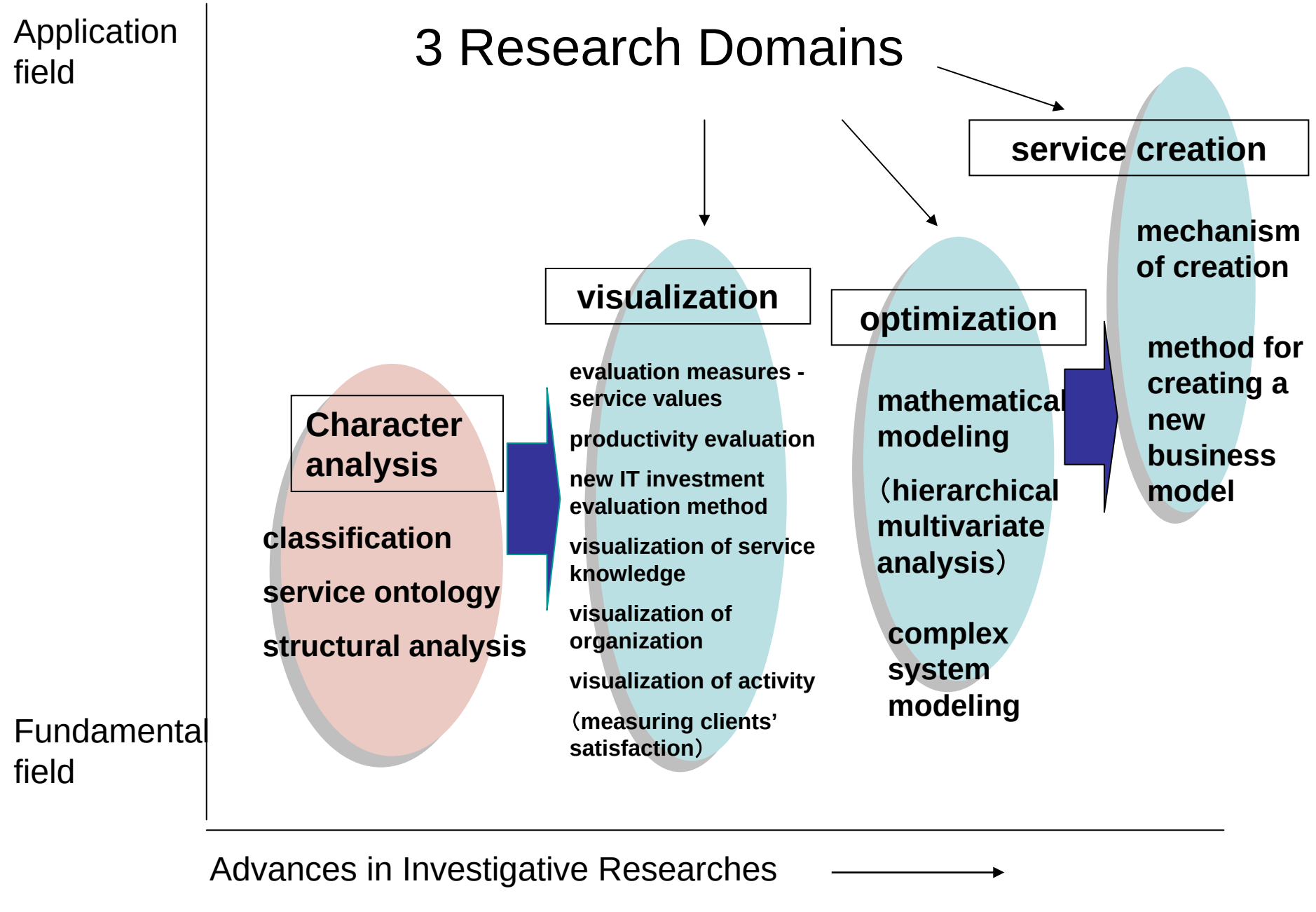
New Collaborations among Industries Such as Brewing, Sugar Producing, Stockbreeding and Aquafarming

[出典] The United Nations University, Zero Emissions Research Initiative,1994, p.13.

Service Sciences Concept of Zero Emissions

◆Collect data from sensing information in a regional experiment field.
◆Environmental and economic information and analysis performed by sensing information using a computer grid.
◆Feedback results of analysis, and use these in offices.



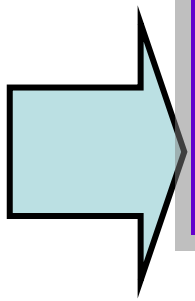

Application field
3 Research Domains
service creation
mechanism of creation
visualization
optimization
method for creating a new business model
evaluation measures - service values
productivity evaluation
new IT investment evaluation method
visualization of service knowledge
visualization of organization
visualization of activity
（measuring clients' satisfaction）
mathematical modeling
（hierarchical multivariate analysis）
complex system modeling
Character analysis
classification
service ontology
structural analysis
Fundamental field
Advances in Investigative Researches

Mining into a Social System

- application

Former platform

- middleware
- OS layer
- HW layer



i-ex platform

- **application**

i-ex overcoming basis

- **visualization technology**
- **measuring technology**
- **optimization technology**
- **knowledge DB**
- **modeling DB**

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- **middleware**
- **OS layer**
- **HW layer**

Information Network and Environmental Issues

- **If the government or international organizations drive investments in an adequate way using tax systems, subventions and facilities financing based on industries' global-dealing networks, industries can form the cross-industrial enterprise group needed to carry out "Zero Emission Project" in a relatively easy way.**

- **Industries' global-dealing networks can move toward formation of an industries' group which matches the idea of sustainable development.**

Consideration for Data Distribution1

- In many businesses, information systems used to be built for individual services. Each service was streamlined and optimized in those systems.

- However, when different organizations or different systems share data, these data-sharing systems at the present time operate inefficiently. Some data are registered redundantly or input again from printed data.

Consideration for Data Distribution 2

- XML, a widely-used script in which data can be assigned meaning, raises the problem of the inundation by XML tags capable of disturbing uses of the data.
- Former optimizations in each service area must be reconsidered, and a new system to optimize organizations that play a role in data distribution and in the overall society must be constructed.

National Innovation

Important factors in innovation

Staff

- A national education program is needed to gain a new labor force.

Investment

- Analysis from the viewpoint of complexity science is needed for investment. (e.g., physics, mathematics, computer science, economy, and law studies should be used strategically.)
- The vitalization of the economy to encourage the founding of new companies.

Infrastructure

- Construction of a system to protect intellectual property
- **Largest innovation in the 21st Century : a Test bed for healthcare**

- **Council on Competitiveness USA 2005**

Digital Revolution and Social Evolution

"A species can survive not only because it is the strongest or most intelligent. It can survive because its ability to respond to change is high."

Charles Darwin

From E-Japan To a New Strategy for IT Innovation

Priority Issues in Future IT Policies ①

Pursuit of IT's ability to reform structure

Solve problems in Japanese society using IT

- **Structural reforms of medical care using IT** ◆100% upload of receipts on WWW
- **An environment-conscious society using IT** ◆efficient use of energy and resources by IT
- **The safest and most secure society in the world** ◆lessening damage by broadcasting disaster information by terrestrial digital media
- **The safest road traffic country in the world** ◆prevention of car accidents by ITS
- **The most convenient and efficient e-administration in the world** ◆achieved more than 50% online application
- **Enhancement of industrial competition by establishment of IT management** ◆enhancement of collaboration between departments and companies by IT
- **Rich living throughout life** ◆active use of telework, e-learning

Core of Government IT Strategy Organization

- Planning, Assessment Organization
- Government IT Strategy Head Office
  - ✓ the Prime Minister
- Expert Study Group Assessing IT Innovation Strategy
  - ✓ Chief：Watanabe, the President of Toyota
- Health-care Innovation Assessment Board
  - ✓ Chief: Kokuryo, Keio Univ. Prof.
- e-Government Assessment Board
  - ✓ Chief: Sudoh, UT Prof.

- Implementing Organization
- The Ministry
  - ✓ the Prime Minister
- Cabinet Secretariat
  - ✓ GPMO
  - ✓ Nest-Generation e-Administration Service Basic Project Team（public and private）
- All ministries and agencies
  - ✓ CIO（Deputy Vice-Minister）、CIO assistant official
  - ✓ PMO, etc.

‡ Assessment Activities of e-Administration in OECD Countries (Researched during 2003~2004)

countries	Non-money assessment	money assessment
Australia	KPI	NPV、ROI、VA
Austria	benchmark	
Canada	Ability, function evalutation	VA
Czech Republic	benchmark	
Denmark		NPV
Finland	KPI	CBA
Germany	KPI	
Italy		CBA
Japan		
Netherlands	KPI	
New Zealand	KPI	NPV、Financial analysis
Poland	KPI	
UK	benchmark	BA、NPV、CBA
USA	KPI	ROI、NPV、CBA、IRR、VA

(注1)BA= break-even analysis(損益分岐点分析); CBA=cost-benefit analysis(費用・便益分析); IRR=internal rate of return(内部収益率); KPI=key performance indicators(主要業績指標); NPV=net present value(正味現在価値); ROI=return on investment(投資収益率); VA=value assessment methods(価値評価手法)
(注2)調査対象諸国の中で, 何らかの評価活動を行っている国のみを掲載。

(出所)OECD、2005:105.

Resource：OECD [2005] *e-Government for Better Government*, Paris: OECD.

The aims of e-Government

- Aims of e-administration in “IT innovation strategy”
  - Realization of “the most convenient and efficient e-administration in the world”

① to achieve more than 50% online use of application and notification procedures before 2010

② optimization of services and systems of whole government

③ securement of liability and security, higher security, cultivation and diffusion of frontier technology

Missions of an e-Government Assessment Board

- Aims of an e-Government Assessment Board Indicated in the 2006 Report

① “Visualization” from the viewpoint of users and pay-per-performance systems

Evaluate the challenges of an e-Government globally and make the PDCA cycle function constantly so that the board’s evaluation (Check) will be reflected unfailingly in new challenges and measures (Action).

② Evaluation toward optimization of the whole government

Enhance collaboration between front office innovation and back office innovation, and check if optimization of the whole e-Government is promoted.

③ Evaluation which results in the improvement of organizational governance

In case of disturbing in collaborations between the ministries and agencies, between the government and local municipal entities, public and private, discover the problems and find effective measures for solving them.

Activities of an e-Government Assessment Board

- To evaluate e-Government, promotion of visualization is important; and quantitative and qualitative analyses of “input index”, “output index”, “outcome index”, and “actual feeing index” are especially important. Multivariable analyses are most important.

Resource : the Government “e-Government Assessment Board Report”

Direction to Aim In

- Construction of a one-stop service from the viewpoint of users should be most emphasized.
- System collaboration and data standardization for both front and back offices are thus inevitable.
- Also, collaborations between ministries, agencies, the government and municipalities are inevitable.
- Optimization of the organization by the whole government and procedures outlined above should be promoted.

Keidanren's Opinions and Suggestions

✓ **Recognizing Industries' Needs**

- Present online application/acceptance systems of administrative procedures are only online versions of former systems. They ignore the needs and reality of business flow in industries with heavy requirements. As a result, the following problems resulting in low usage occurred.

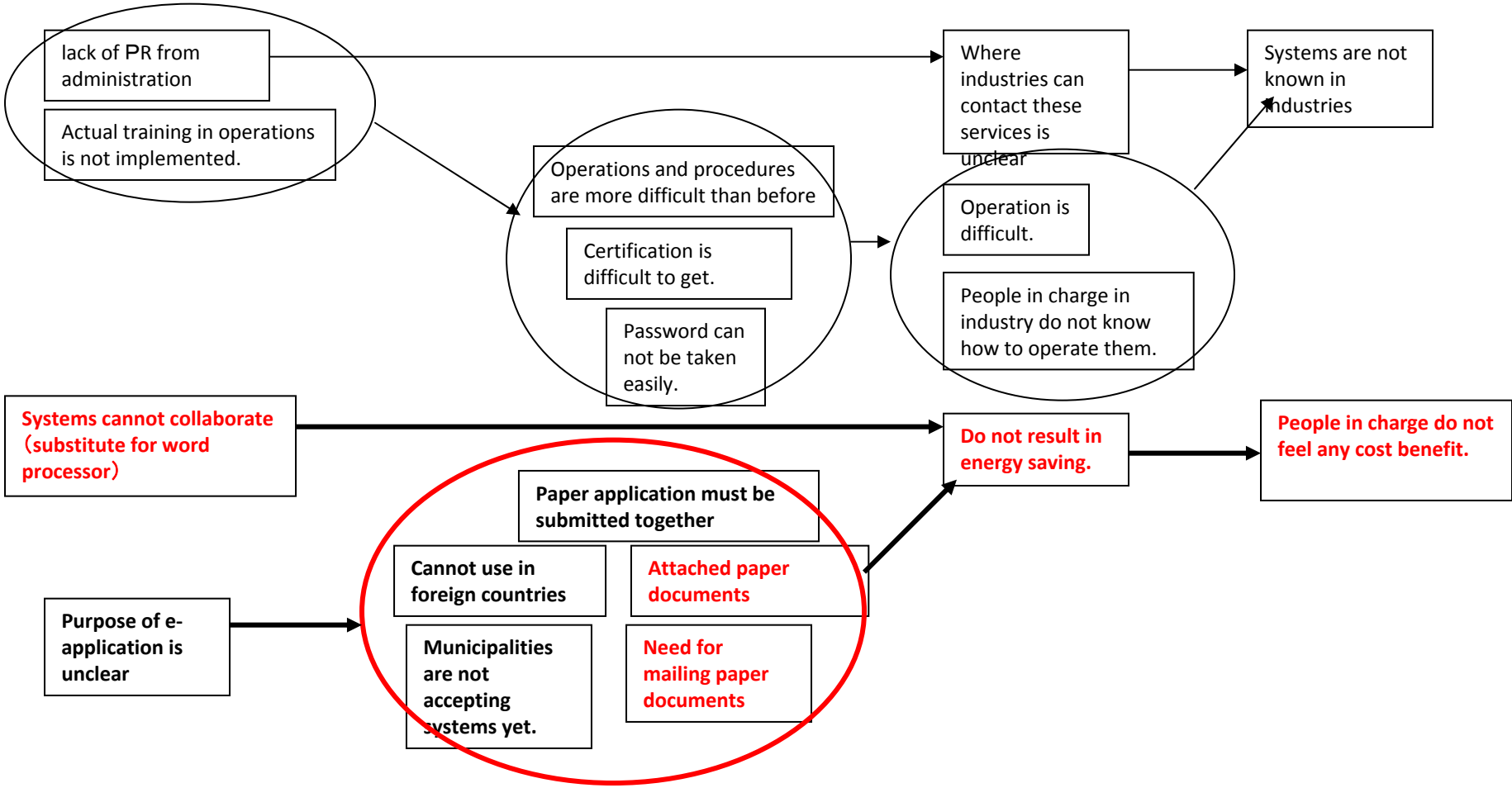
- **① Rationalization and simplification of each procedure, and reconstruction of whole procedures, are not done.**
- Online versions of former procedures are neither reasonable nor easy for industries to use. Some of these require attached documents or certifications, and are rather troublesome.

- **②Business flow of industries and office processing system do not match well.**
- Individual procedures do not suit office processing flow in industries. Some processing systems do not match well with e-administration.

Resource : the Government "e-Government Assessment Board Report"

Problems in Electric Application in Industries

（national tax・social insurance・labor insurance）



Resource ： the Government “e-Government Assessment Board Report”

An Example of Problems

- **How users feel when they actually use online applications, what users think is important when they use it, what problems or obstacles are not understood or analyzed efficiently. Adequate measures for reforms from the viewpoint of users are not clearly proposed yet.**

- **（Direction for solving problems）**

- **The government must consider administration services according to users' needs. For example, services must be offered not only for each procedure, but also for life events such as changes in the household, marriage, and childbirth.**
- **There is a need to proactively consider online applications matched with users' needs from the viewpoint of users such as retirees. When people born in the 1950s retire, they will apply for social insurance and labor insurance on their own.**

Resource ： the Government "e-Government Assessment Board Report"

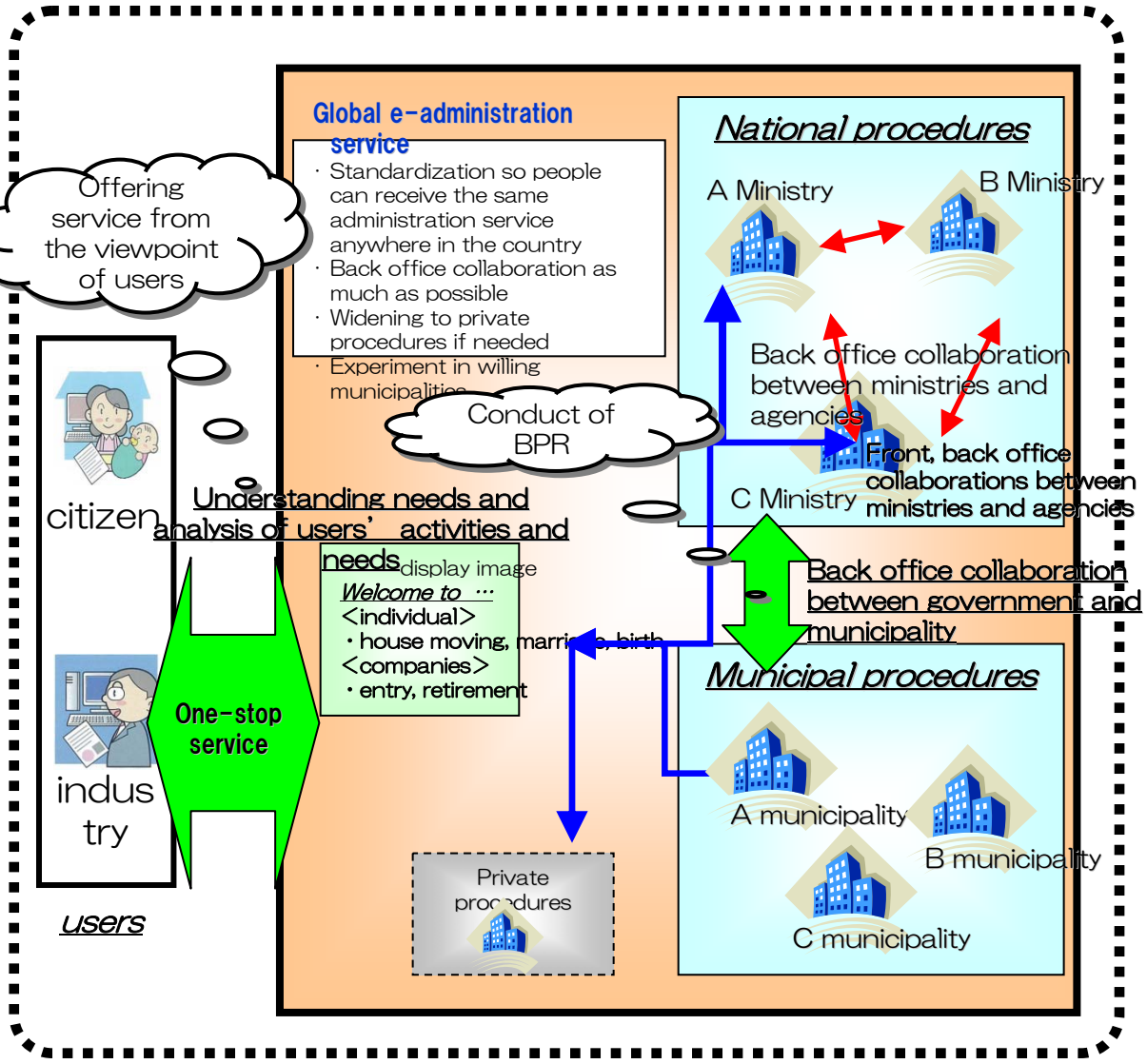
A challenge to realize the leading edge e-Government

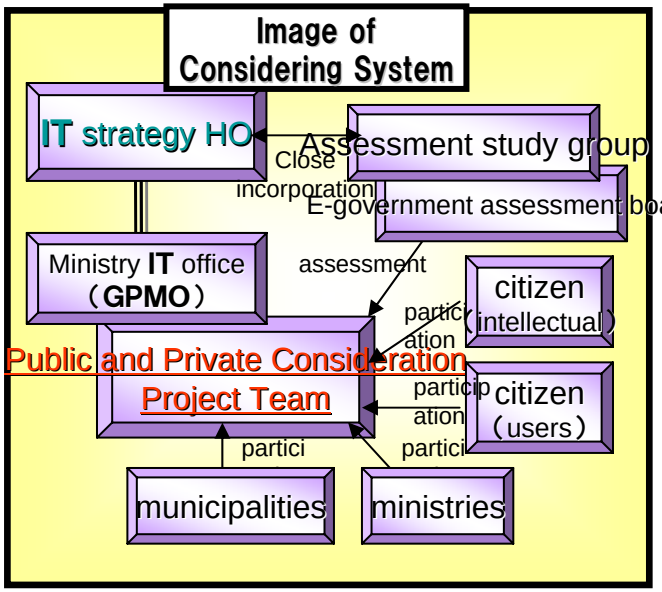
Grand Design Image of New Generation e-Administration Service

resource：Cabinet Secretariat

http://202.232.58.50/jp/singi/it2/nextg/meeting/dai1/pdf/siryou3.pdf p3 revised

Consideration for building a standard model of second generation e-administration, particularly beyond the government and municipal framework





※ GPMO(e-Government Promotion and Management Office)

resource：Cabinet Secretariat

1. Canada（Service Canada）

http://202.232.58.50/jp/singi/it2/nextg/meeting/dai1/pdf/siryou4.pdf p9

"Service Canada", the new administrative organization offering a one-step administration service was born by the reconstruction of employees from related ministries and agencies. The service started in September, 2005.

- Administration one-stop services offered by separate ministries such as social insurance were restructured according to user segments, and became available by phone, service counters, internet, and mail.

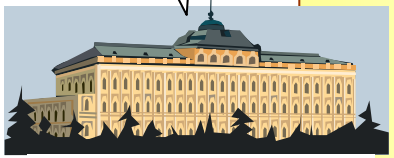
users：32 million Canadians
service counters：**550**
staff：**22000**
dealt cases：call center 65 million
e-mail 20 million

cut-down money：$3.6 billion
- operational cost $2.2 billion
- effect on improper receipt prevention $1.4 billion

PAC（※） use for online service

Service counter

All services are available only by accessing Service Canada



Service Canada

One-stop internet, phone, and service counters

Disabled life-support
- Military veteran healthcare program
- medical bill support
- nursery subtraction
- State's handicapped support service
- The 3rd sector support service

Technology development, learning
- Canada research grant
- CPP reemployment support
- Dependent subtaction

emp oym t
- Employment benefit/ support
- LMAPD
- Employment opportunity fund

For disabled people

For seniors

For laborers

For all Canadians

Services were coordinated from the users' viewpoint

military veterans

Revenue Ministry

states, countys

The third sector

Service menu according to user categories
There are service menus for each life event (marriage, recruit, house moving) of an individual

※PAC‥personal access code, which is needed when using an online service. It is mailed to a user when he orders publications over the telephone using his social insurance code.

2. England (DirectGov, Business Link)

UK government reconsidered each ministries' website with a view to redesigning services for users indicated in an e-government initiative, "Transformational Government" presented in November, 2005 and streamlined in the service channels, integrating various web sites into 2 portal sites, **DirectGov** and **Business Link**.

Administration portal for citizens
Started in March 2004
Linked with government (18 ministries) and local municipalities (388 groups)
Can be accessed from the internet and from digital TV
5 million accesses/month

In 2001, according to a "UK online strategy" proposed by the Blair government which will offer all government services online, Ukonline started. DirectGov succeeded UK online.

Individual

company

Portal for companies
Started in Nov, 2003
700 thousand accesses/month

DirectGov

category
- education
- home,community
- money,tax
- ⋮

users
- youths
- parents
- handicapped
- ⋮

Online service
- law
- education
- employment
- car
- ⋮

Business Link

category
- entrepreuner
- finance
- tax
- employment
- ⋮

Online service
- consumption tax
- Corporate tax
- E-document management
- bid
- ⋮

Link to each ministry's online service

Link to each ministry's online service

Government gateway (certification basis)

AAAオンラインサービス HP

BBB online service HP

CCCオンラインサービス HP

A ministry

551 sites from 951 sites of 16 ministries moved to a portal site (90 were abolished),26 continued

MMM online service HP

NNNオンラインサービス HP

B ministry

The remaining 374 sites are to be reconsidered (before 2007,7)

YYY online service HP

XXX online service HP

ZZZ online service HP

municipality

A common basis for certification and treatment exchange between administrative organizations
Started in Feb, 2001
Handled 5 million cases in a year

resource：Cabinet Secretariat

http://202.232.58.50/jp/singi/it2/nextg/meeting/dai1/pdf/siryou4.pdf p10

resource：Cabinet Secretariat

3. Korea（G4C）

http://202.232.58.50/jp/singi/it2/nextg/meeting/dai1/pdf/siryou4.pdf p11

5 major businesses of administration（citizen, real estate, car, company, tax）and 24 information were back office collaborated, and e-government portal（Gov. For Citizen）started in November, 2001 to offer digital public services. Also, publishing of 20 kinds of certification via internet started in May, 2003.

Resident registration and 20 other kinds of certifications can be published（printed by printers）

President Kim Dae-Jung presented “Cyber Korea 21” in 1999. G4C construction started in July, 2001, and operation started in November, 2002.

24 kinds of information are shared

G4C

（digital public services）

category

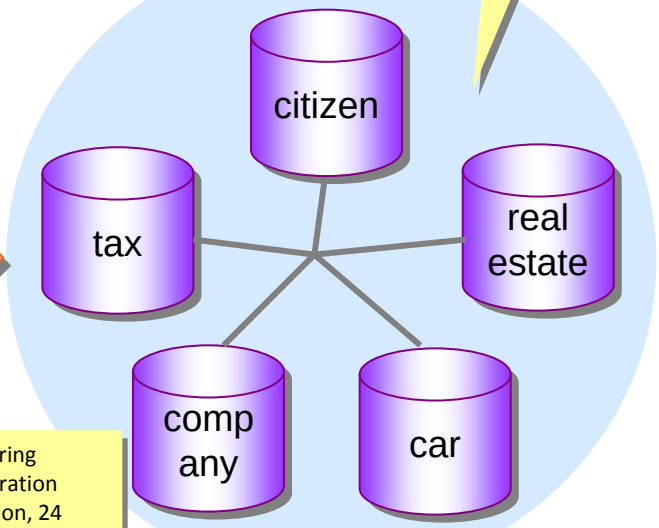
- Private and home
- real estate
- car
- tax
- Company/ economy
- travel /immigrants
- education/ recruit
- ⋮

Common basis

- application guide
- digital form
- mobile
- application publishing
- car
- e-payment
- total certification

One-stop of front office

Back office collaboration



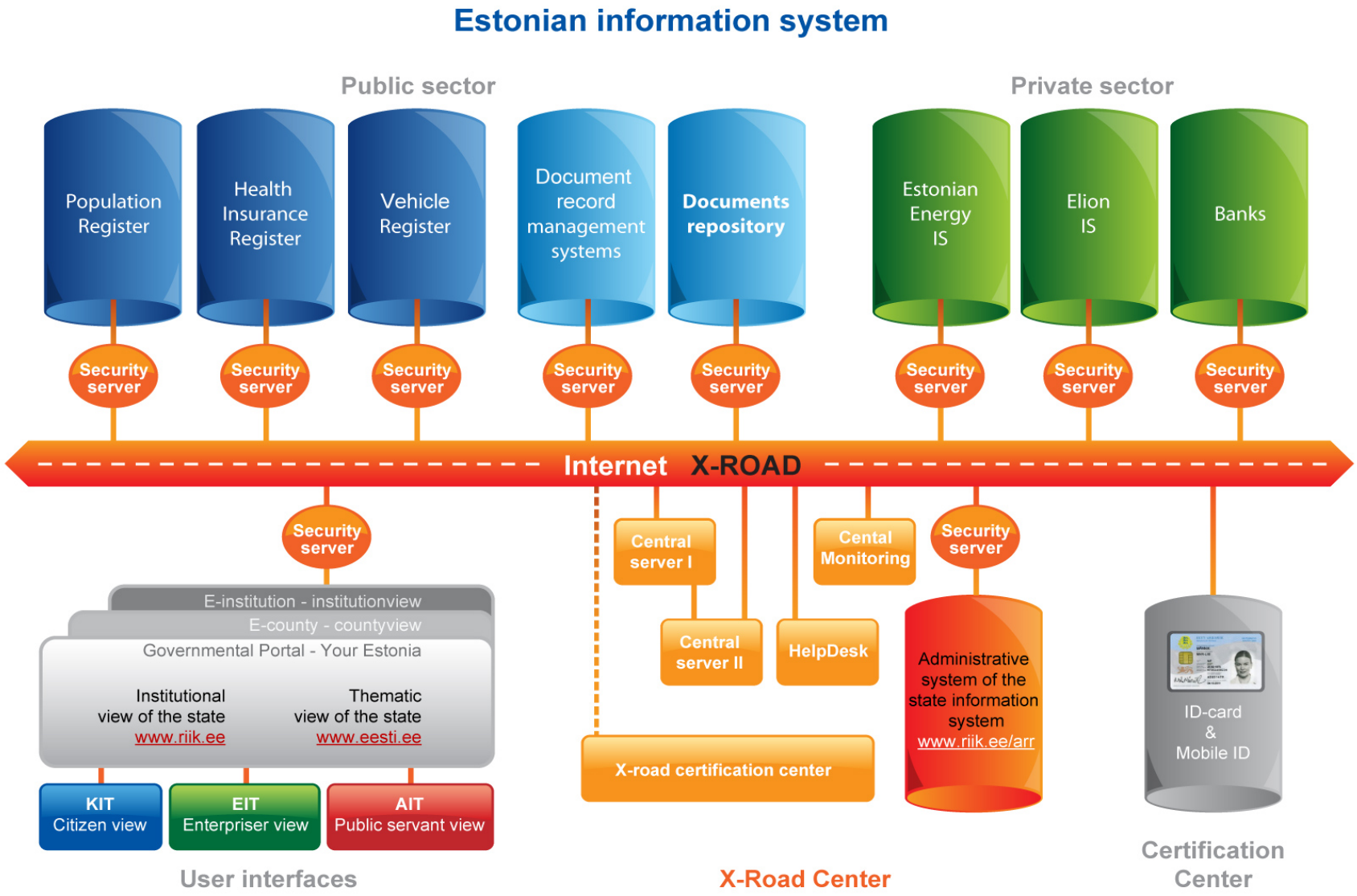
By sharing administration information, 24 attached documents for application became needless.

Recognition by e-certification (stored in bank IC card and distributed to citizen)

Guidance for application (4900 kinds), applications (590 kinds), internet publishing (20 kinds)
accesses：2.8 million accesses／month
cut-down documents：40 million／year, reduction of citizen’s time :248 billion won

Sharing will expand to private institutions

An Example of a Database-Incorporated IT Society Basis



(copyright) Estonian government

Government “e-Government Assessment Board” 2007, second meeting document

http://www.kantei.go.jp/jp/singi/it2/densihyouka/kaisai_h19/dai2/siryou6.pdf

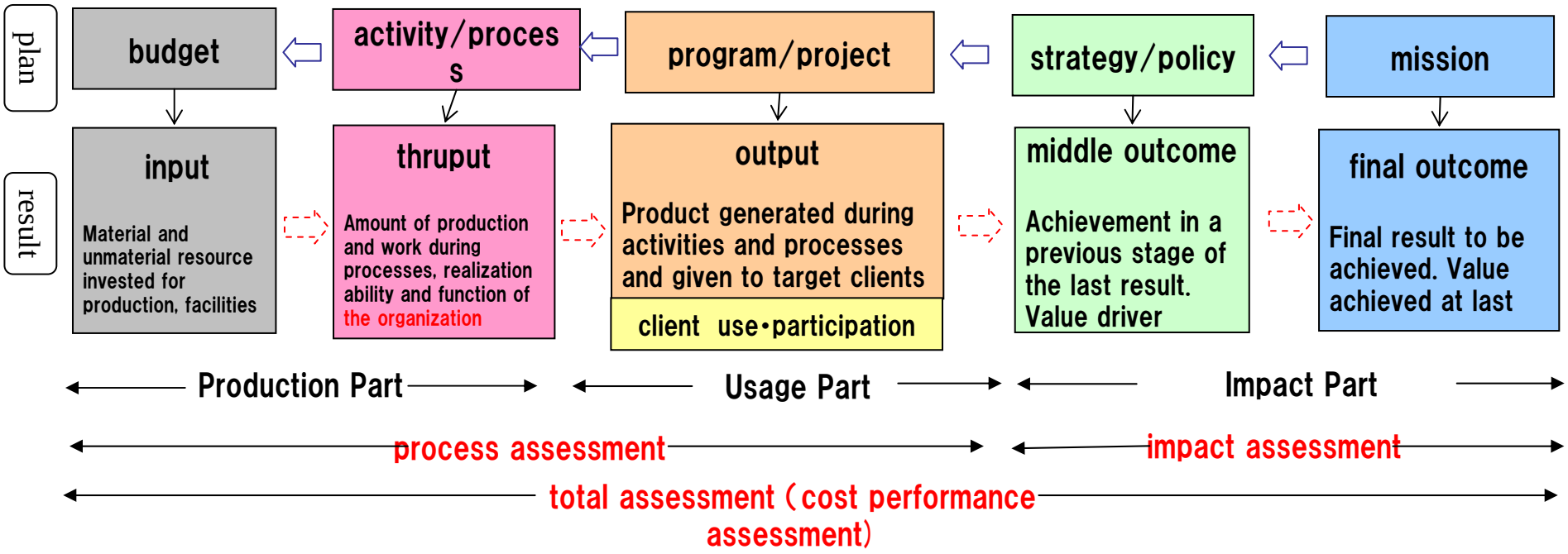
Assessment Framework of an e-Government and Results of an Analysis of e-Application Use Promotion

2007/7/26

Osamu Sudoh・Reiko Goto・Masaharu Akatsu・Yu Yoshikawa・Chusuke Nakagawa・Yumiko Kinoshita

UT Division of University Corporate Relations
“Service Innovation Study Group”
SWG-1”Visualization of Values” Public Service Analysis Team

The Logic to Public Service/ Policy Systematically Assessment



- **Logic model**
  - **A framework to measure and evaluate achievements of public service and policies with regards to the mission. A hierarchical structure of purpose and procedures, cause and effect.**

（resource）Rossi et al.[2004]

http://www.kantei.go.jp/jp/singi/it2/densihyouka/kaisai_h19/dai2/siryou7.pdf

Process Assessment, Impact Assessment, Total Assessment

- Process assessment･･･evaluate to see if programs are offered to target groups as intended

  ○Output assessment･･･Are adequate services delivered efficiently to target groups?
  - Service users, visibility (in target groups)
  - Whether amount, variety, quality of services that participants were offered were appropriate
  - Satisfaction level of users for service quality, number of staffs in programs, processes of service offering

  ○Thruput assessment･･･Is there the ability to produce required output?
  - Is the essential program function executed efficiently? Is the program well organized?
  - How is the teamwork between the staff and the collaborations between organizations going?

  ○Input assessment･･･Are enough resources invested to produce the required output effectively and efficiently?
  - Are resources, facilities, money, number and ability of staff sufficient to support important program functions?
  - Are resources used efficiently and effectively?

- Impact assessment･･･evaluate “absolute profit” (=program effect) of the outcome by comparing before and after, or participating groups and related groups

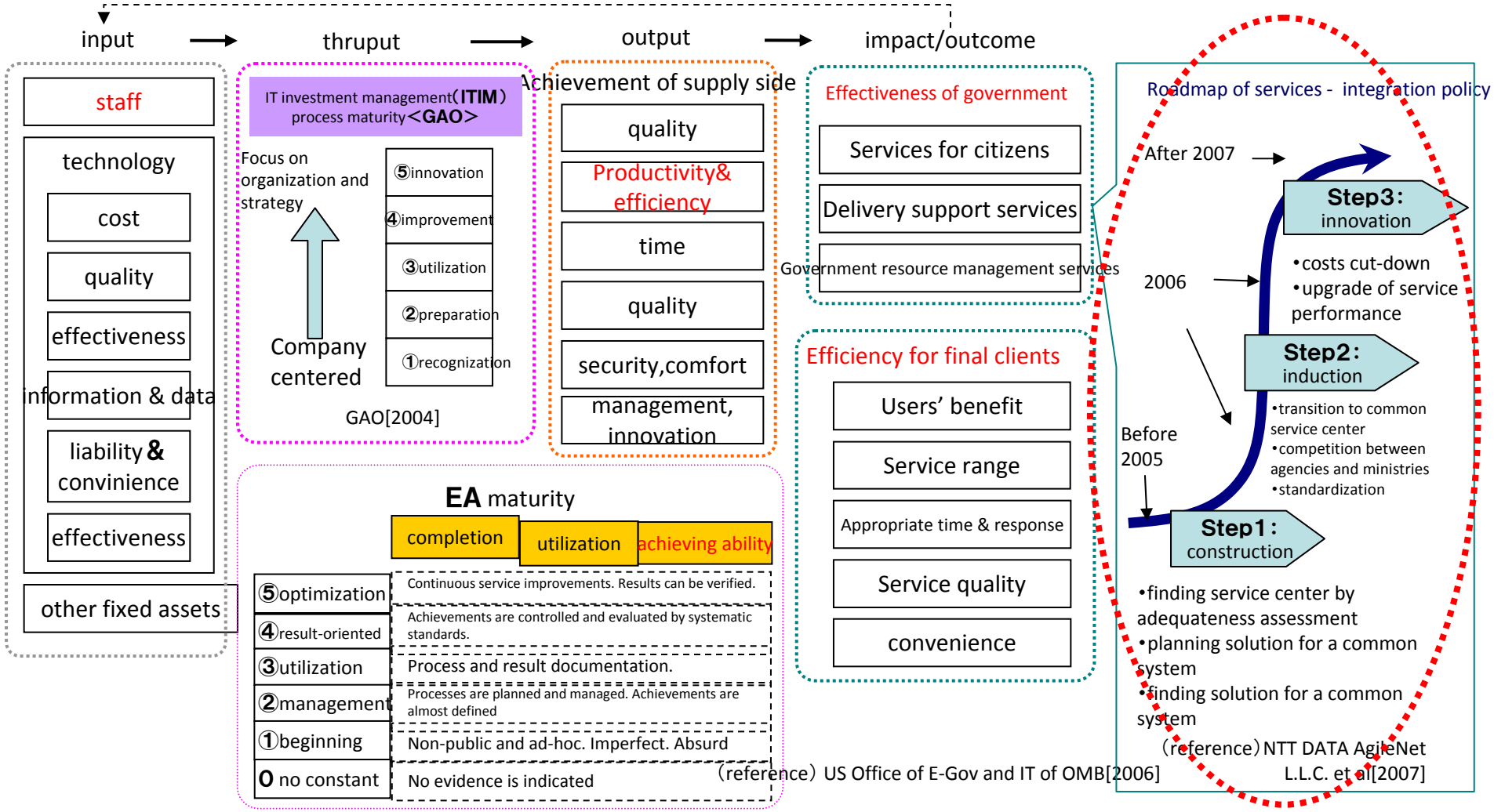
- Total assessment･･･evaluate cost performance by analyzing cost benefits (the outcome is expressed in currency) and cost-benefit performance (the outcome is expressed directly) , and judge their need or effectiveness. Social costs and benefits are considered.

(Reference) Rossi et al.[2004]

http://www.kantei.go.jp/jp/singi/it2/densihyouka/kaisai_h19/dai2/siryou7.pdf

Measurement and Assessment Framework of e-Government①: the U.S. government

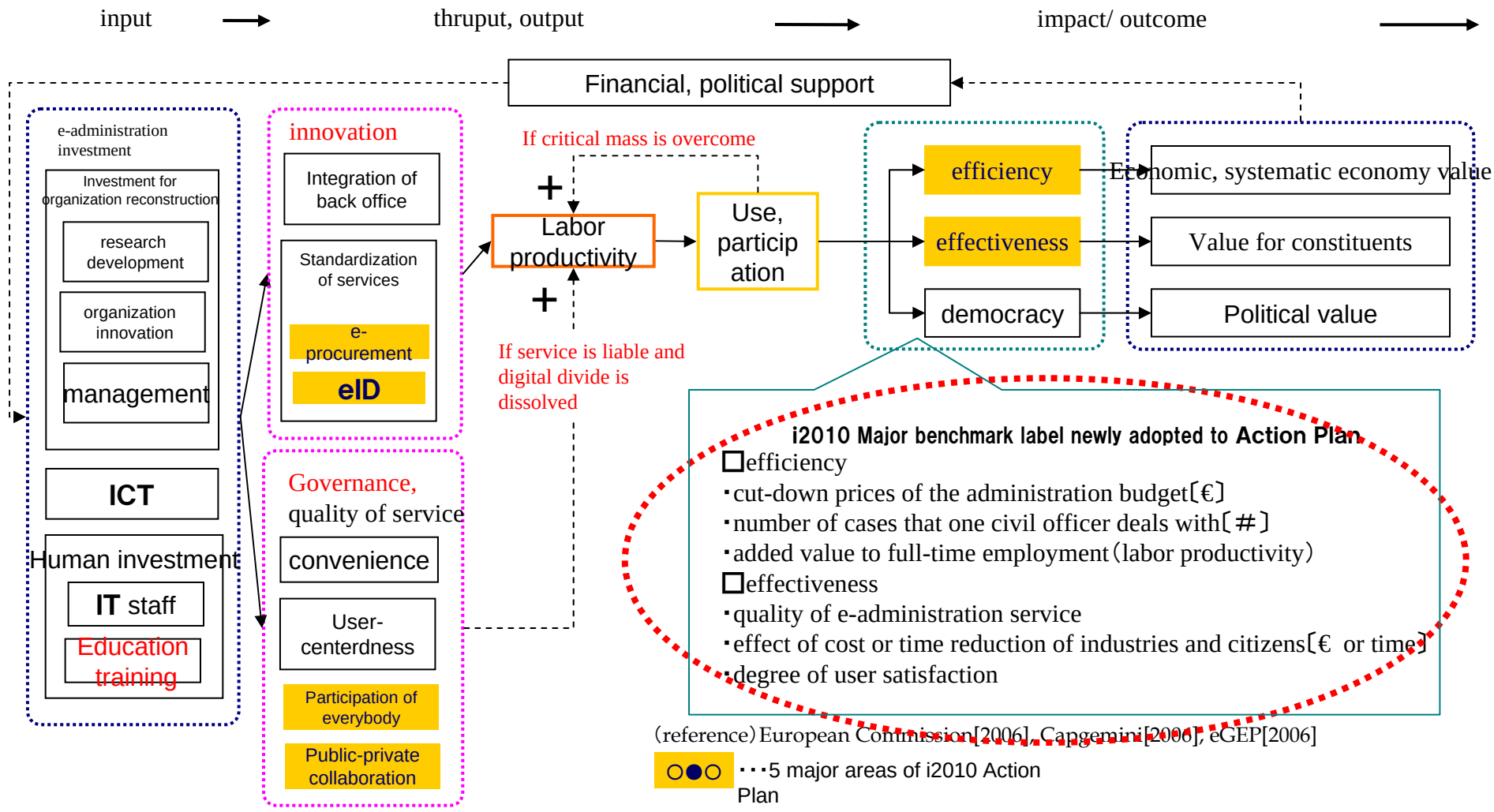
- Adequateness of IT investment portfolio and achievements of process stages are measured and evaluated crossing ministries and agencies.
- To upgrade cost performance of services, integration, standardization of businesses and challenges for commons use of services advanced.（ex. Financial management, personnel management, IT basis etc.）



http://www.kantei.go.jp/jp/singi/it2/densihyouka/kaisai_h19/dai2/siryou9.pdf

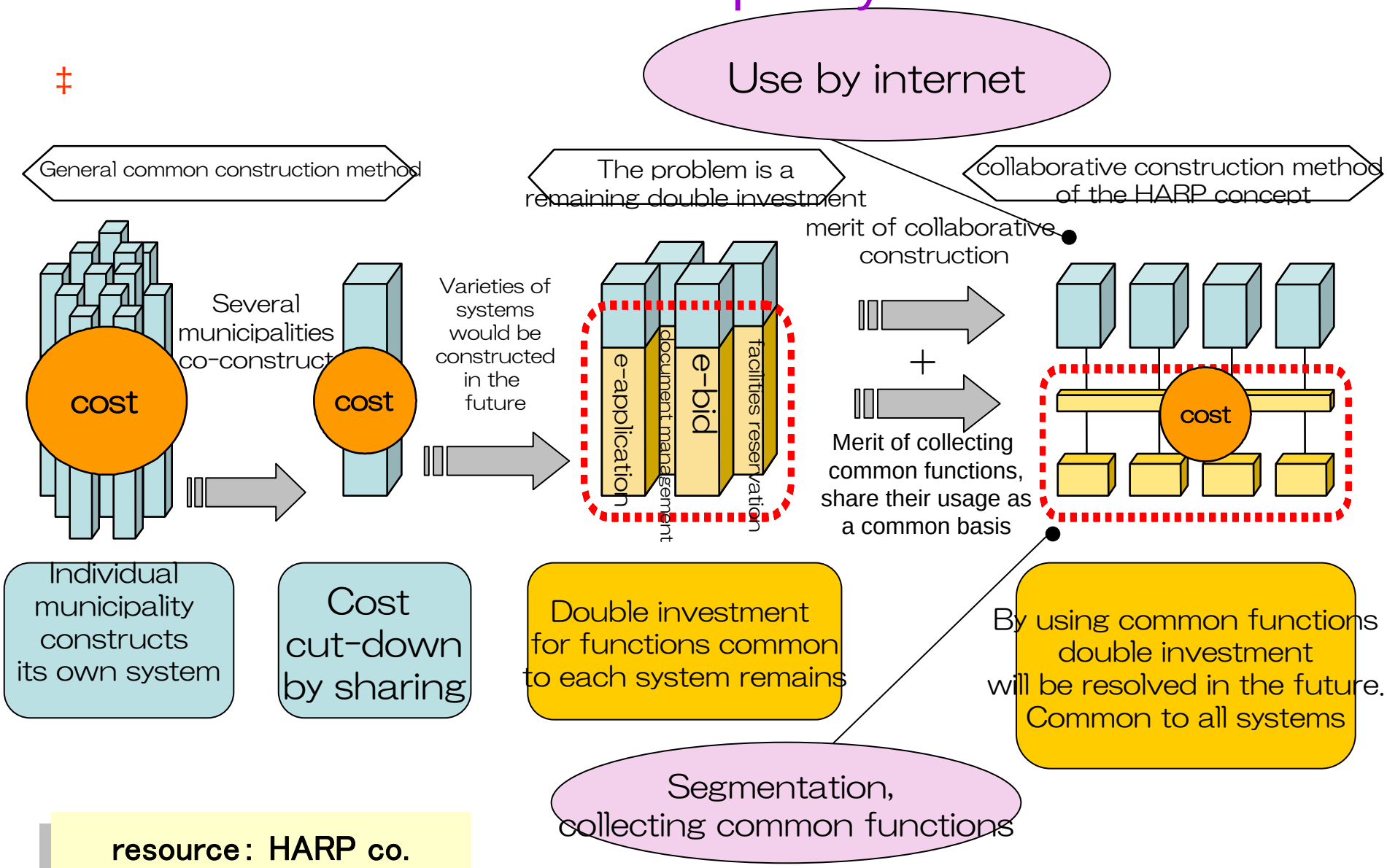
Measurement and Assessment - Framework of e-Government ②：EU

- To heighten the efficiency and effects of e-administration, not assessment of “ usage environment level” but impact assessment and good practice analysis are emphasized.



http://www.kantei.go.jp/jp/singi/it2/densihyouka/kaisai_h19/dai2/siryou10.pdf

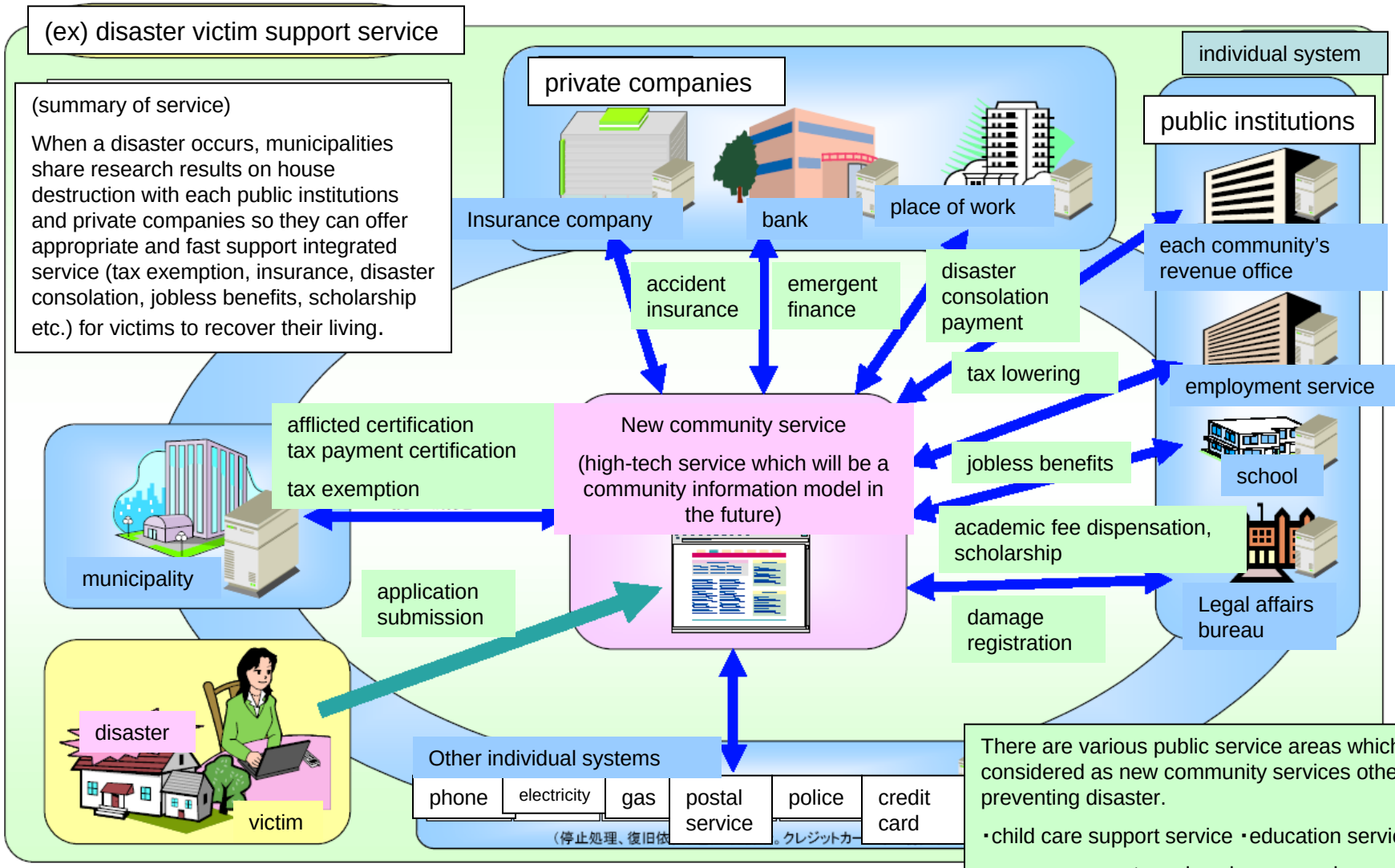
Construction and Operations Model for a New Electric Municipal System



resource：HARP co.

http://www.senryaku-kaigi.jp/pdf/hokkaido_b5.pdf

Examples of Services Using a Local Information Platform



There are various public service areas which can be considered as new community services other than preventing disaster.

・child care support service ・education service

・nursery support service ・house moving portal service

・marriage portal service etc.

http://www.nmda.or.jp/kanmin/5kai/5-7.pdf p3

Local Information Platform

Oct. 17, 2007
The Association for Promotion o
Public Local Information and Communication

MEXT Special Field Research "Information Explosion IT Basis"

i-explosion 情報爆発

B01 Governance of Intellectual Society Formation in the Age of Information Explosion

Project Research
Collaborative Development of Economic System in Intellectual Society and Its Governance

Chief of Research

Osamu Sudoh