Future Information Society and their Infrastructures

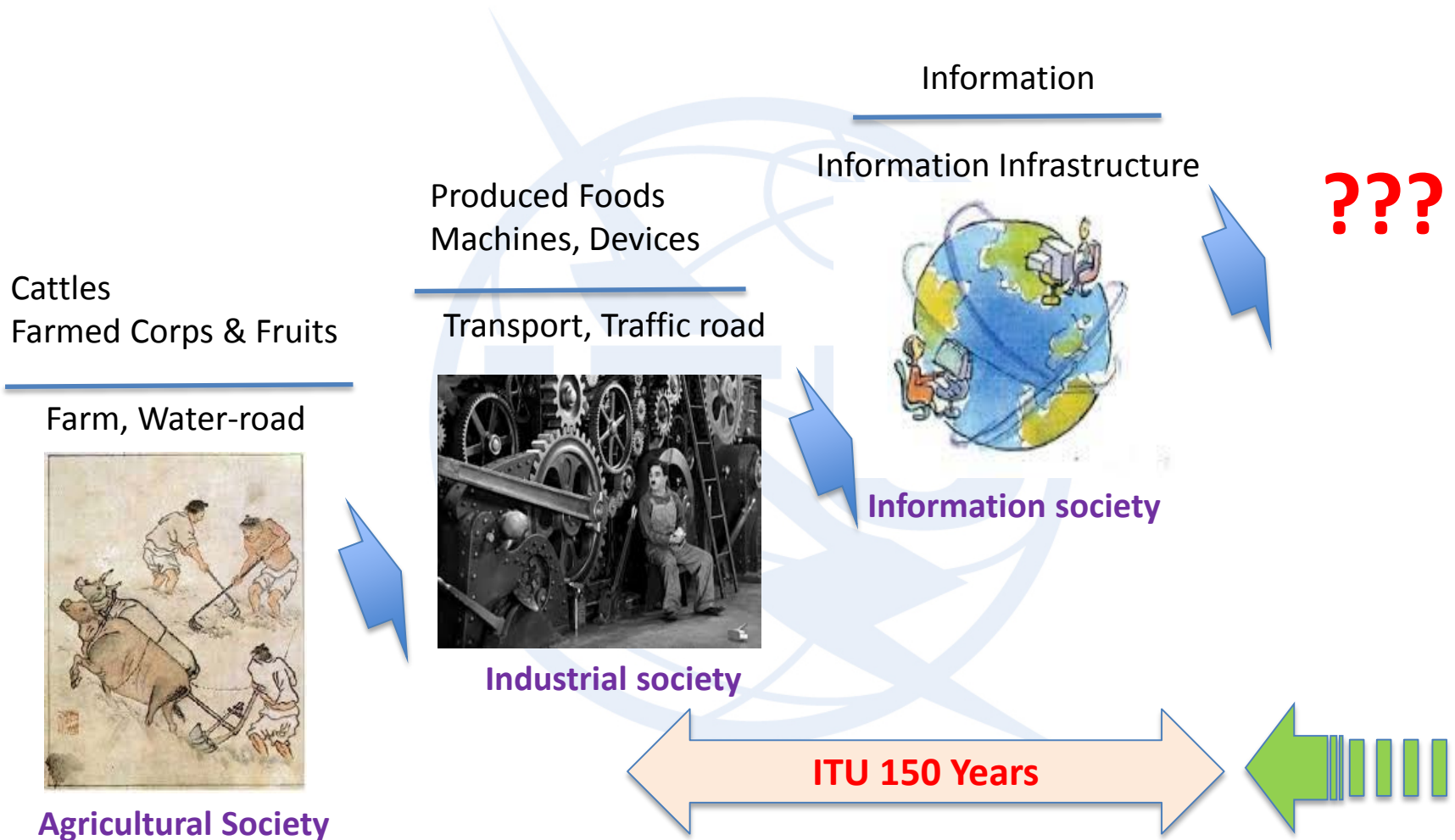**Chaesub Lee**

Director, ITU TSB

Contents

I. Society and Infrastructure

- Human beings have social nature = 人間

- Human history with "Society developments"
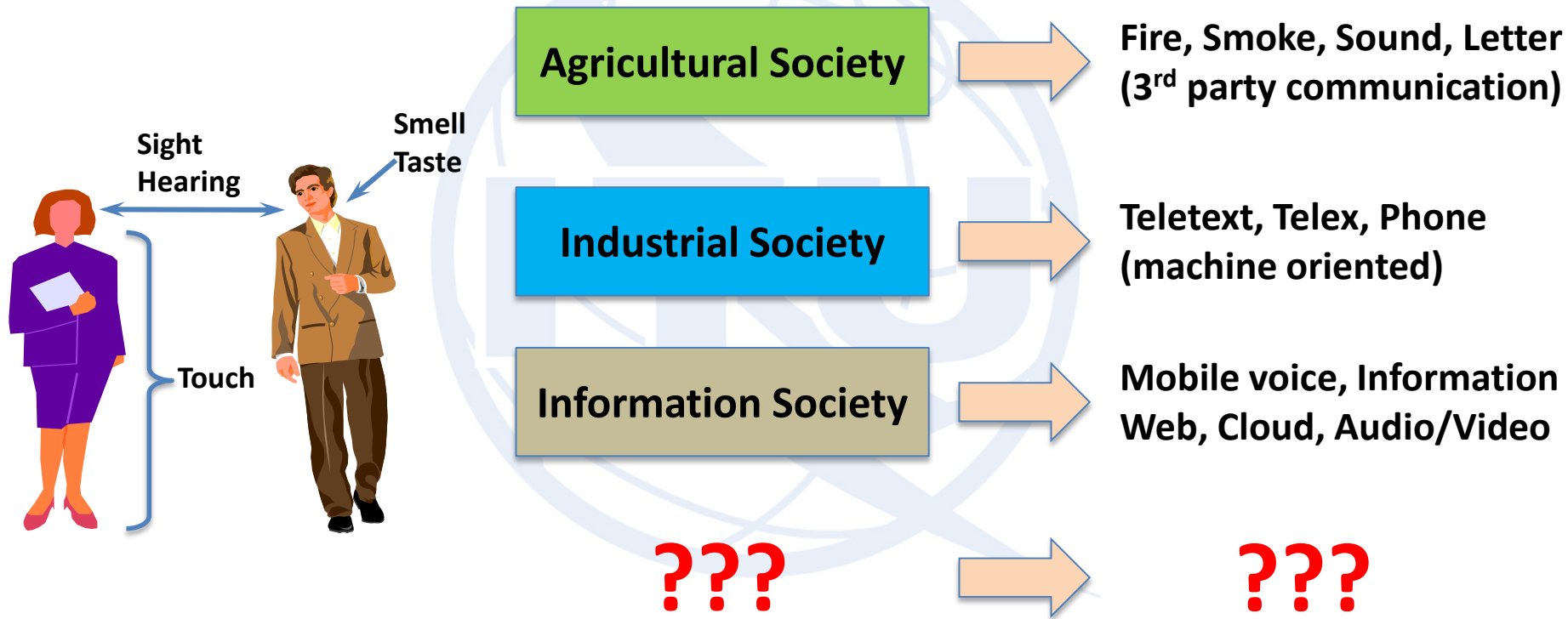 - Primitive Society
  - Agricultural Society
  - Industrial Society
  - Information Society

I. Society and Infrastructure

Information

Information Infrastructure

???

Produced Foods
Machines, Devices

Cattles
Farmed Corps & Fruits

Transport, Traffic road

Farm, Water-road

Information society

Industrial society

Agricultural Society

ITU 150 Years

I. Society and Infrastructure

- **Communication** is an essential part to build human society, because human-beings have social nature (use of five senses)
- So each society used **different means** for communication

Sight
Hearing

Smell
Taste

Touch

Agricultural Society → **Fire, Smoke, Sound, Letter (3rd party communication)**

Industrial Society → **Teletext, Telex, Phone (machine oriented)**

Information Society → **Mobile voice, Information Web, Cloud, Audio/Video**

??? → **???**

II. Information Society

Information

Information Infrastructure

Information society (initiated 1993~5)

Information Super Highway

GII: Global Information Infrastructure

Connecting the people: Mobile

Connect the world: Broadband

Smart Devices: Smart ICTs

Connecting the Things: IoT

???

Information Super Highway → GII: Global Information Infrastructure

Forming concept & Social consensus

Connecting the people: Mobile ← Connect the world: Broadband

Provide Connectivity

Smart Devices: Smart ICTs → Connecting the Things: IoT

Provide Mobility

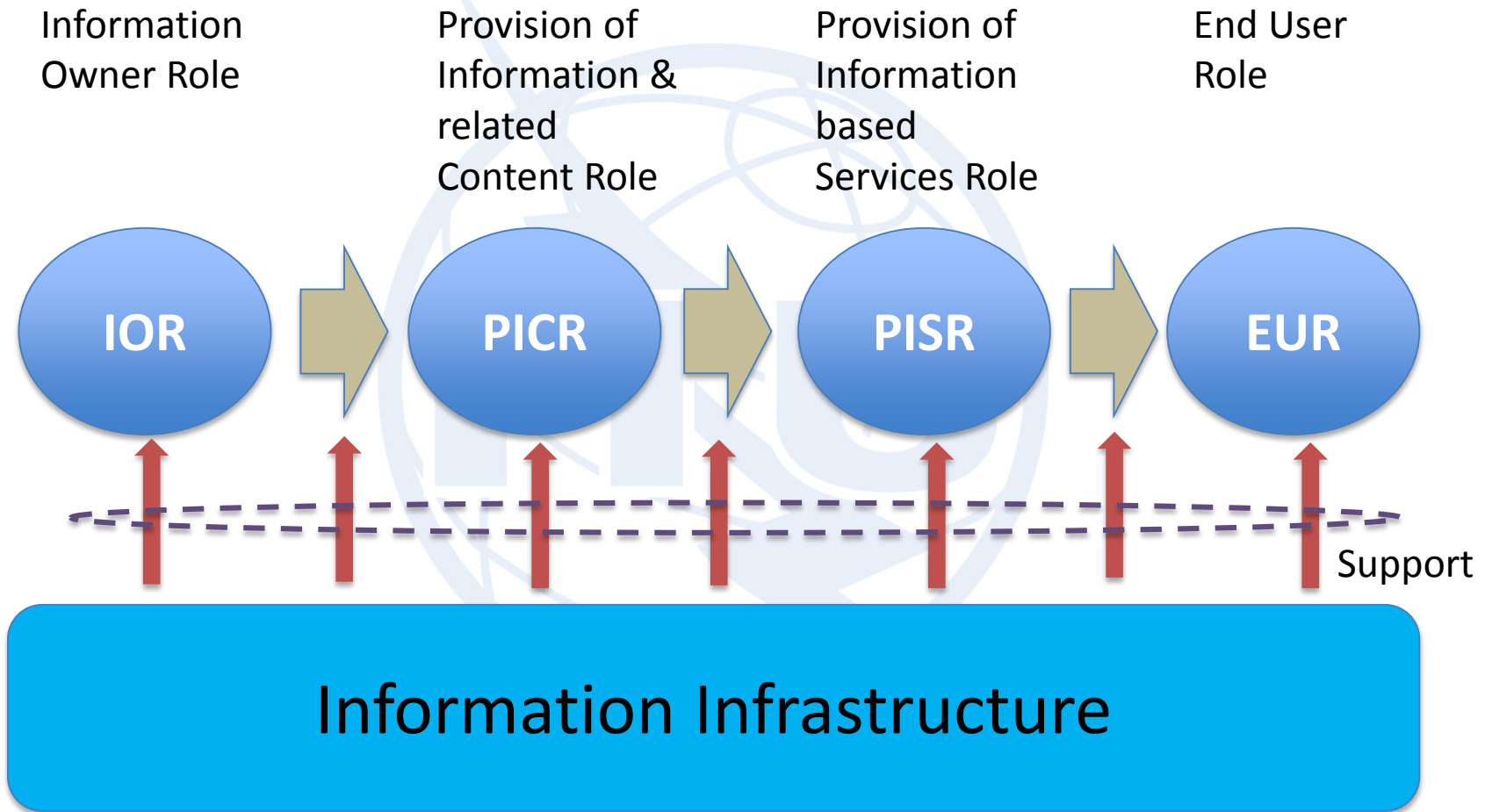**Make Safe and Smart Information Society**
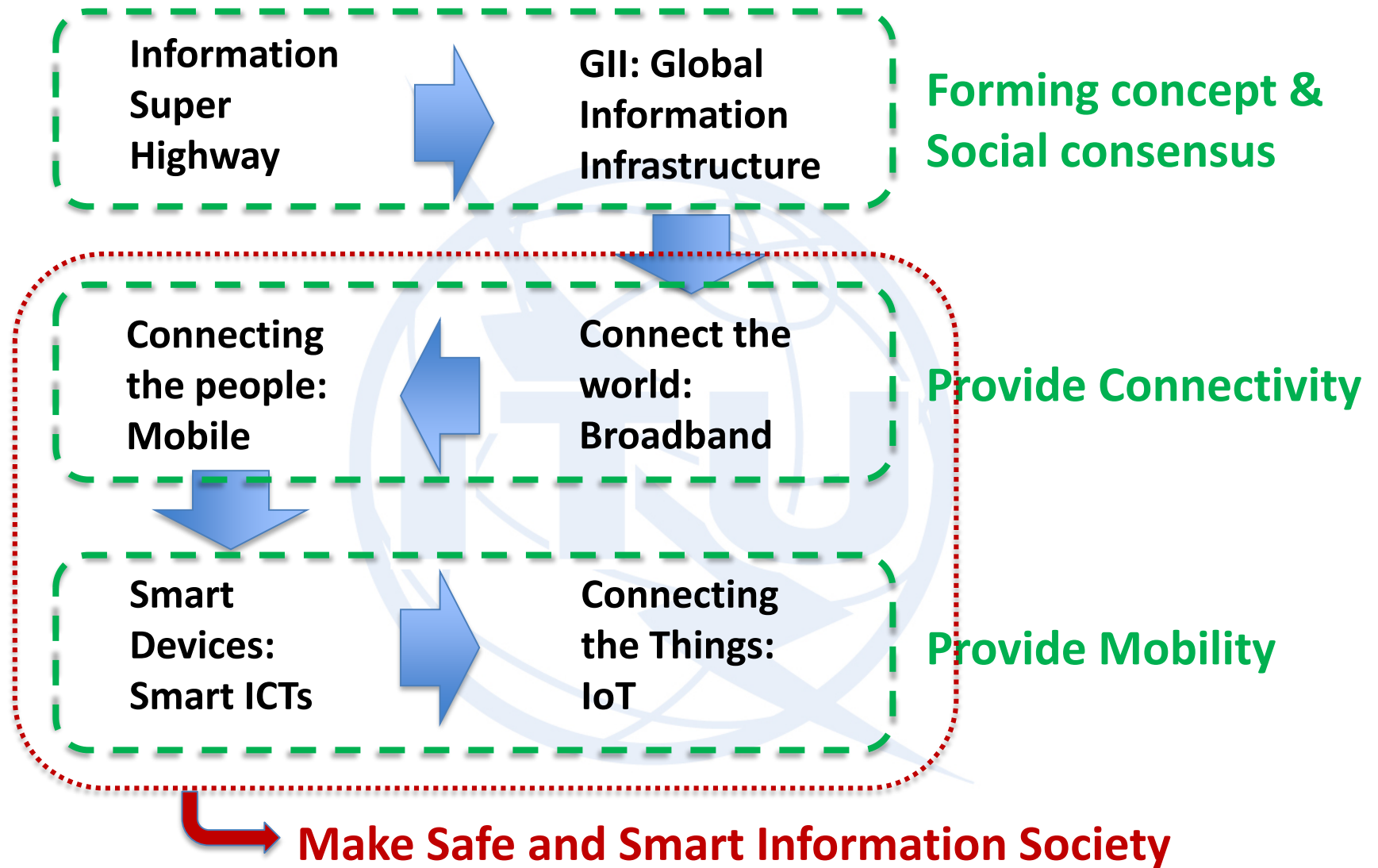
Structural Role and Infrastructural Role

● high level views of Society using enterprise model (**ITU-T Y.110**)

– Structural role: a role in the primary value chain of an industry and will involve a business activity

– Infrastructural role: not in the primary value chain of the industry → supplies goods/services

Structural role

Infrastructural role
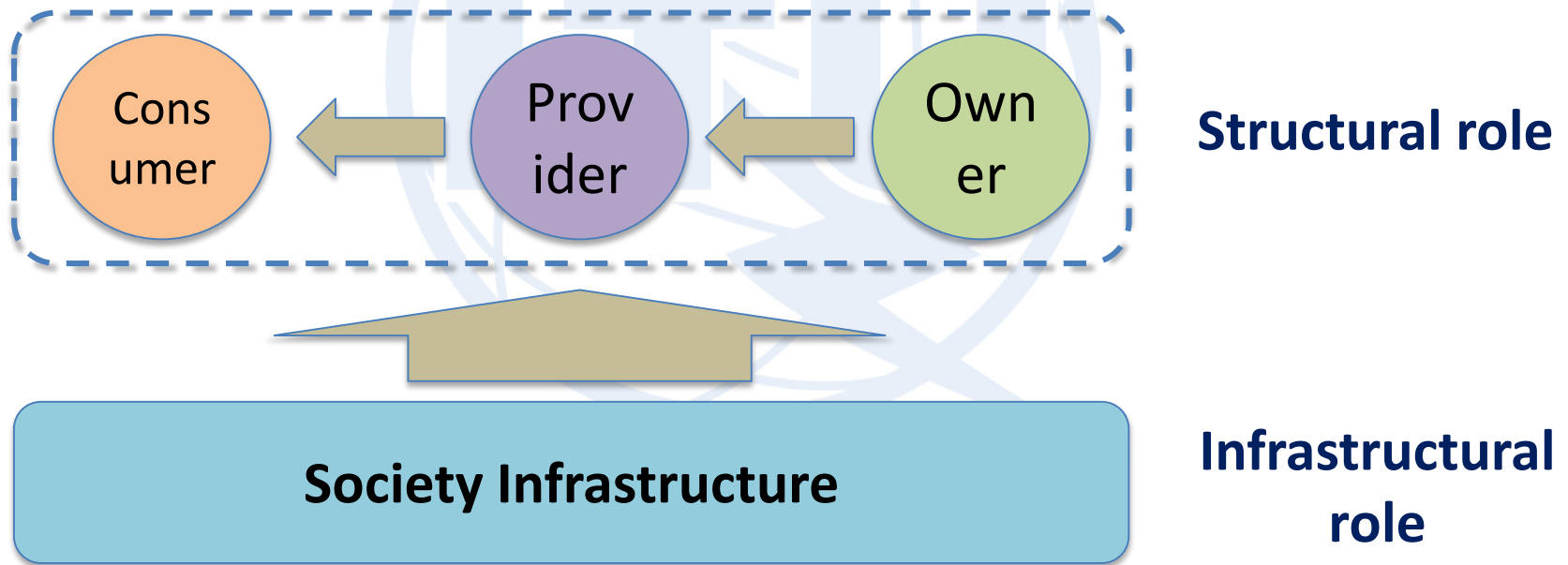
III. Features of Infrastructure

- Different roles in Structural role: IOR → PICR → PISR → EUR

Information Owner Role

Provision of Information & related Content Role

Provision of Information based Services Role

End User Role

IOR → **PICR** → **PISR** → **EUR**

Support

Information Infrastructure
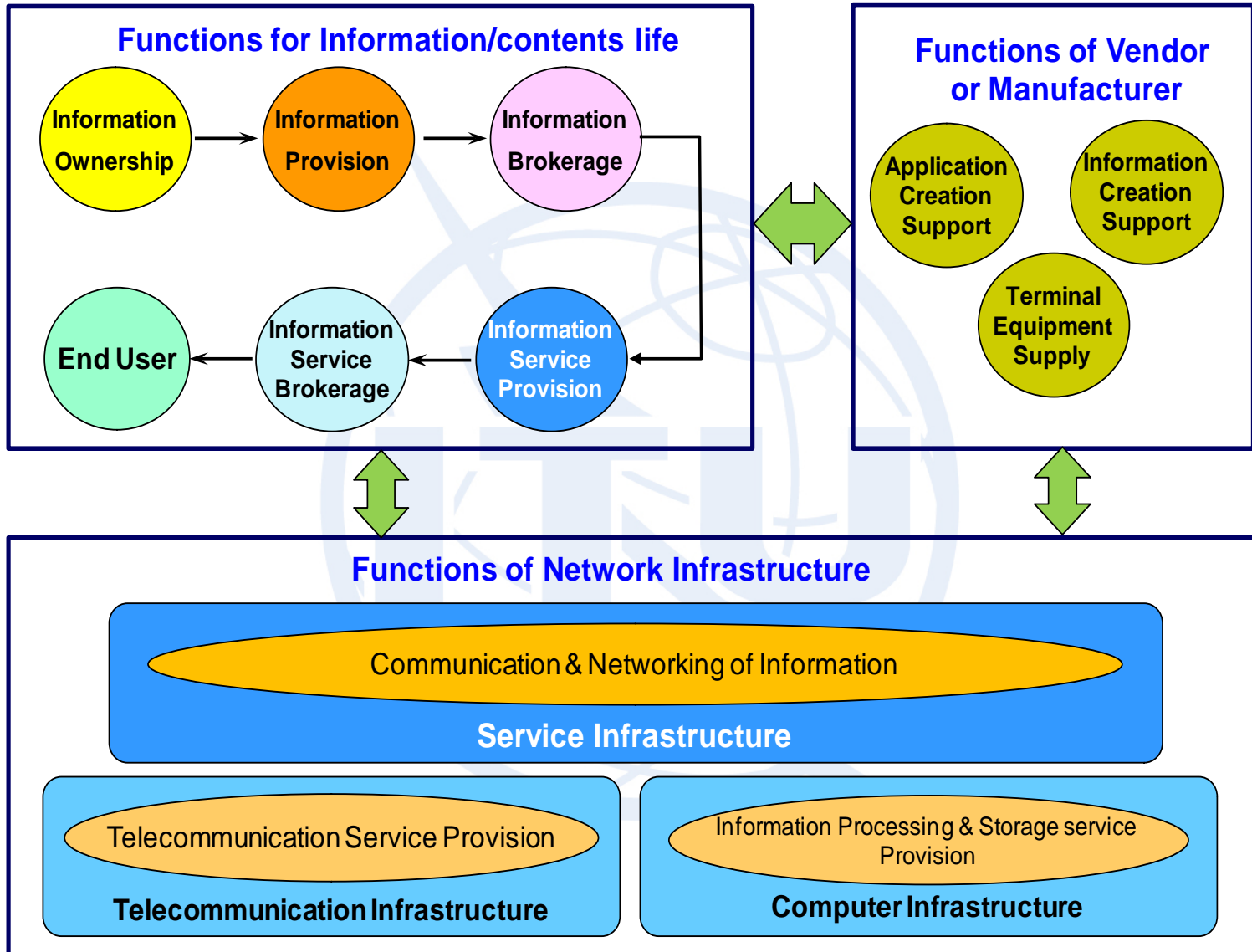
III. Features of Infrastructure

- Infrastructural Role: infrastructural "goods and services" to the information industry and supply "goods and services" to other industries or directly to end users with several Roles

Business and Life Value Chains

Terminal Equipment Supply

Com & Networking of Infor

App/Ser Creation Support

Generic Com. Serv Provision

Dist. Inf processing & Storage serv provision

Infrastructure Role
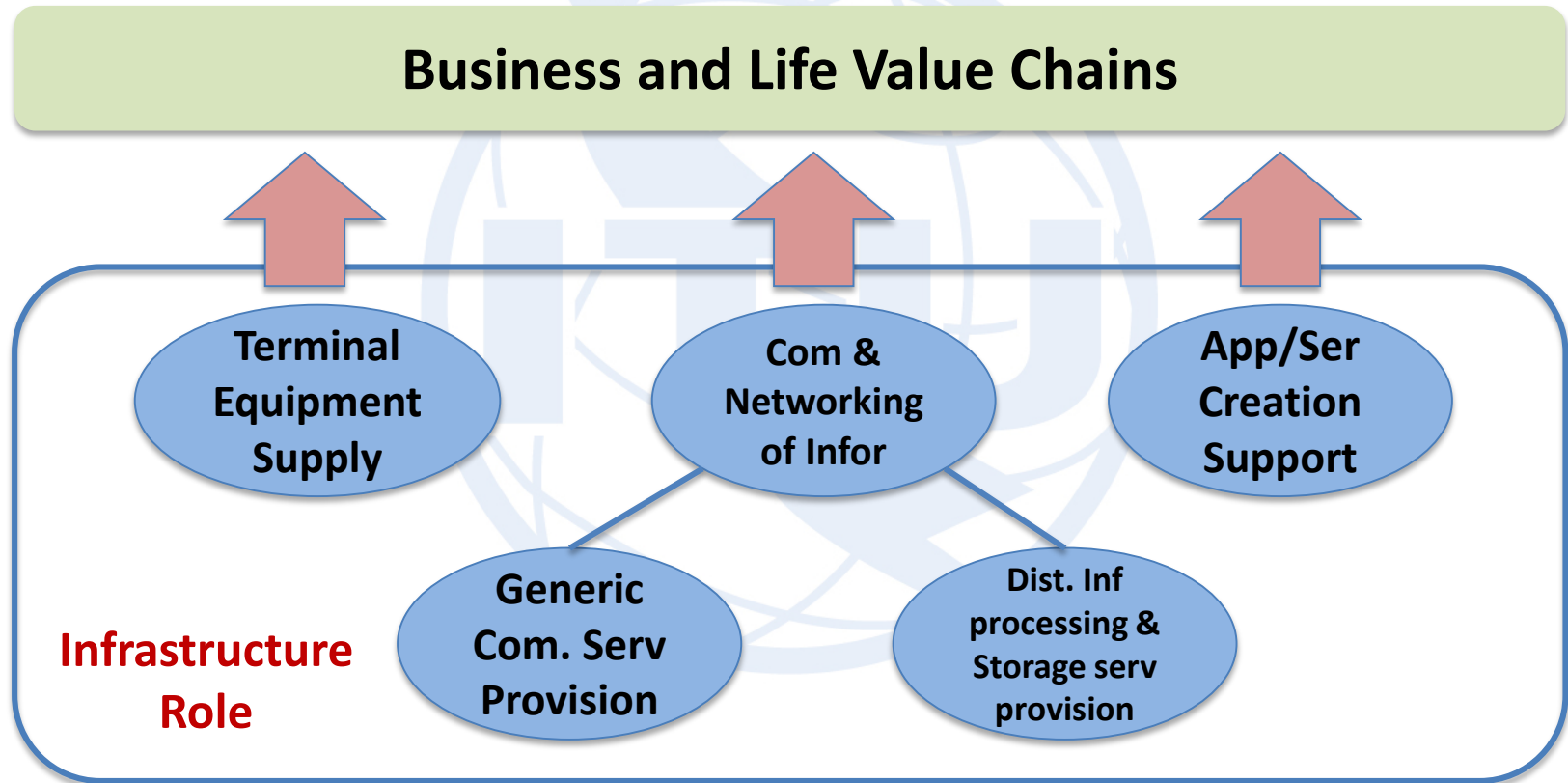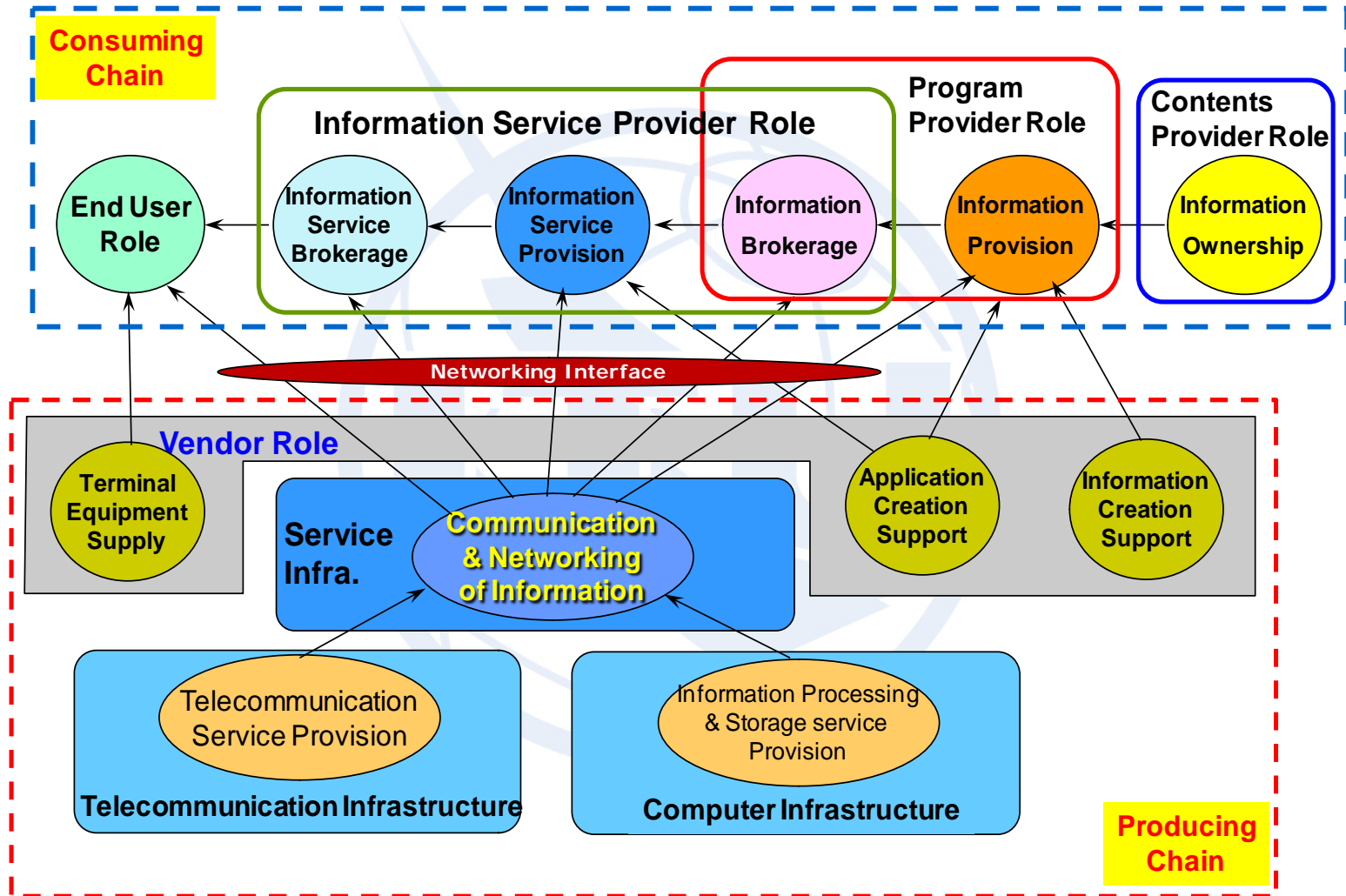
III. Features of Infrastructure

- Basic features of Information Society:
  - information is **an object** as well as **a mean** for social life
  - all relevant infrastructures should be enough to support **creation and dissemination** of such information **by on-line manner** which means over connected environment
- Key functions:
  - Functions for **information and contents**: **creation** of contents/ information and **transform** into services and applications
  - Functions of **network infrastructures**: forming of underground networks provided **connectivity** and **transported**
  - Functions of **vendor/manufacturer**: providing necessary **systems and tools** such as software

III. Features of Infrastructure

Functions for Information/contents life

- **Information Ownership** → **Information Provision** → **Information Brokerage**
- **End User** ← **Information Service Brokerage** ← **Information Service Provision**

Functions of Vendor or Manufacturer

- **Application Creation Support**
- **Information Creation Support**
- **Terminal Equipment Supply**

Functions of Network Infrastructure

Communication & Networking of Information

Service Infrastructure

Telecommunication Service Provision

Telecommunication Infrastructure

Information Processing & Storage service Provision

Computer Infrastructure

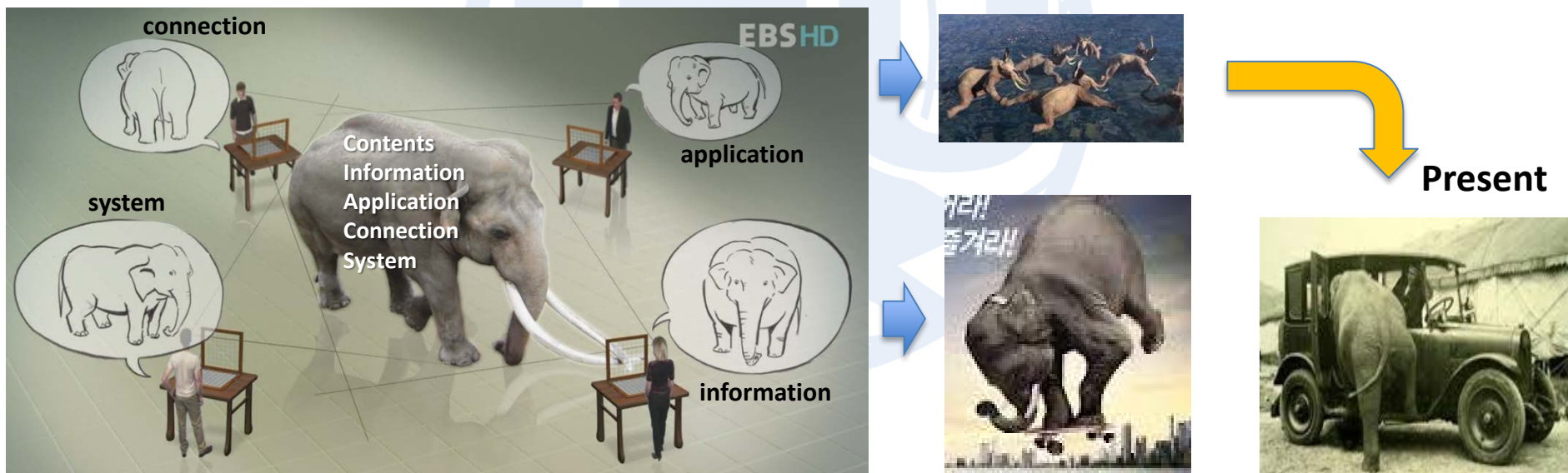## ● Value Chain Model of Information Society

- **Problem Space 1: Convergences**
  - Intra convergence (FMC) → Inter convergence (IPTV) → External convergence (ITS, Smart Grid, e-health)
  - Leaded by Technology Innovation concluded by business success
  - Differences: culture, environment, eco-systems

- **Problem Space 2: Complexity and Heterogeneity**
  - **Functions and capabilities** getting complex: System/Functions → Intelligent → Smart → Next (???)
  - Integrate various functions/capabilities into a system/function
    - Codecs: voice, video, multimedia, including Related PF
    - Connecting capabilities: WiFi (802.11 a/g/ab)+3G+4G+5G
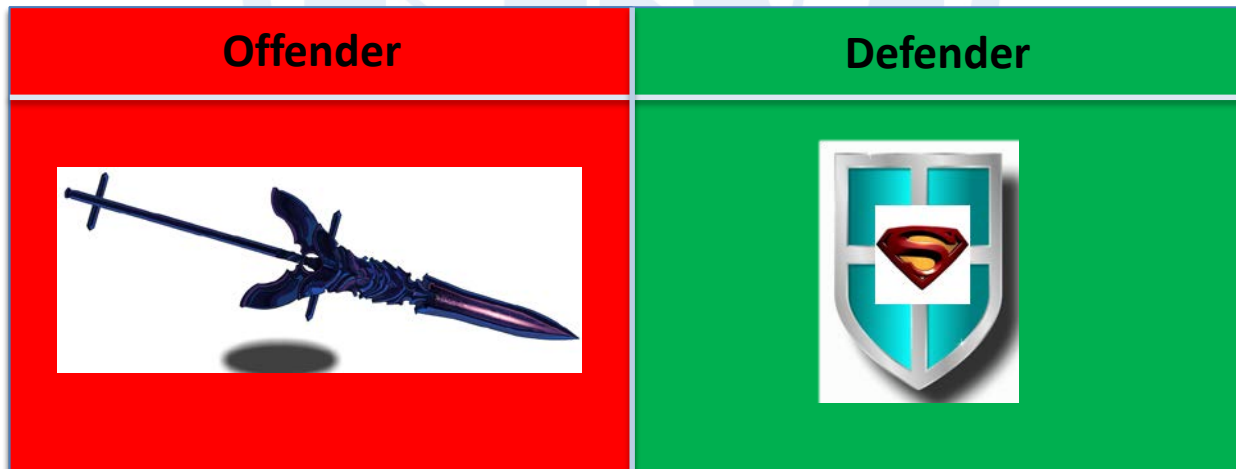   - Security platforms and protocol stacks

Could be OK

But

Too difficult and cost
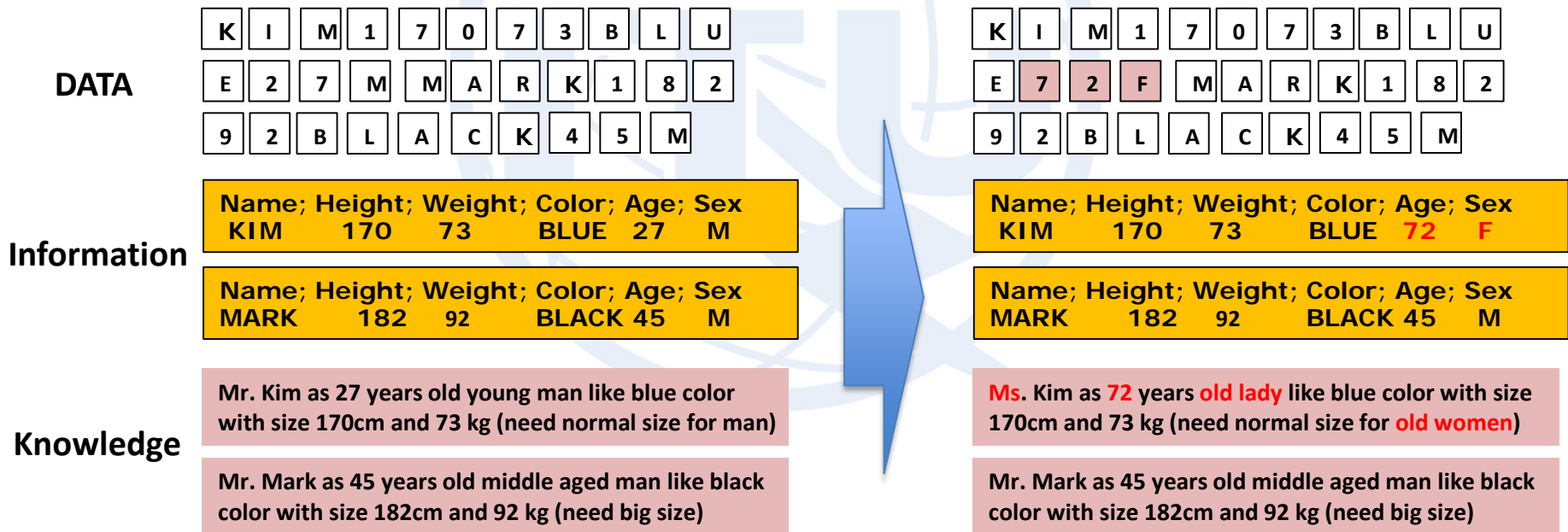
- **Problem Space 3: Cybercrimes**
  - exposing our societies to the threat of cybercrimes
  - cyber-attacks on ICTs are **borderless** (anywhere)
  - Status of today cybercrimes:
    - 12 cybercrime victims/second, 1 M victims/day
    - 50% on-line adults have been victims of cybercrime
  - Additional **costs** but very few impacts to raise **income**
  - **Divide** the world in **two groups**, so never ending (Spear & Shield)

| Offender	Defender

- **Problem Space 4: Lost trust**
  - How to ensure trust of **sources from on-line** (data, information, knowledge, providers, contents, brokers etc.)
  - **Less** trust data → **Incorrect** information → **Poor** knowledge
  - **waists** huge **time**: productivity, efficiency and effectiveness
  - no guidelines and reference to indicate the **level of trust**

DATA

K	I	M	1	7	0	7	3	B	L	U
E	2	7	M	M	A	R	K	1	8	2
9	2	B	L	A	C	K	4	5	M

K	I	M	1	7	0	7	3	B	L	U
E	7	2	F	M	A	R	K	1	8	2
9	2	B	L	A	C	K	4	5	M

Information

| Name; Height; Weight; Color; Age; Sex |
| KIM   170   73   BLUE 27   M |

| Name; Height; Weight; Color; Age; Sex |
| MARK   182   92   BLACK 45   M |

| Name; Height; Weight; Color; Age; Sex |
| KIM   170   73   BLUE 72   F |

| Name; Height; Weight; Color; Age; Sex |
| MARK   182   92   BLACK 45   M |

Knowledge

Mr. Kim as 27 years old young man like blue color with size 170cm and 73 kg (need normal size for man)

Mr. Mark as 45 years old middle aged man like black color with size 182cm and 92 kg (need big size)

Ms. Kim as 72 years old lady like blue color with size 170cm and 73 kg (need normal size for old women)

Mr. Mark as 45 years old middle aged man like black color with size 182cm and 92 kg (need big size)
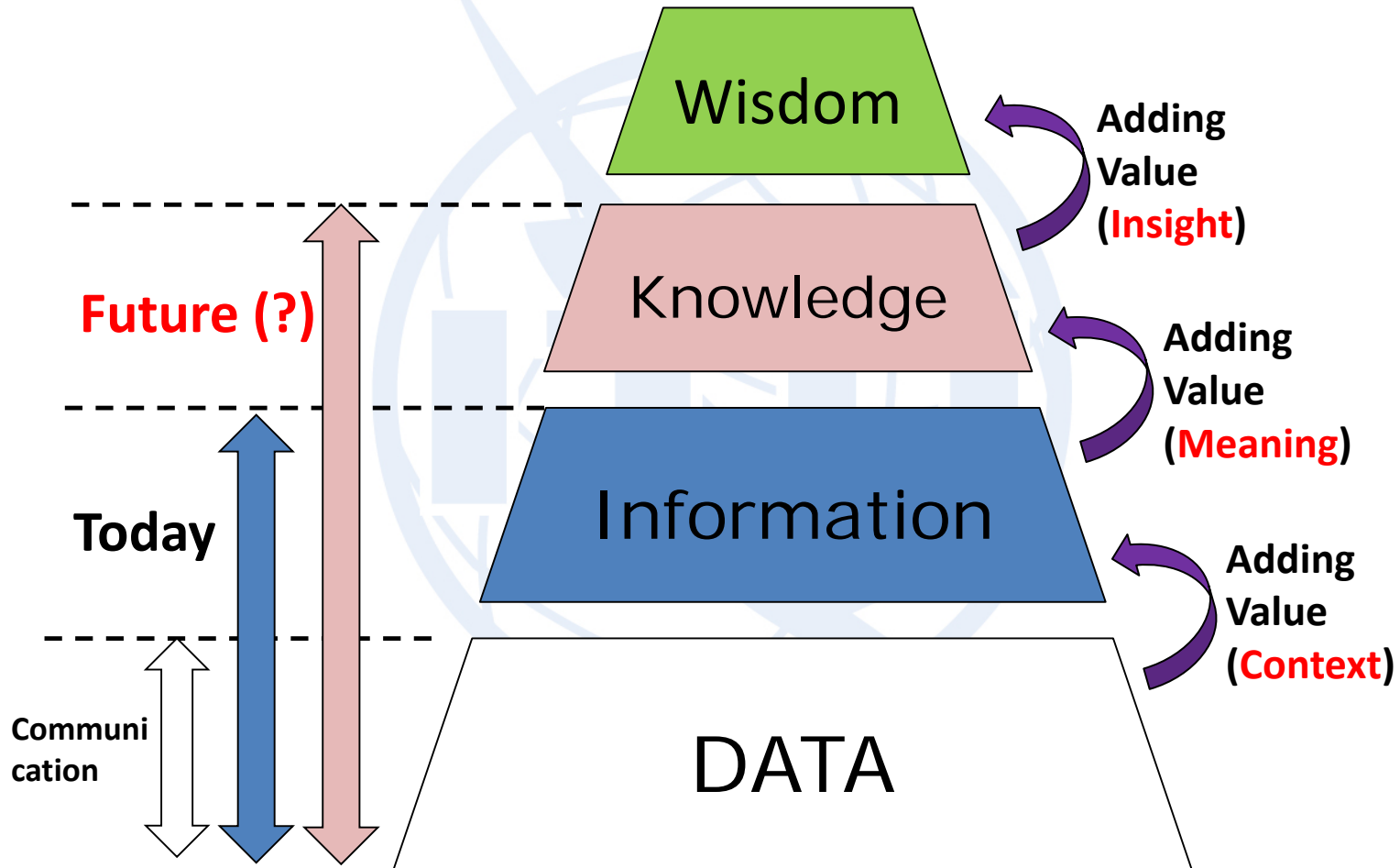
IV. Problem Spaces

- **Problem Space 5: Autonomy**
  - **Distributed** processing and computing even communication
  - Increase of **autonomy** functions and systems even **under distributed and software** based environments
  - Increase **sharing** resources and emerge **binding** as one among **different** resources (slicing and virtualization)
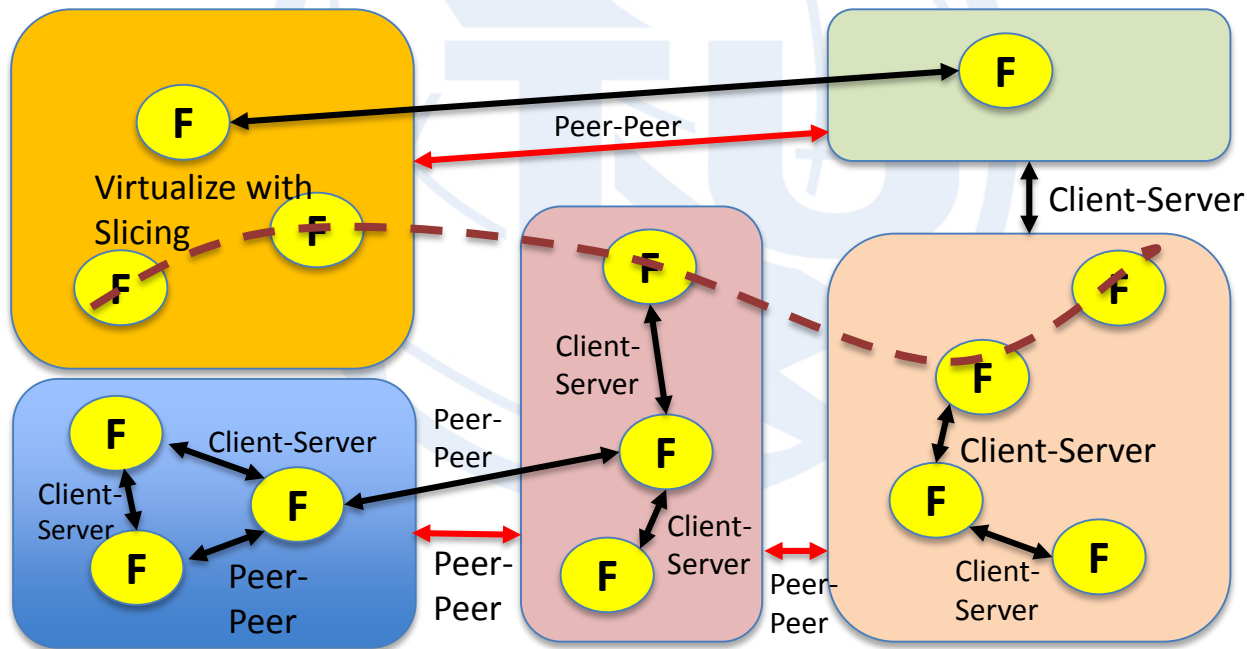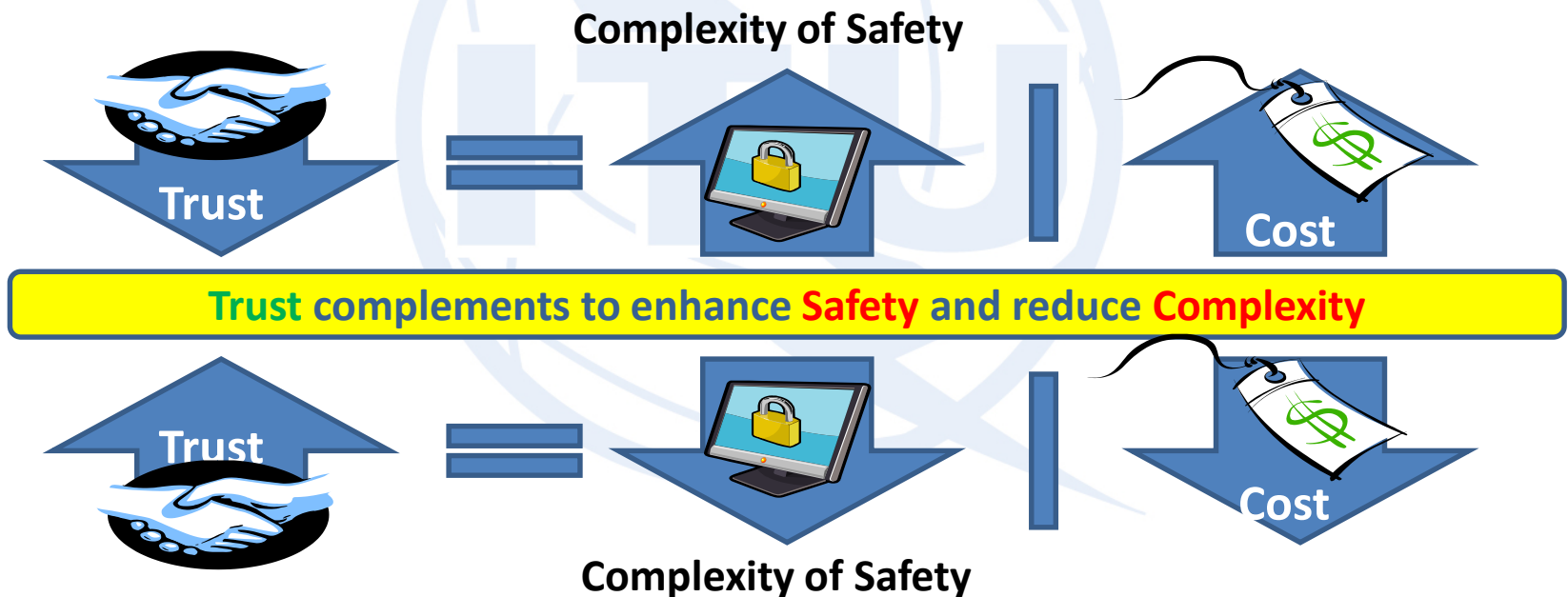
V. Future IS and its Feature

- **Continue on developments: Data → Information, then Future will be Knowledge based (Knowledge Society?)**
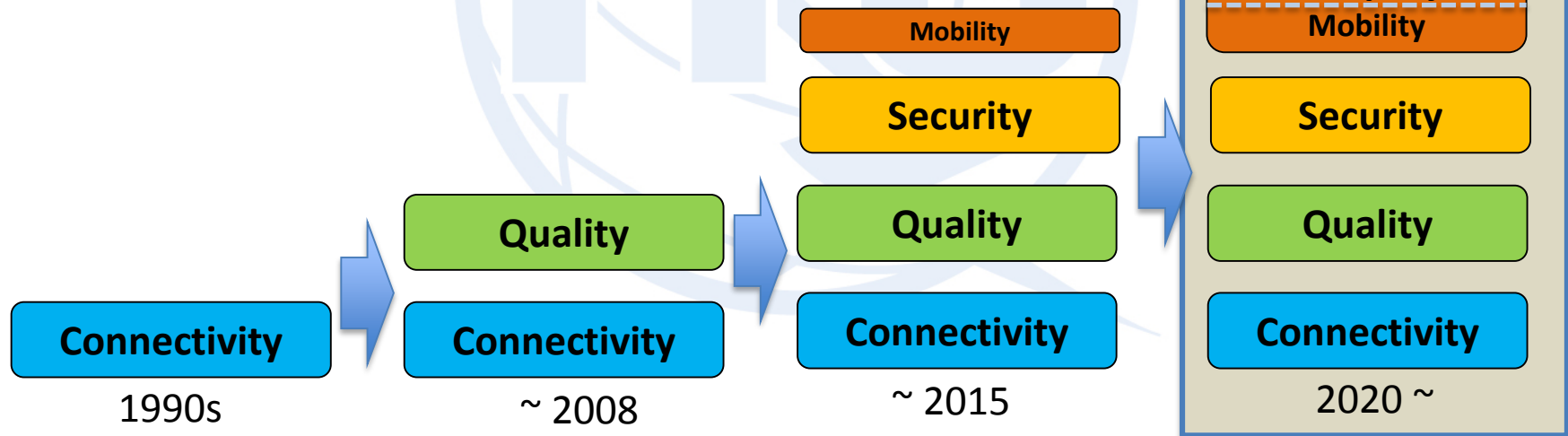
V. Future IS and its Feature

- Connected World → Connecting People → Connecting Things (near future) → **Knowledge Networking**
- Living normal life under **"Echo-Life environments"** by **Trust**
- **Trust:** Solution for resolving Problem Spaces **(Convergences, Complexity, Cybercrimes, Lost of Trust and Autonomy)**

Complexity of Safety

Trust = 🔒 | 💲 **Cost**

Trust complements to enhance Safety and reduce Complexity

Trust = 🔒 | 💲 **Cost**

Complexity of Safety

V. Future IS and its Feature

- **New Features for the Future Information Infrastructure**
  - Better solution for **Safer and Smarter operation of Infrastructure**, while well enhance quality (with enhanced Broadband)
  - **Ubiquity and Mobility**: need enhancement (e.g. seamless) of mobility and realize **better Ubiquity**
  - **Trust**: new feature for safer society with efficiency and effectiveness (an entity having trust to other entity)

1990s	~ 2008	~ 2015	2020 ~
Connectivity	Quality / Connectivity	Mobility / Security / Quality / Connectivity	FTII: Trust / Ubiquity / Mobility / Security / Quality / Connectivity

VI. Conclusion

- New life environments
  - New cultures by emerging new generation
  - Review of existing Business Value Chains by ICTs
  - Develop new Echo-systems by collective intelligence
- Future society need better balance among different roles
  - today segmented Eco-Systems → Open & collaborative Eco-Systems
  - Review relationships between Public and Private
- ICT (Information Communication Technology): enough?
  - Impact for convergences (e.g., energy, transport, health…)
  - How to support Knowledge networking (creation, processing, sharing and Echoing)

VI. Conclusion

- **Trust** should be one of **critical word** to identify features of **"Future IS and their infrastructures"**
- **Smart Capabilities for Trustworthy:**
  - For **trustworthiness relationships** between entities, each parties should knew about each other
  - The **level of trust** should be dependent on the level of knowing each other (more knowing, more trust)
  - **Smart capability** used to collect information to help knowing the details not only for that entity but also environments such as network status, communication sessions and others
- **Echo-Capabilities by Knowledge Networking:**
  - **Knowledge** should be **shared cross over** different areas , services and devices
  - **Context/Content-aware Networking** Capabilities

International Telephone and Telegraph Union

International Telecommunication Union

International Trust Union

I
Trust
yoU