# The 28th STAG Board Meeting
# Session III: Quality Living

# Topic I: Development Strategy for Intelligent Living Space

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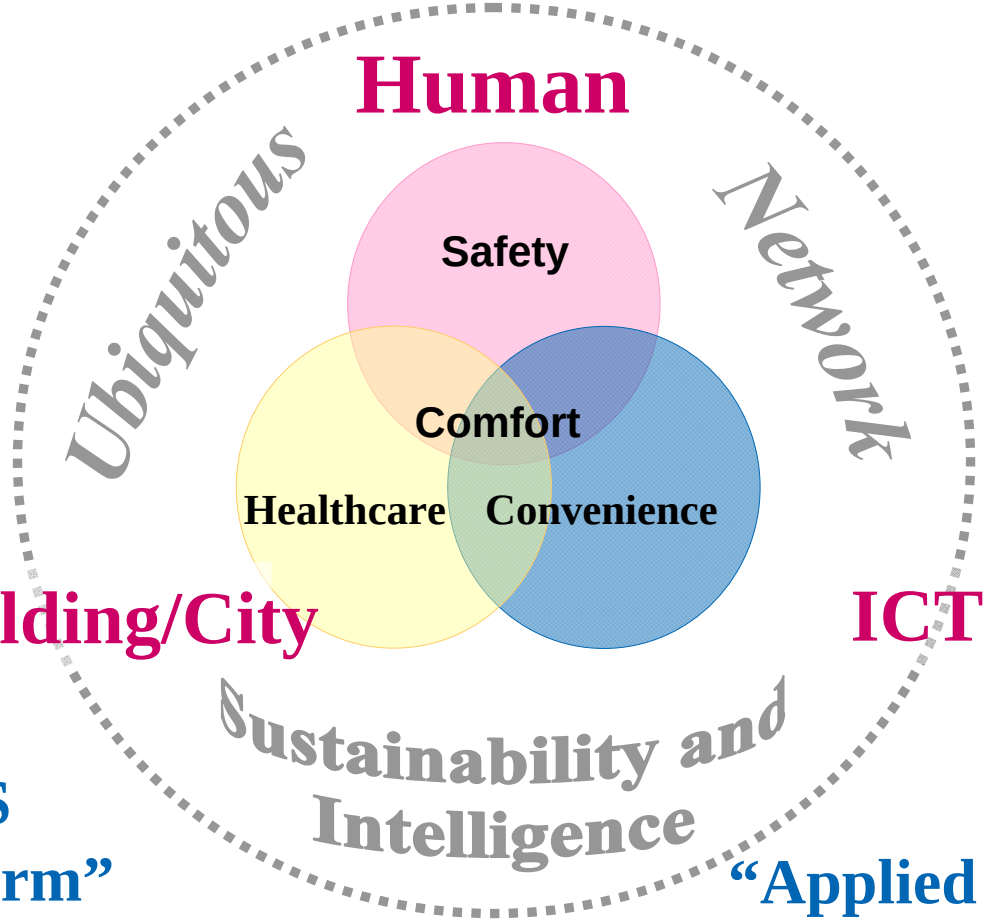
**Architecture and Building Research Institute**
**Ministry of the Interior**


**November 18, 2008**

# 1. Background

## 1-1. Concept for the development of Intelligent Living Space (ILS)

Vigor & Creativity




Warmth & Humanity

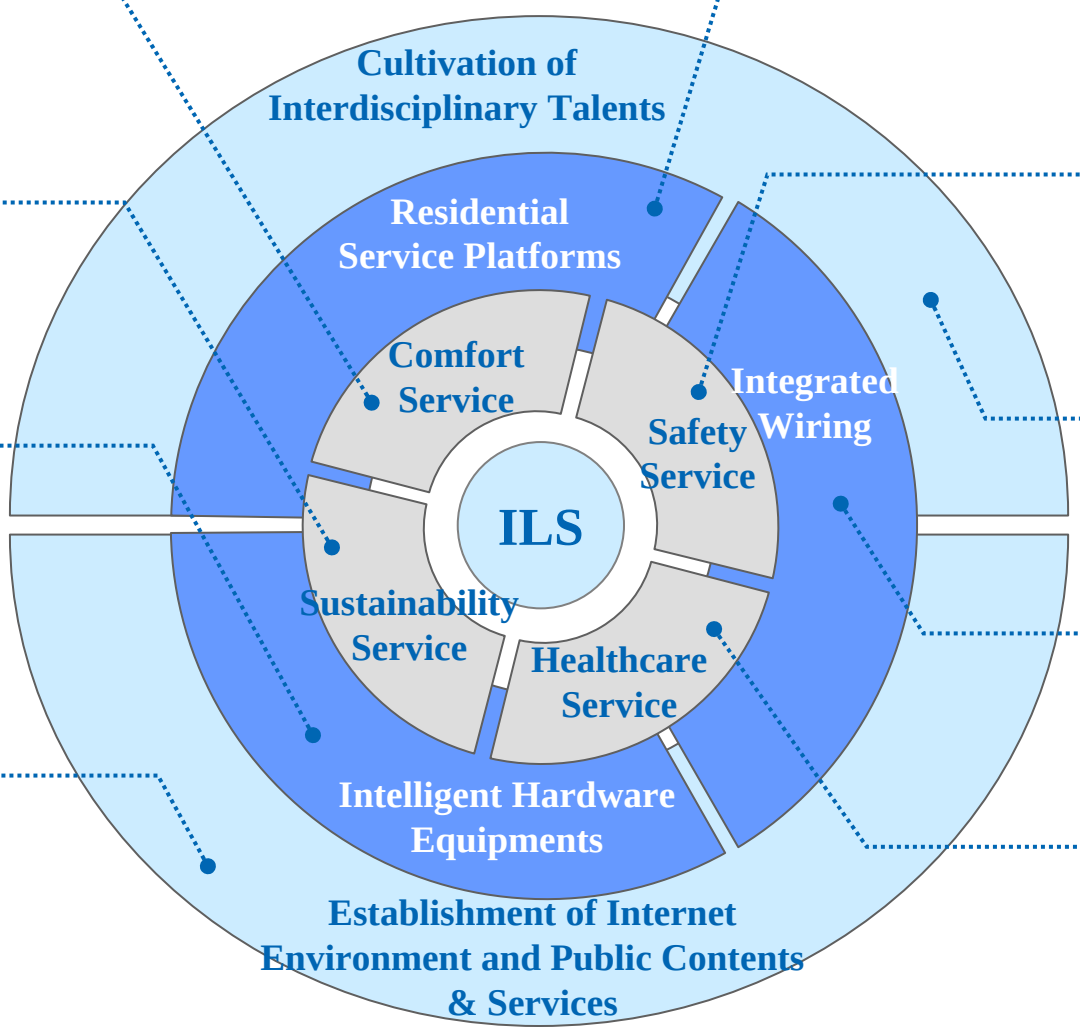
# 1-2. Scope – Integrating technologies of ICT, information appliances, building, materials, and quality living services, ILS is a cross-industrial synergy of service, construction and manufacturing

**Comfort Service**
- AV, entertainment, EC, property management, home automation, distance learning, etc.

**Sustainability Service**
- Utility supply, ESCO, home and building energy management, etc.

**Intelligent Hardware Equipments**
- Smart meter, information appliances, building materials and furnishings with computing, sensing and communicating functions

**Establishment of Internet Environment and Public Contents & Services**
- Telecom service, IPv6, VoIP, emergency medical services, crime prevention, disease control, etc.




**Residential Service Platforms**
- Information appliances, communication equipment

**Safety Service**
- Security service, CO detection, GPS positioning, etc.

**Cultivation of Interdisciplinary Talents**
- Education service

**Integrated Wiring**
- Architecture, interior design, construction, electrical wires and cables, etc.

**Healthcare Service**
- Medical service, health care, senior care, distance caring system, etc.

# 1-3. Output forecast of global intelligent living industry

| Output forecast of global intelligent living industry (2015) | Unit: billion US$ |
|---|---|
| Digital Audio and Video Producing | 526.4 |
| Game and Animation Producing | 143.1 |
| Digital Content Providing | 294.6 |
| Digital Learning and Publications | 173.7 |
| **Intelligent Building** | **83.3** |
| **Network Solution for Intelligent Building** | **130.9** |
| Advanced Optical Display Systems | 146.0 |
| Telematics and Infotainment Systems | 74.2 |
| **Total** | **1,572.2** |

Source: (1) IDC, Gartner, MRI, JARA, CDG, Strategy Unlimited, Fuji Chemera, PIDA, ITRI, MIC, TRG and iSuppli; 2007/1
(2) Development Strategies of Digital Living Industries, Phase 1 (2007-2009), Vision of 2015 Economic Development, MOEA

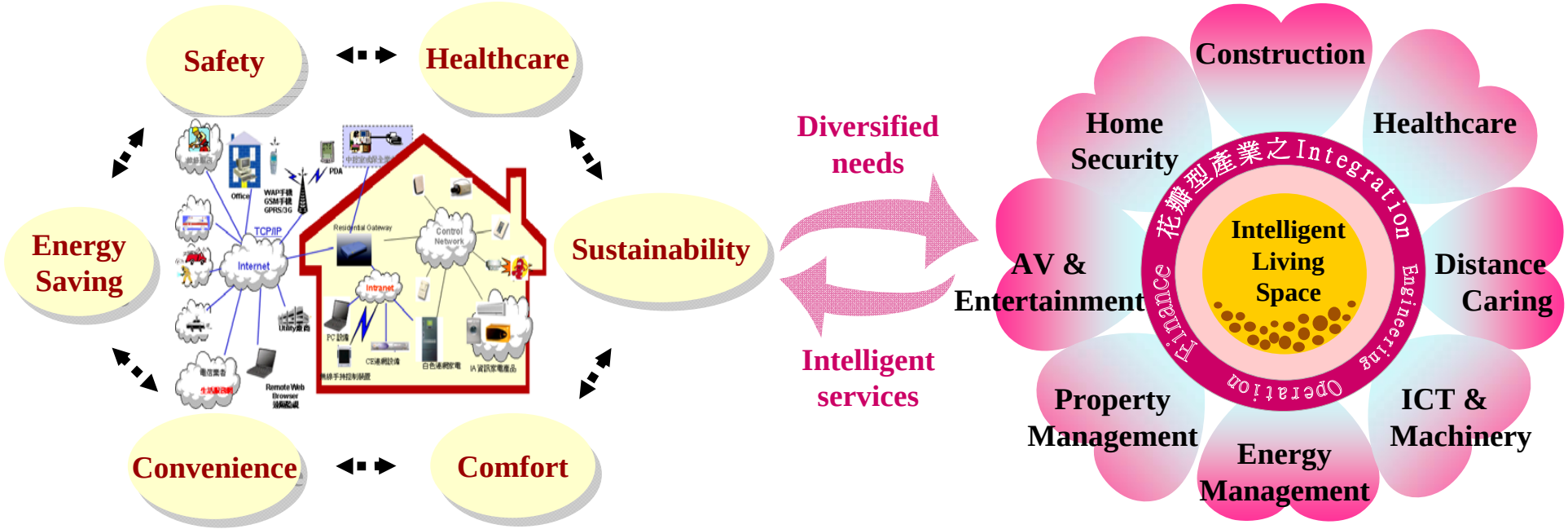
# 2. Vision & Goals

## 2-1. Vision

*"To create a context-aware living space and a satisfactory place that may fulfill user's demands by applying the intelligent technology and user-oriented service into buildings, in the hope to enhance the living quality of the public and to promote innovative industrial development."*

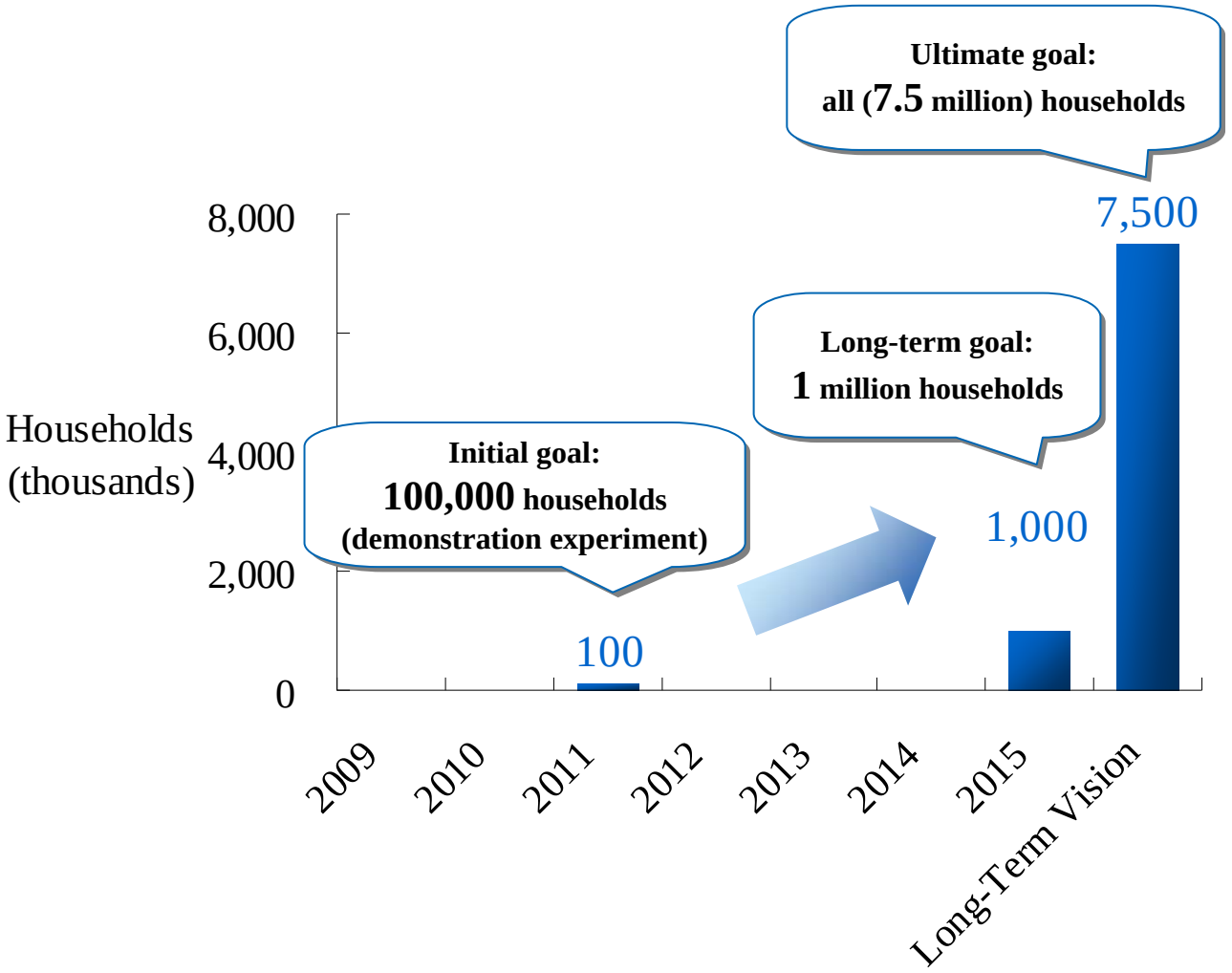
**Enhancing quality living by meeting diversified needs**

**Integrating relevant industries to collaborate and create higher added value**



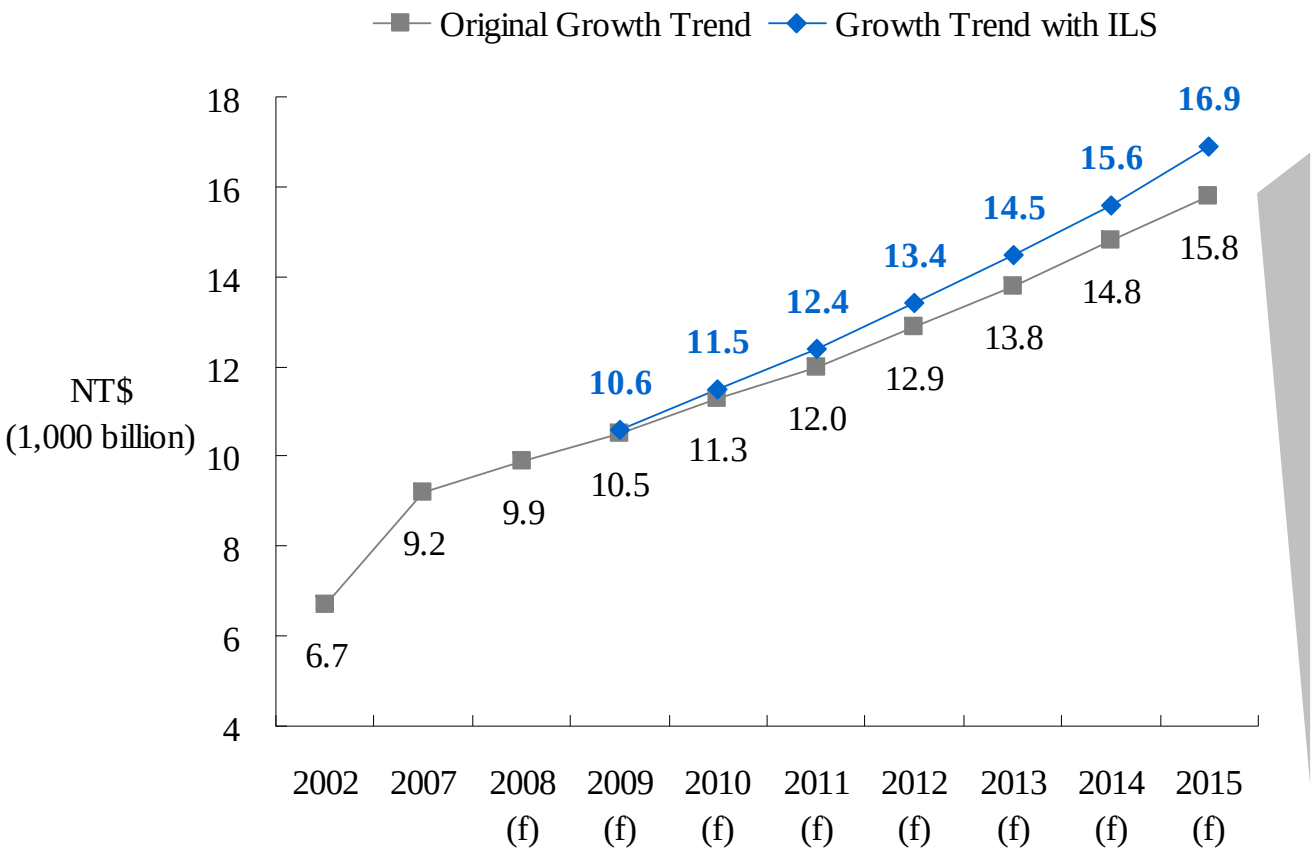
# 2-2. Goals (1) – Penetration of 1 million households that are capable of acquiring on-demand intelligent services by 2015

## Penetration of Intelligent Living Space in Taiwan




# 2-2. Goals (2) – Value creation of NT$ 1,100 billion in relevant industries by 2015

## Output value of ILS relevant industries




**By 2015, output value of relevant industries will grow by NT$ 1,100 billion**

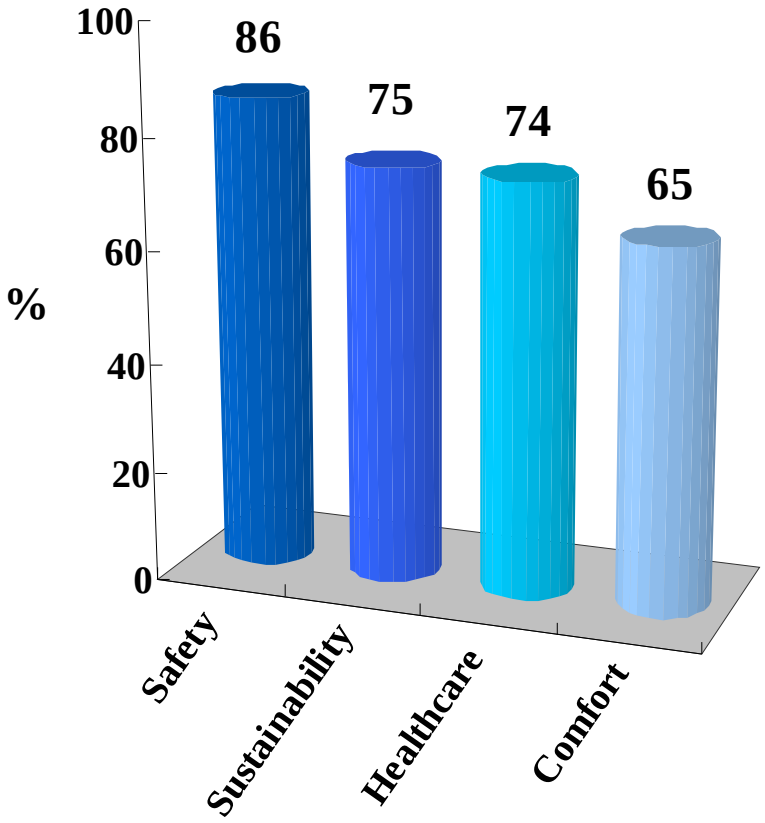
| Industry | Definition |
|---|---|
| Manufacturing | Furniture, Computer, Electronic & Optic Prod., Electronic Parts & Components, Electrical Equipment Manufacturing, Machinery and Equipment Manufacturing, Medical Materials and Suppl., etc. |
| Construction | Architecture and Engineering Services, Construction, etc. |
| Service | Electricity and Gas Supply, Postal and Courier Services, Telecommunications, Home and Security Services, Education, Human Health and Social Work Services |

Source: Directorate-General of Budget, Accounting and Statistics

# 3. Opportunities & Challenges

## 3-1. Current development (1) – diversified, dynamic user needs in living environments

**Users showed pressing needs for safety, sustainability and healthcare**




**User needs are dynamic and change at all times in response to different people, time, or locations – Notion of "On-Demand"**

**In response to different people.....**

**"Needs of parents may not be the needs of children**

**In response to different time.....**

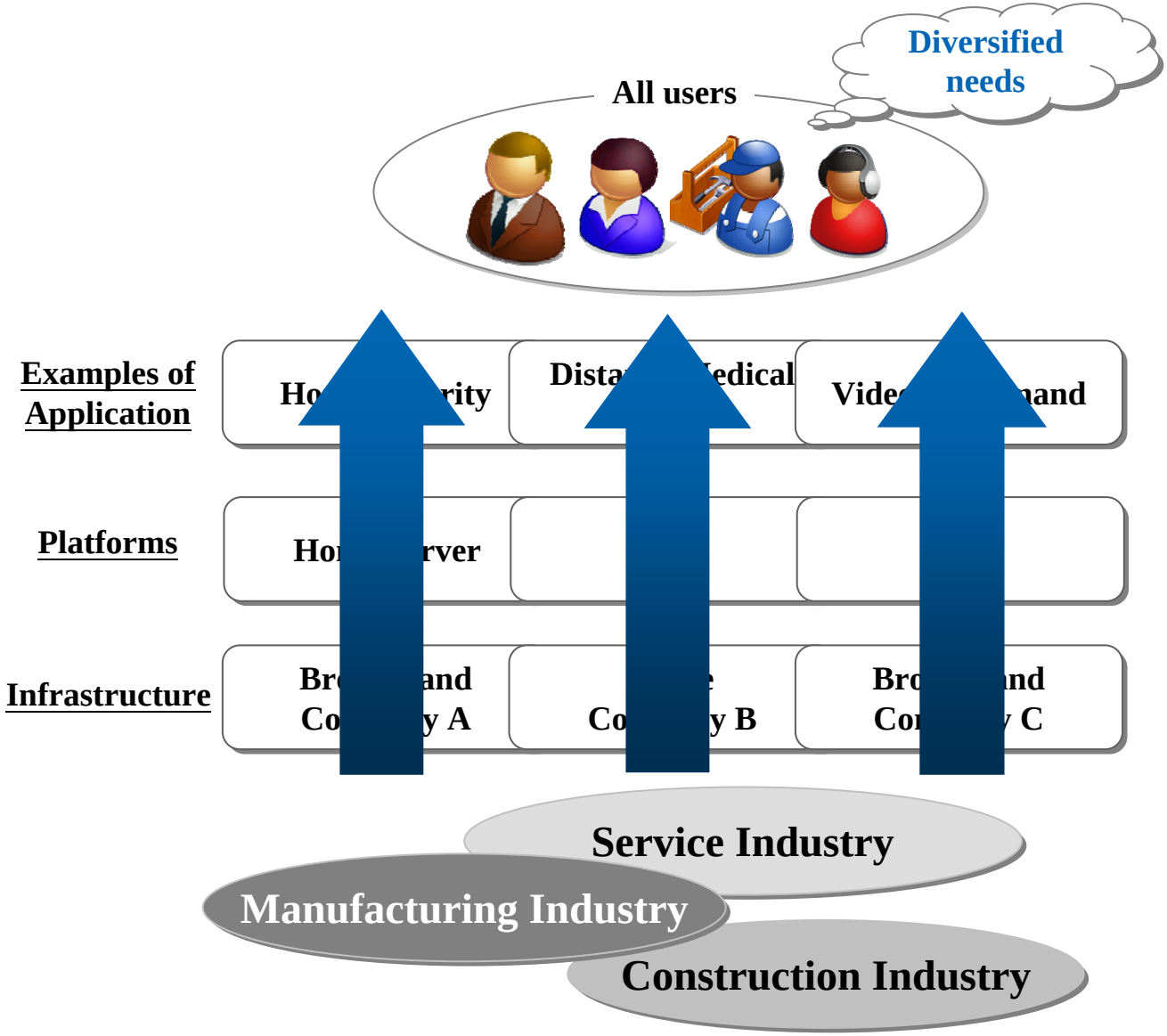
**"Current needs may not be the needs in the future"**

**In response to different locations.....**

**"Needs in cities may not be the needs in the countryside"**

Source: Survey conducted by Nomura Research Institute in Taiwan in 2007/11

# 3-1. Current development (2) – To capture diversified and ever-changing needs, industries need to integrate so as to achieve the concept of Open Network Services




## User Level

User needs in living spaces are too diversified to be captured by single industry or company

## Application Level

System integration of services and hardware on ad hoc basis may lead to costs too high to be accepted by common users

## Industry Level

Industries are engaging in cross-industrial collaboration to create added value that cannot be realized by itself

# 3-2. ILS' Key Factor of Success – On-Demand & Open Network Services…the concept of "$O_2$ Services"

| Vision of ILS | ILS' Key Factor of Success (KFS) |
| --- | --- |
| To satisfy diversified, ever-changing user needs in the fields of safety, sustainability, healthcare and comfort | **USERS** should be able to acquire **On-Demand Services** in response to different people, time, or locations |
| To integrate powers from service, manufacturing and construction industries to provide integrated services | **INDUSTRIES** should be able to lower integration cost and establish **Open Network Services** models to ensure inter-operability |

# 3-3. Current projects in Taiwan

**Abbreviations:**

- **BSMI: Bureau of Standards, Metrology and Inspection, MOEA**
- **DOC: Department of Commerce, MOEA**
- **DOH: Department of Health, Executive Yuan**
- **DOIT: Department of Industrial Technology, MOEA**
- **MOI: Ministry of the Interior**
- **MOTC: Ministry of Transportation and Communications**
- **NSC: National Science Council**

## Intelligent Equipments:

**NSC** – Regional Integration Center Project of Intelligent Living Technologies, Cross-disciplinary Research Project of Advanced Quality Living Environment Technologies, Cross-disciplinary Research Project of Smart Living Space

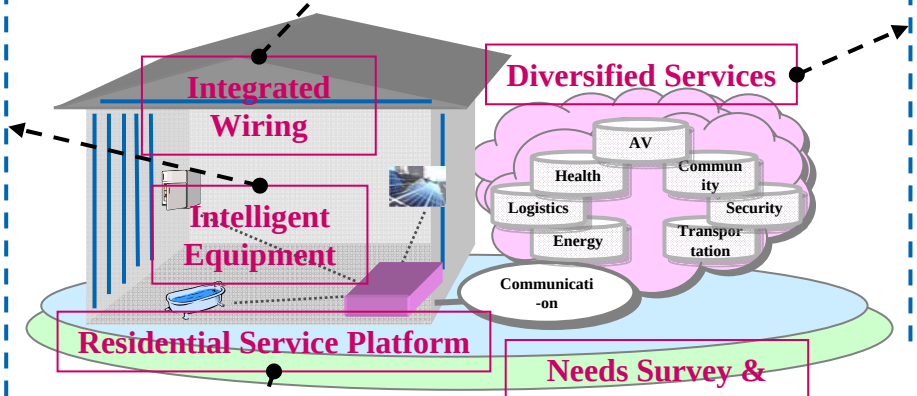
**DOIT** – ILS Technology Application Project, R&D Project of RFID System's Key Technologies, R&D Project of Sensing and Identification Applications in Digital Living, R&D Project of Environmental Safety Technologies

**BSMI** – Quality Living Industry Measuring Technologies Development Project, Integration and Standardization Project of ILS Industrial Interfaces

**MOI** – Development Plan of ILS Industry

## Integrated Wiring:

**MOI** – Development Plan of ILS Industry




## Diversified Services:

**DOC** – RFID Application Demonstration Flagship Project (Community Living sub-project)

**MOTC** – Intelligent Bus

**DOH** – Distance Care

**SECOM, SKS, CHT** – Home Security

**CHT, Farglory Realty** – Entertainment, Home Automation, etc.

## Residential Service Platform:

**DOIT** – R&D Project of RFID System's Key Technologies, R&D Project of Sensing and Identification Applications in Digital Living

## Needs Survey & Research:

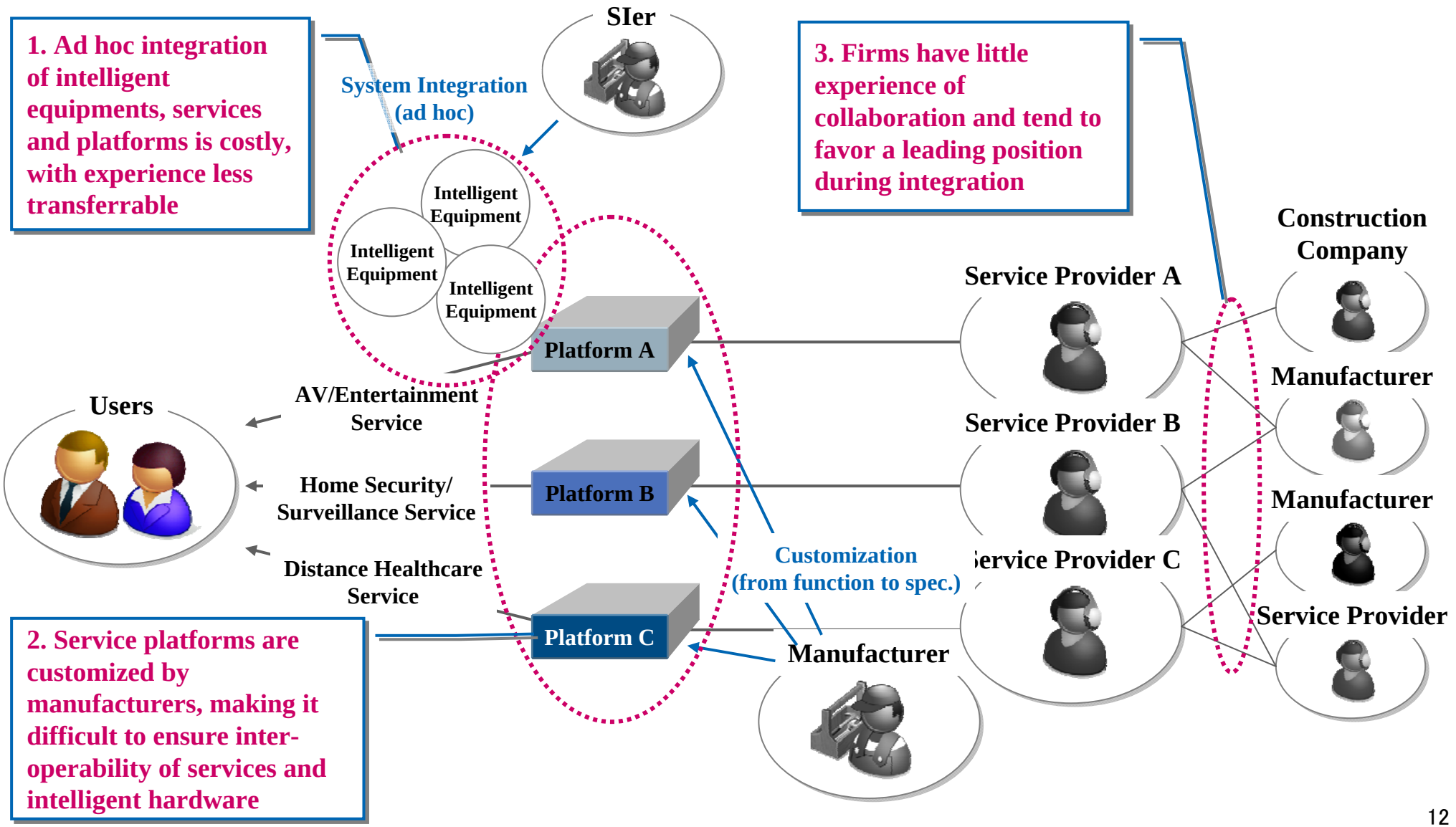
**NSC** – Regional Integration Center Project of Intelligent Living Technologies, Cross-disciplinary Research Project of Advanced Quality Living Environment Technologies, Cross-disciplinary Research Project of Smart Living Space

**MOI** – Development Plan of ILS Industry

## 3-4. Review of current development (government) – Concept of "$O_2$ Services" remains weak in related government projects

| Agency | Project Focus | Review of Current Development |
|---|---|---|
| NSC | User Needs Survey & Research, Intelligent Equipments, etc. | R&D and promotion of intelligent living space in Taiwan is primarily led by relevant government agencies (NSC, MOI, MOEA, etc.), with collaboration from research institutes and the academia.<br><br>Current issues remain as follows:<br>1. Most needs research and promotion projects are short-term, non-integrative and non-consistent. Projects were formulated from the viewpoint of supply side and in lack of long-term research mechanism for user needs.<br>2. Commitment and collaboration from leading firms are weak, making it difficult to bring instant and decisive impact to relevant industries.<br>3. Research institutes and the academia have accumulated innovations and solutions in various fields, but most projects are not mutually integrative. |
| MOEA | R&D of Intelligent Equipment, Residential Service Platforms, Diversified Services (RFID applications), etc. | |
| MOI | User Needs Survey & Research, Integrated Wiring, Intelligent Building Materials, Intelligent Building Certification, etc. | |
| MOTC | Diversified Services (Intelligent Bus) | |
| DOH | Diversified Services (Distance Care) | |

# 3-4. Review of current development (industry) – Integration of service and hardware on ad hoc basis is costly and cannot achieve the vision of "$O_2$ Services"



# 3-5. Review of current development (domestic market) – "$O_2$ Services" are not matured enough to meet users' diversified, ever-changing needs

| | | |
|---|---|---|
| Promotion Mechanism | | R&D and promotion projects are mostly led by the government |
| Leading Firms | | CHT, SECOM, SKS, Advantech, Asustek, O+ Design, Farglory Realty, etc. |
| Major Solutions | | Intelligent residential services (security, AV/entertainment, etc.), home automation |
| Current Development | Gov't | ■ Promotion office, promotion task force and industrial alliance were formed but commitment and collaboration from leading firms is relatively weak<br>■ R&D projects in research institutes and the academia are carried out individually without considering integration of final outputs to create high added value |
| | Industry | ■ Major fields: safety and comfort<br>■ Firms are trying to expand scope of services, but output is limited due to lack of collaboration among different industries and firms |
| Conclusion – Maturity of "$O_2$ Service" | | ■ **On-Demand: the scale of Taiwanese companies makes it difficult for firms to satisfy users' diversified needs by itself. Service quality in each field is competitive but integrative services are not diversified enough to achieve the concept of "on-demand"**<br>■ **Open Network Services: firms tend to vertically integrate services and hardware within the same group, in a hope to retain most values, which prevents different firms' solutions from achieving inter-operability** |

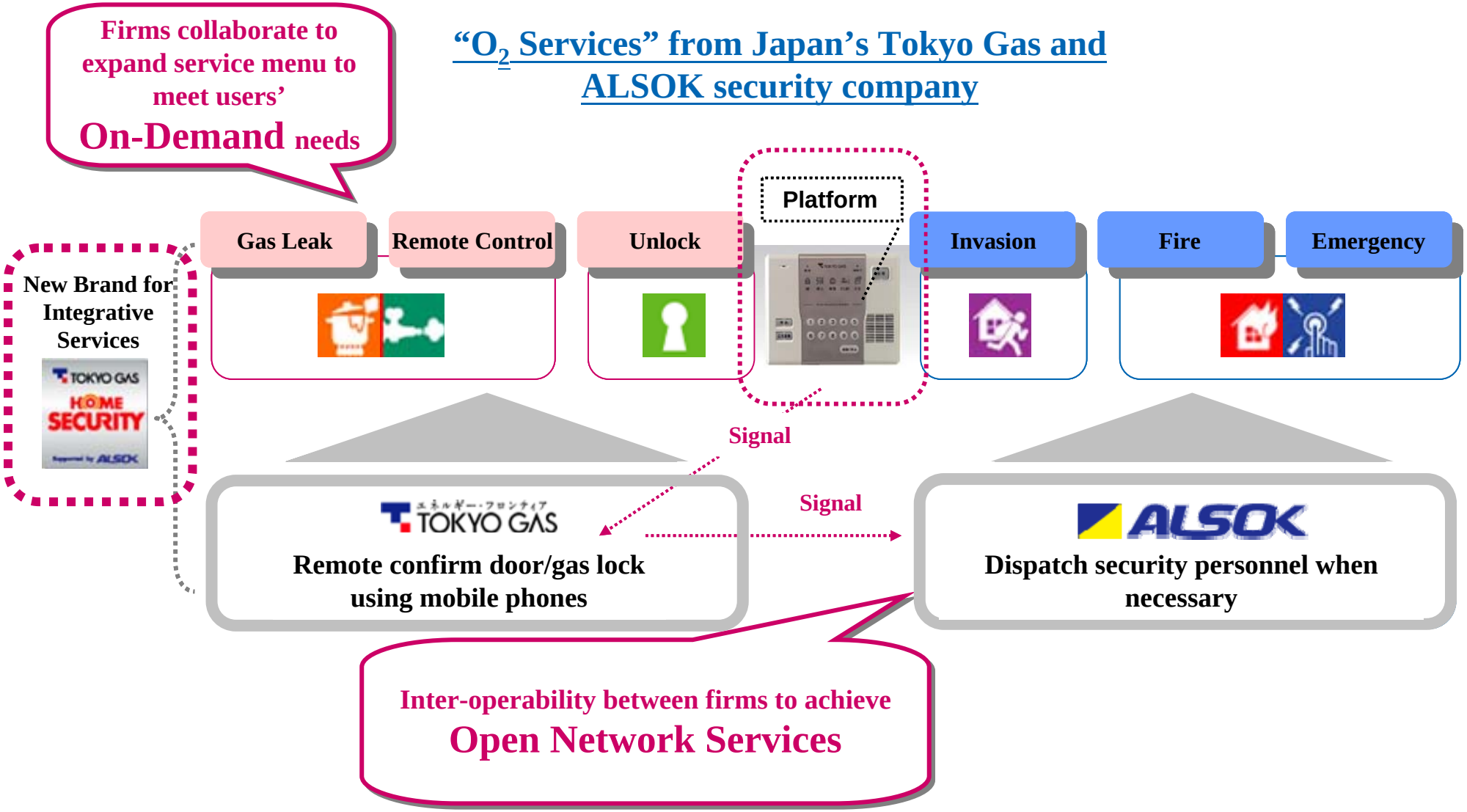
△ **: Lower**

# 3-5. Review of current development (overseas market) – "$O_2$ Services" gained attention but are still in early stage of development in most advanced markets

| Country | EU | USA | Japan | South Korea |
|---|---|---|---|---|
| **Promotion Mechanism** | Road Map and R&D Funding from Gov't + industrial alliance & SIGs | Primarily led by companies and the academia | Primarily led by major information appliance makers | Strongly led by central and local governments (e.g. u-City Projects) |
| **Leading Firms** | Philips, Bosch, Siemens, etc. | Microsoft, Home Depot, etc. | Panasonic, Tokyo Gas, SECOM, etc. | S1, Samsung, Hyundai, KT, SKT, etc. |
| **Major Solutions** | Digital Home, Home Automation | Digital Home, Home Automation | Intelligent Residential Services, Digital Home | Intelligent Residential Services, Digital Home |
| **Current Development** | ■ Strong vertical integration within the same group<br>■ Hardware replacement as major business model | ■ Digital Home as mainstream in intelligent residential services | ■ Strong vertical integration within the same group<br>■ Few cross-group service integrator<br>■ Strong emphasis on intelligent residential services | ■ Strong vertical integration within the same group<br>■ Few cross-group service integrator<br>■ Strong emphasis on intelligent residential services |
| **Conclusion – Maturity of "$O_2$ Services"** | ■ **On-Demand: integrative residential services are not diversified enough**<br>■ **Open Network Services: developing open platform to enhance inter-operability** | ■ **On-Demand: integrative residential services are not diversified enough**<br>■ **Open Network Services: the academia has noticed the issue of low inter-operability** | ■ **On-Demand: scope of services is relatively diversified & complete**<br>■ **Open Network Services: negotiation under way to improve inter-operability** | ■ **On-Demand: scope of services is relatively diversified & complete**<br>■ **Open Network Services: mega-groups led by KT & SKT are open to group members** |

△: **Lower** ○: **Higher**

# 3-5. Review of current development (case study) – Japan's Tokyo Gas collaborates with ALSOK security company to provide integrative intelligent residential services of security and comfort

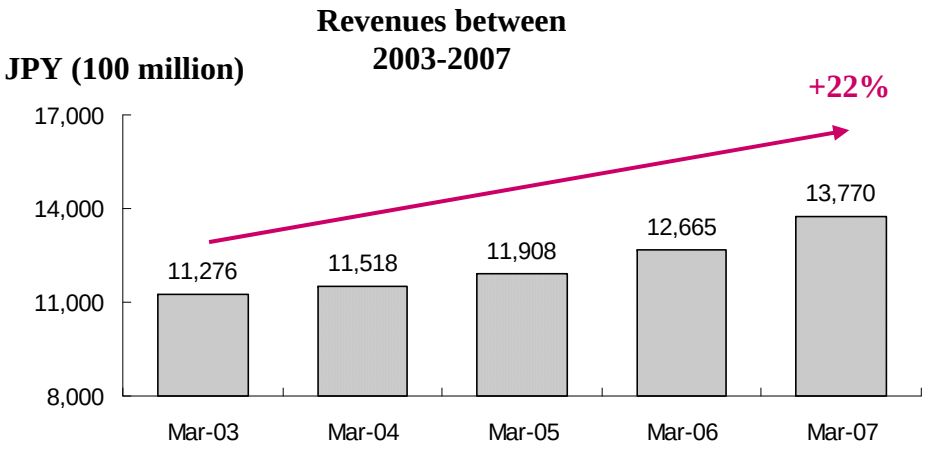



Source: websites and annual reports of Tokyo Gas and ALSOK

# 3-5. Review of current development (case study) – steady growth of revenue for both Tokyo Gas and ALSOK between 2003-2007

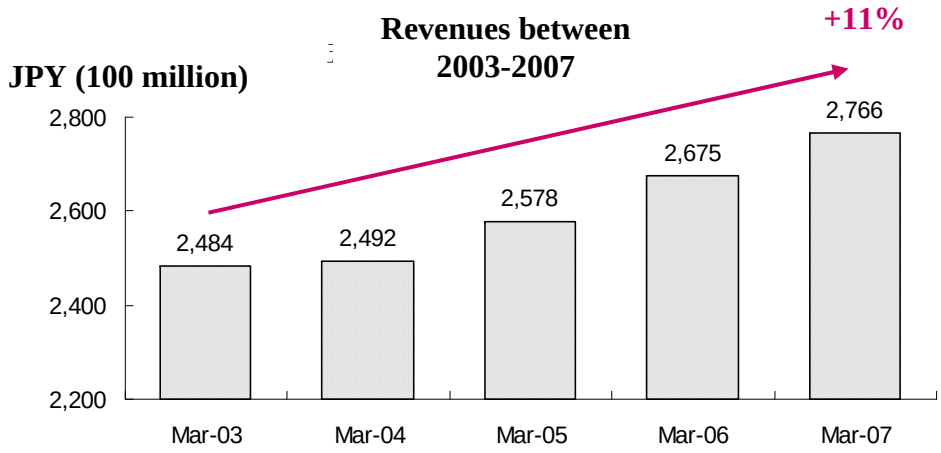
TOKYO GAS

- Tokyo Gas serves over 9.9 million households in Tokyo/Kantou region and is the largest urban gas provider in Japan




ALSOK

- ALSOK is the 2nd largest security company in Japan. Since 2004, ALSOK has been providing "ALSOK Home Security 7" total solution service, attracting over 100,000 subscriptions




Source: websites and annual reports of Tokyo Gas and ALSOK

# 3-6. Opportunities

## Taiwan's Competitiveness

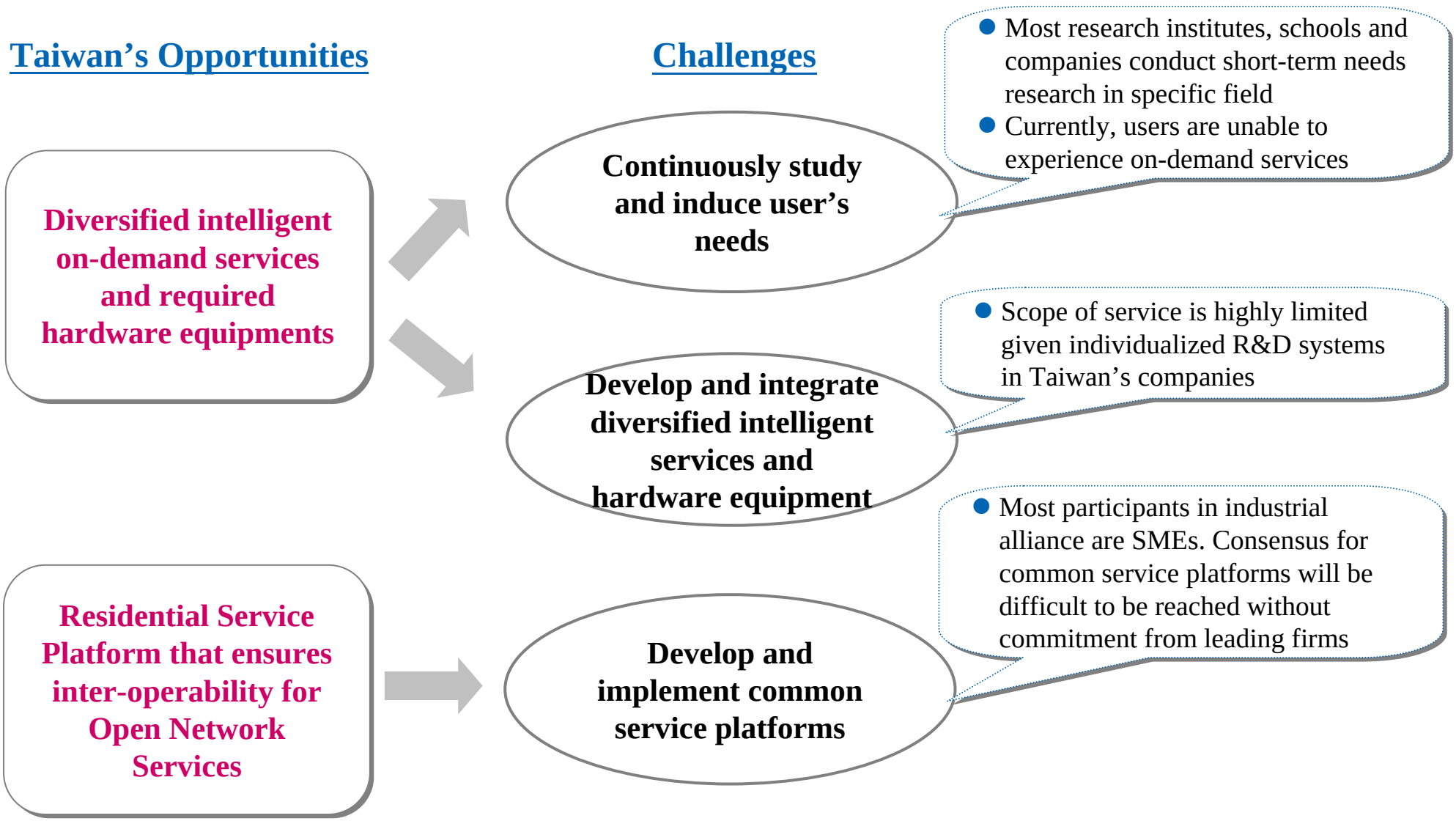
- ICT, machinery and construction industries that are strong and flexible
- Rich experiences in developing diversified services and platforms
- High-quality talents in fields of ICT, architecture/construction and design

## Taiwan's Opportunities

Diversified, on-demand intelligent services and required intelligent hardware equipment (e.g., intelligent appliances, furnishings and building materials) in fields of safety, healthcare, sustainability and comfort

An open residential service platform that ensures inter-operability and compatibility of open network services and relevant intelligent hardware equipment from different firms and industries

# 3-7. Challenges



# 4. Issues & Suggestions

## 4-1. Issues

| Challenges | Issues |
| --- | --- |
| Continuously study and induce user's needs | ☒ A systematic, long-term user needs research mechanism and effective promotion strategy shall be established |
| Develop and integrate diversified intelligent services and hardware equipment | ☒ Current R&D systems that are standalone in the industry shall be modified |
| Develop and implement common service platforms | ☒ Common service platforms and evaluation & certification systems for intelligent devices development shall be developed<br>☒ An ICT-architecture interface "Integrated Wiring" shall be implemented to facilitate deployment of intelligent services |

As "integration" is common among issues, a collective, integrative solution is required

# 4-2. Suggestions

| Issues | Suggestions for Development Strategies |
| --- | --- |
| ● A systematic, long-term user needs research mechanism and effective promotion strategy shall be established | ■ Strategy 1. Study citizens' needs continuously and promote services demonstration |
| ● Current R&D systems that are standalone in the industry shall be modified | ■ Strategy 2. Educate and train integration teams to provide intelligent services and conduct experiment projects |
| ● Common service platforms and evaluation & certification systems for intelligent devices development shall be developed | ■ Strategy 3. Construct integration developments for intelligent devices and related application services |
| ● An ICT-architecture interface "Integrated Wiring" shall be implemented to facilitate deployment of intelligent services | ■ Strategy 4. Promote integrated wiring system for buildings to accelerate intelligent service to be applied in buildings |

# 4-3. Explanation for development strategies (1) – Continuously studying and promoting user needs

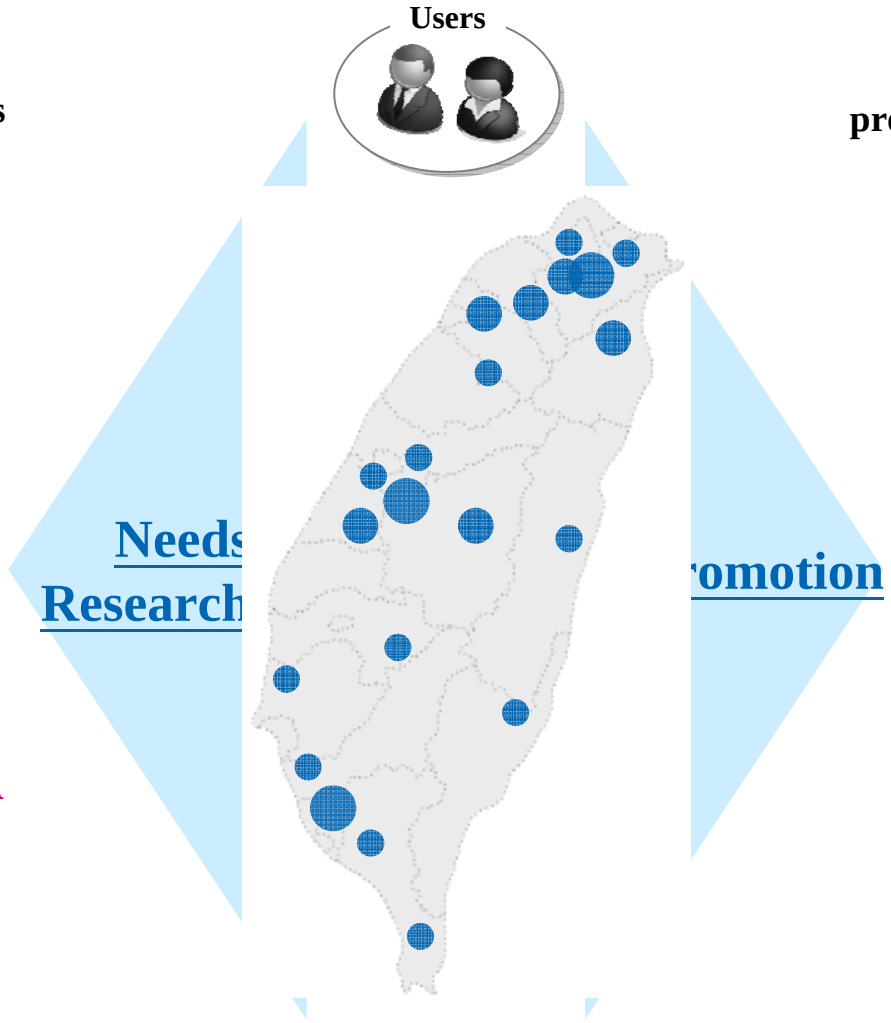
## Strategy 1. Study citizens' needs continuously and promote services demonstration

**Systematic, long-term user needs research mechanism**

- **Users' characteristics in population, geography, socio-economic status, psychology and lifestyle**
- **Issues, concerns and needs in everyday life**
- **Potential solutions**

**PDCA**

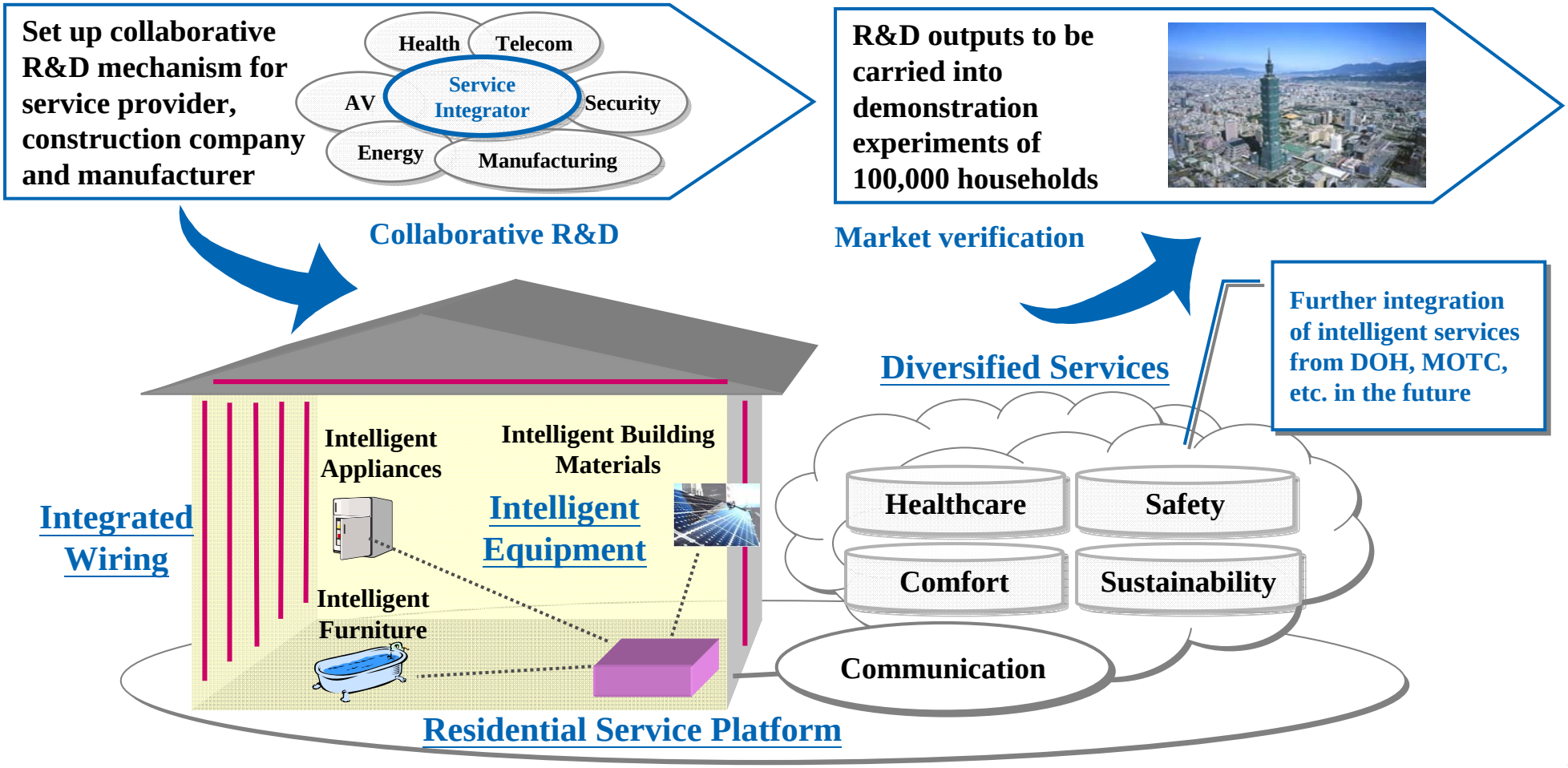
- **Feedbacks on ILS services and products**




**Interactive demonstration & promotion leveraging on R&D outputs from the government, research institutes and the academia**

# 4-3. Explanation for development strategies (2) – Establishing environments that foster the development of "$O_2$ Services"

**Strategy 2. Educate and train integration teams to provide intelligent services and conduct experiment projects**
**Strategy 3. Construct integration developments for intelligent devices and related application services**
**Strategy 4. Promote integrated wiring system for buildings to accelerate intelligent service to be applied in buildings**



# 5. Action Plans

## 5-1. Action Plans (1)

| Action Plans | Agency in Charge | Schedule |
|---|---|---|
| **1. Study citizens' needs continuously and promote services demonstration** | **MOI (NSC, MOEA)** | **2009~2012** |
| 1-1. Establish survey and feedback mechanism of citizens' issues and needs in everyday life | | 2009~2012 |
| 1-2. Simulate intelligent lifestyle and service models based on citizens' needs | | 2009~2012 |
| 1-3. Support interactive demonstration and promotion projects that fully deliver the concept of intelligent services and products in intelligent living space | | 2009~2012 |
| **2. Educate and train integration teams to provide intelligent services and conduct experiment projects** | **MOEA (MOI)** | **2009~2012** |
| 2-1. Set up basic features and specifications for RSP (Residential Service Platform) to achieve the concept of diversified services and inter-operability | | 2009~2010 |
| 2-2. Promote actively cross-field industries to develop and integrate RSP, intelligent services and intelligent devices | | 2009~2010 |
| 2-3. Conduct experiment projects for integration and reward projects for application demonstration to assist industries to expand domestic markets and abroad | | 2011~2012 |

# 5-1. Action Plans (2)

| Action Plans | Agency in Charge | Schedule |
|---|---|---|
| **3. Construct integration developments for intelligent devices and related application services** | **MOI (NSC, MOEA, DOH)** | **2009~2012** |
| 3-1. Support industries to develop up-to-date technology on safety, sustainability, healthcare and comfort through science funding projects | | 2009~2012 |
| 3-2. Assist industries to develop intelligent devices with computing, sensing and communicating functions, which shall be easy to integrate with RSP and other related application services | | 2009~2012 |
| 3-3. Promote integrated application of intelligent building materials and environmental sensing devices matching living environment of subtropical zone | | 2009~2012 |
| 3-4. Construct the evaluation and certification system for intelligent buildings to promote the design capability and brand image of related industries for expanding business markets | | 2009~2012 |
| **4. Promote integrated wiring system for buildings to accelerate intelligent service to be applied in buildings** | **MOI (MOEA, NCC)** | **2009~2012** |
| 4-1. Develop integrated wiring systems suitable for new and existing buildings and implement promotion and demonstration of application | | 2009~2012 |
| 4-2. Revise building design code and communication device regulation with standard of integrated wiring system | | 2009~2010 |

## 5-2. Discussion Issues (1)

| Issue | How to study and induce user's needs with respect to intelligent living services on a constant basis? |
|---|---|
| **Background** | As Taiwan's economic and social structure transforms, user needs in living environment also become highly dynamic and diversified. Needs may change at all times in response to different people, gender, age, locations or countries; therefore, how to sufficiently capture, satisfy and promote diversified needs will become an important issue in developing advanced services in the future.<br>The smaller scale of Taiwanese companies, however, has limited their abilities to develop a variety of intelligent residential services that shall be provided as an integrative package, making it difficult to balance user's diversified, ever-changing needs against reasonable cost.<br>This report suggests to establish a continuous research and feedback mechanism as a reference for the industry's R&D activities, and to widely implement interactive demonstration and promotion strategies so as to accelerate penetration of intelligent living space in Taiwan. |

# 5-2. Discussion Issues (2)

| Issue | How to develop user-oriented intelligent living services and devices? |
|---|---|
| **Background** | In a matured economy like Taiwan, user needs in living environment have become too diversified to be fully captured by a single industry or company, pushing industries to engage in cross-disciplinary collaboration to create added value that cannot be realized by itself. Past research has suggested that system integration of services and hardware on ad hoc basis may lead to cost too high to be afforded by common and mass users. However, companies in Taiwan still tend to vertically integrate services and hardware within the same group, causing low cross-industrial collaboration and inter-operability among different players.<br>Therefore, the report proposes a collaborative R&D and demonstration experiment mechanism to modify current R&D systems that are standalone in the industry. Common service platforms at home shall be developed to lower integration cost for service providers and manufacturers. R&D of intelligent application services and intelligent equipment (information appliances, building materials and furnishings) shall be continuously supported so as to meet user's diversified needs. Finally, an ICT-architecture interface "Integrated Wiring" shall be implemented to facilitate implementation of intelligent services and equipment into buildings. |