IT Utilization in Construction Field of Taiwan

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Presentation Overview

#1 Introduction of IT into Taiwan Construction-related Public Sectors

#2 Present Major Difficulties for Promoting IT in Taiwan Construction Field

#3 Present Development of Government Procurement Information System in Taiwan

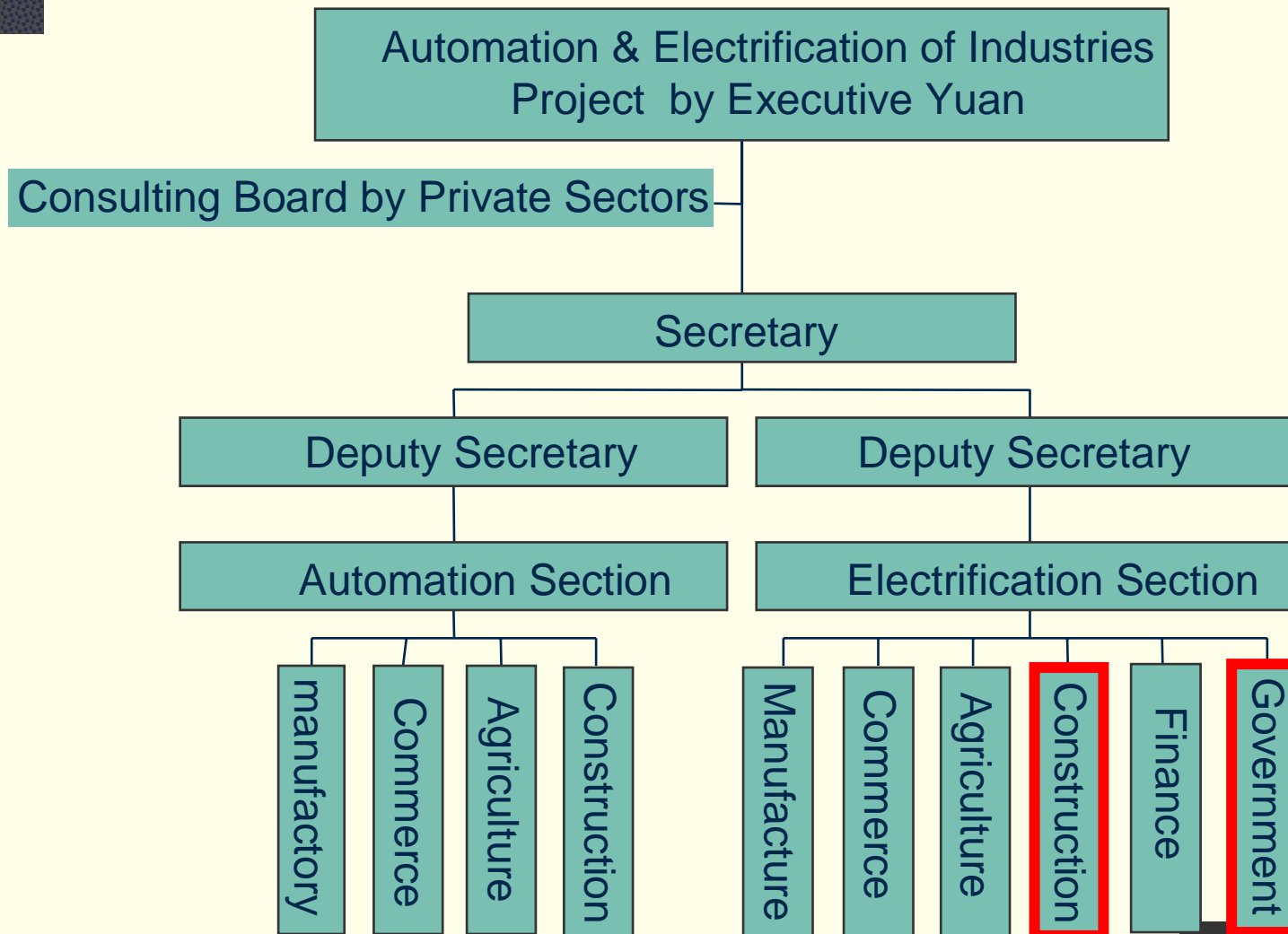**#4 Future Development & Trend of IT in Taiwan Construction Field**

Introduction of IT into Taiwan Construction-related Public Sectors

Present Development of IT Introduction into Taiwan Industries

⌗ **In order to promote Taiwan competence of industries, Taiwan Executive Yuan passed the action program "Promotion Act for Automation & Electrification of Taiwan Industries (PAAETI)" in June 1999   it was expected to effectively diminish the cost of business operation   by assisting the introduction of IT into the business application of industries .**

⌗ **Besides, through the pilot project for offering online bidding and procurement of government units, the utilization of IT within industries can be stimulated.**

Promotion Structure for Automation & Electrification Project by Executive Yuan

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┌─────────────────────────────────────────┐
│  Automation & Electrification of Industries │
│       Project  by Executive Yuan           │
└─────────────────────────────────────────┘

┌──────────────────────────────────┐
│  Consulting Board by Private Sectors │
└──────────────────────────────────┘

              ┌──────────────┐
              │   Secretary   │
              └──────────────┘

   ┌──────────────────┐    ┌──────────────────┐
   │ Deputy Secretary │    │ Deputy Secretary │
   └──────────────────┘    └──────────────────┘

   ┌──────────────────┐    ┌──────────────────┐
   │ Automation Section │    │ Electrification Section │
   └──────────────────┘    └──────────────────┘
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manufactory	Commerce	Agriculture	Construction

Manufacture	Commerce	Agriculture	Construction	Finance	Government

Promotion Measures for IT Utilization of Industries in Taiwan

Promotion Strategy

- **Fundamental Environment**
- **Model Project**
- **Offering Investment Encouragement**
- **Pilot Project by Government Units**

Promotion Measures

- **Reduce Tax**
- **Special Discount on Loan**
- **Infrastructure**
- **Cooperation with Government Sectors**
- **Technology Development**
- **Standardization**
- **Strategy Research**
- **Promotion**
- **HR Training**

E-government within Taiwan Construction-related Public Sectors (1/3)

Public Construction Commission (PCC)

- **Offer government online procurement clearinghouse**
- **Set up E-catalogue and Bid/request for proposal system**
- **Construct online certification and contracting system- under test**
- **Construct online posting/receiving bids system- under test**
- **URL   http://www.pcc.gov.tw**
  - **Bidding information web http//www.pcc.gov.tw/big5/cgpis.htm**

- **Online upload and download of automation and electrification research results**
- **Offer online service and search engine on related code, statistics, real estate information, local development project information for safety of public structures, etc.**
- **URL   http://www.cpami.gov.tw**
  - **Automation and electrification http://www.cpami.gov.tw/casa/index.htm**

- **Scopes for search engine**
  - **Building codes　resource catalogues contract　elemental graphics construction specification　national standards　machinery on rental human resource, etc.**
- **URL　http://arch.org.tw**

Background of Introducing IT into Taiwan Construction Field

- **Declination** of Economic growth and domestic market and Entrance into WTO since Jan. 2002, Construction Industry in Taiwan is facing the **most serious challenge**

- **If construction engineering cannot utilize IT to integrate and manage the engineering information during life cycle**, the **efficiency** of construction is seriously affected and even the quality of construction will be influenced

- The **importance** of IT can be more **significant** for the modern buildings or large-scale infrastructures due to the high **complexity**

- **Construction IT** is the **key success factor** during the **competition** of next-generation construction industry

Promoting IT Application within Taiwan construction industry (1/2)

Construction and Planning Administration, Ministry of Interior (CPAMI) sets up "Promotion Project of Automation and Electrification for Construction industry (PPAEC)" in 1999
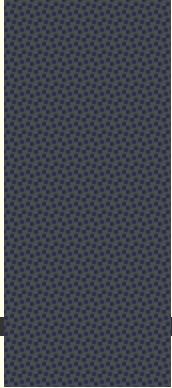
✤ **Development Goal**

Short term	Midterm	Long term
✤ Introduction of E-process within 250 construction companies ✤ Training on Human Resources ✤ Enrollment for information Consultant Company	✤ Introduction of E-process within 500 construction companies ✤ Training on Human Resources for 12000 persons	✤ Promotion on EDI and BPR ✤ Integration on Construction-related information and setup of construction database

Promoting IT Application within Taiwan construction industry (2/2)

1.**PPAEC Action period**　Nov.1999-Dec.2004

2.**Expected points of interest**　achieve 10-15 supply-chain systems within Taiwan construction industry and result in IT utilization within 1000 medium and small size construction-related companies

3.**Target**　Real Estate Planner　General Contractor　Architect　Professional Engineer

4.**Subsidy fee**　50% self investment and 50% from government support for building individual IT system

Promotion Strategy Layout for IT Application with Taiwan Construction Industry
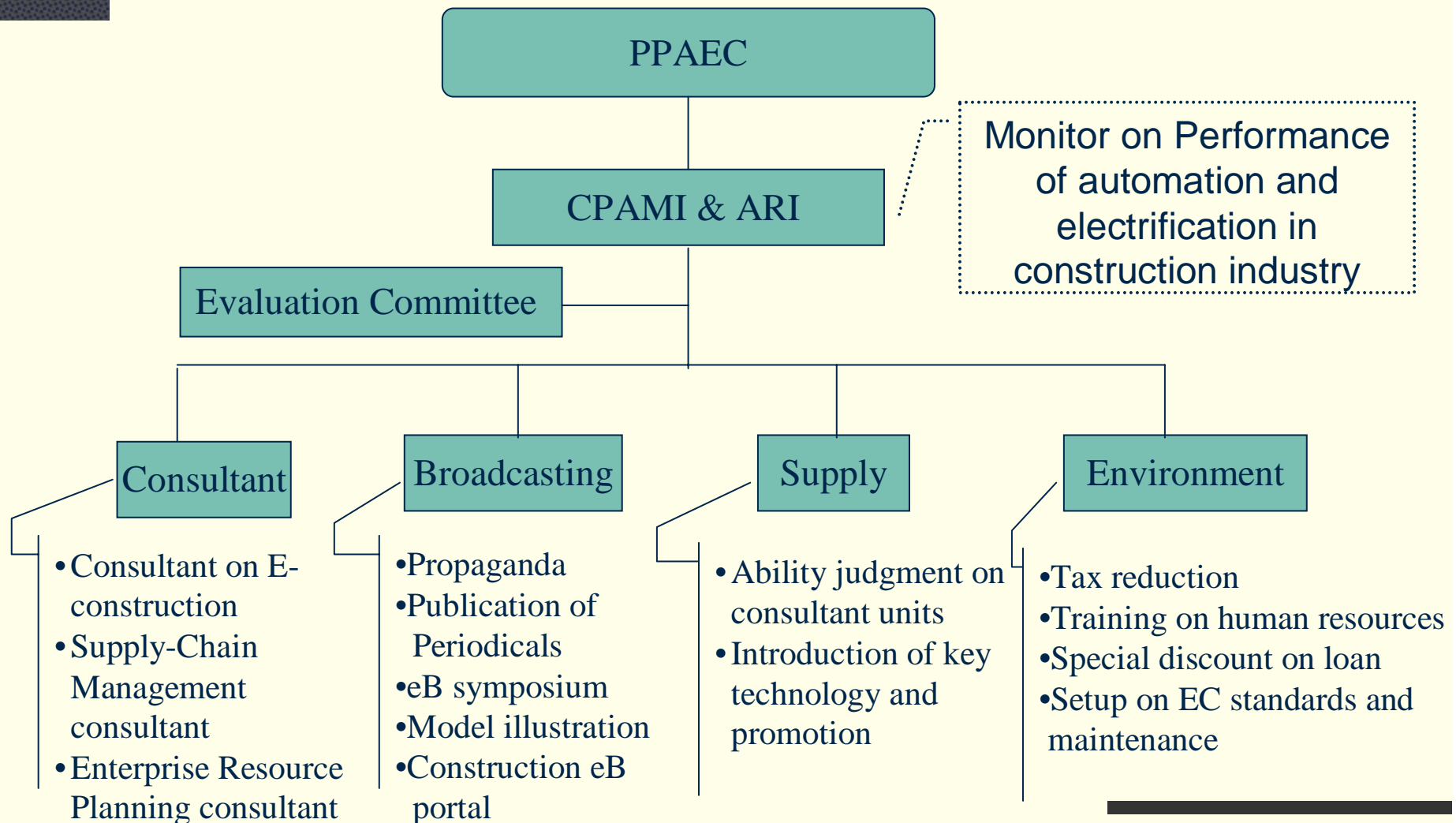
Present Major Difficulties for Promoting IT in Taiwan Construction Field

Major Difficulties on Promoting IT within Taiwan Construction Industry

1. No unified promotion organization
2. diversified demands for IT application
3. hard to renew concept of A&C engineers on their workflow
4. worry on network security
5. hard to bring out for standardization of A&C
6. unclear policy of government on promoting IT with construction industry
7. High cost for introducing IT

Comparison between Taiwan Industries for Promoting IT (1/4)

Industry	Manufactory or Commerce	Construction
Market Demand	⊞ Demand always by customers ⊞ international competence naturally ⊞ product and service level expanded ⊞ demand on prompt information (like order processing ,etc.)	⊞ few demand from customers ⊞ no international competence before entering WTO ⊞ long life cycle,low demand on prompt information but information complicated
Customer Feature	⊞ homogeneity of customer features ⊞ most customers have high professional knowledge and IT skill ⊞ Urgent on IT demand due to internationalization ⊞ Strong demand from customers to introduce IT into supplier process	⊞ heterogeneity of customers ⊞ deficiency in professional knowledge and IT skill of partial customers ⊞ low IT level of customers and no prompt IT demand on products ⊞ diversified demand from customers

Comparison between Taiwan Industries for Promoting IT (2/4)

Industry	Manufactory or Commerce	Construction
Supply-Chain Consultant	⌗ High IT skills owned by supplier ⌗ simpler supply-chain relationship ⌗ similar professional field for similar suppliers ⌗ suppliers under consultant : large economic scale : significant economic efficiency due to IT ⌗ promotion : top-down	⌗ Low IT skills of construction-related suppliers ⌗ complicated supply-chain relationship, no clear distinction between tasks ⌗ dissimilar professional field for similar suppliers ⌗ suppliers under consultant due to no large economic scale : limited economic efficiency due to IT ⌗ promotion : down-top and no IT introduction into related construction-related public units
Propaganda	Some specified organization takes charge of all the tasks of the promotion project	No specified organization takes charge of the promotion project; all are distributed into different organizations

Comparison between Taiwan Industries for Promoting IT (3/4)

Industry	Manufactory or Commerce	Construction
HR Training	✴ many training centers at present ✴ training content and lecturers can be most fit for manufactory	✴ no concrete training program at present ✴ few training centers and few suitable courses and lecturers for construction
Standardization	✴ most products are standardized ✴ specified unit takes charge of standardization and cooperation with international standardization organization for long time ✴ workflow of suppliers are almost standardized and unified	✴ most products are not standardized; however, PCC is engaging to unify the construction code of public work ✴ although some specified unit is taking charge of standardization no long-term planning and consecutive work ✴ work of most suppliers are not standardized and lack of unification

Comparison between Taiwan Industries for Promoting IT (3/4)

Industry	Manufactory or Commerce	Construction
Promotion Strategy	⌗ based on PAAETI ⌗ success on integration with industry, government and academy units for promoting IT ⌗ all the tasks of promotion project are assigned to specified organization and no involvement of governmental units ⌗ target for promoting IT : private sectors ⌗ efficient assistance from the successful integration on related public sectors	⌗ based on PAAETI ⌗ fail on integration with industry, government and academy units for promoting IT ⌗ all the tasks of promotion project are executed by governmental units (like CPAMI or ARI); no specified organization is assigned ⌗ target for promoting IT : private sectors and public sectors ⌗ inefficient assistance from the failed integration on related public sectors

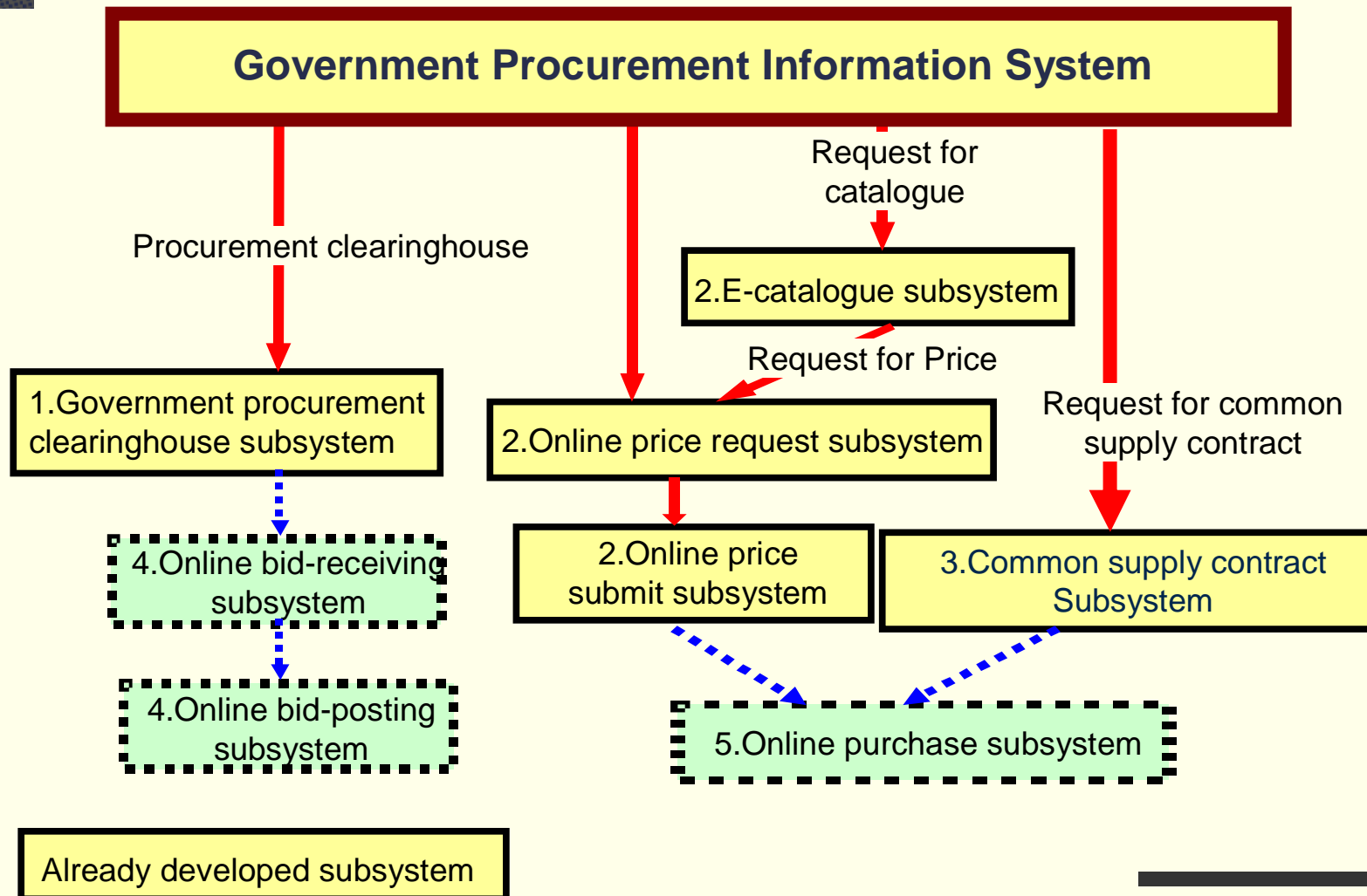# *Present Development of Government Procurement Information System in Taiwan*

Major Difficulties on Taiwan Procurement Procedure

1. **Too many channels related to tendering information**
2. **Difficult to decide the specification of tendering**
3. **Difficult to decide the ceiling price**
4. **Difficult to identify the vendors**
5. **Possible abuse on public assets**
6. **High-frequency repetitive process on procurement**
7. **Inconvenient for receiving bid**
8. **Inconvenient for posting bid**

Taiwan Government Procurement Information System

Illustration of Taiwan Government Procurement Information System

Government Procurement Information System

Request for catalogue

Procurement clearinghouse

2.E-catalogue subsystem

Request for Price

1.Government procurement clearinghouse subsystem

2.Online price request subsystem

Request for common supply contract

4.Online bid-receiving subsystem

2.Online price submit subsystem

3.Common supply contract Subsystem

4.Online bid-posting subsystem

5.Online purchase subsystem

Already developed subsystem

Government Procurement Clearinghouse Subsystem
http://web.pcc.gov.tw/

Common Supply Contract Subsystem
http://sucon.pcc.gov.tw/

E-catalogue and Submit/request for Price Subsystem
http://gecs.pcc.gov.tw/

Present Development of Online Receiving/Posting Bid Subsystems http://www.geps.gov.tw/

- **Online bid-receiving subsystem**
  - **Online   Apr.1, 2000**
  - **Test period   2000/4/1-2001/5/31**
  - **System start   Jun.1, 2001**
- **Online bid-posting subsystem**
  - **Online   Aug.1, 2000**
  - **Test period   2002/1/1-2002/6/30**
  - **System start   Jul.1, 2002**

Time Schedule for Receiving/Posting Bid Subsystems

Unit \ Time	2002	2003	2004	2005	2006
Pilot project	10%				
Major government units		15%	30%	50%	80%	100%
Local government units		5%	20%	40%	70%	90%

Some Important Information Related to Government Procurement System within Taiwan

■ **Electrified Signature Law has been passed on Nov.2001 by Taiwan Congress**
- **Online tendering document can be regarded as official document**
- **Efficiently enhance the willingness of suppliers to join government procurement information system**

Illustration on Digital Signature

Document → mapping function → 101001100 (Encoded by private key of sender) → Signature 110111001 → Encoded Document 110111001

Sender

Document → Mapping function → 101001100

Document (receiver) 110111001 → Identity and security check

110111001 → Decoded by Public Key of Sender → 101001100
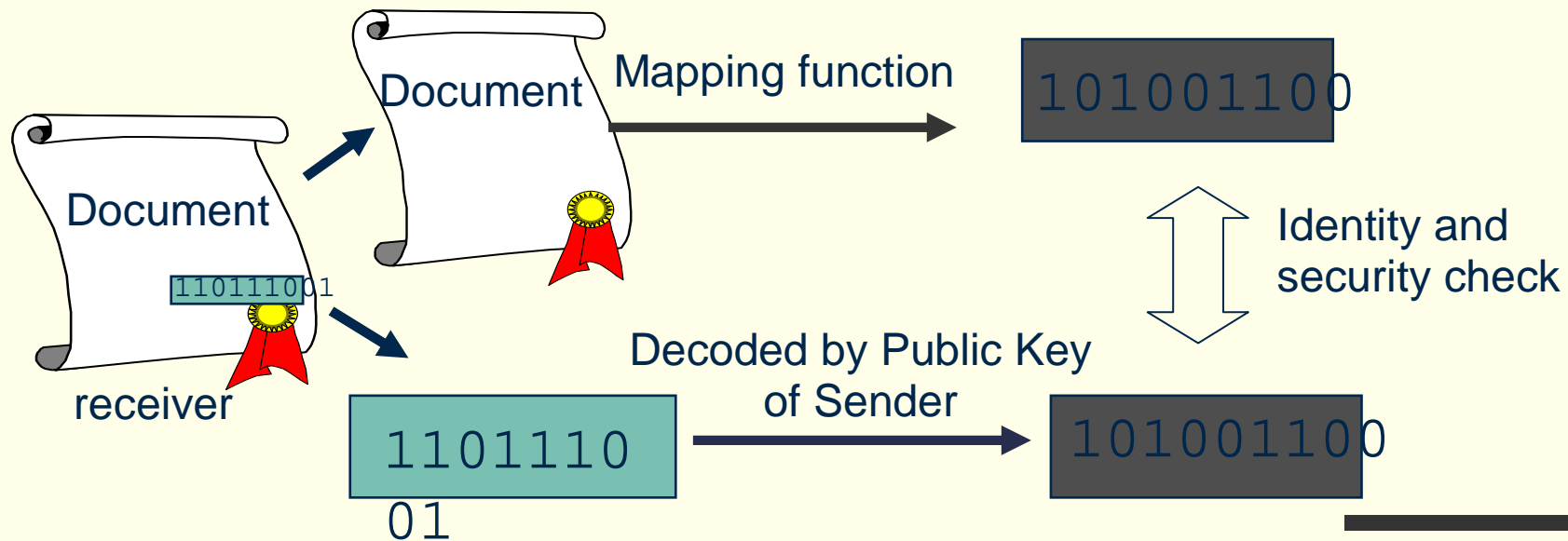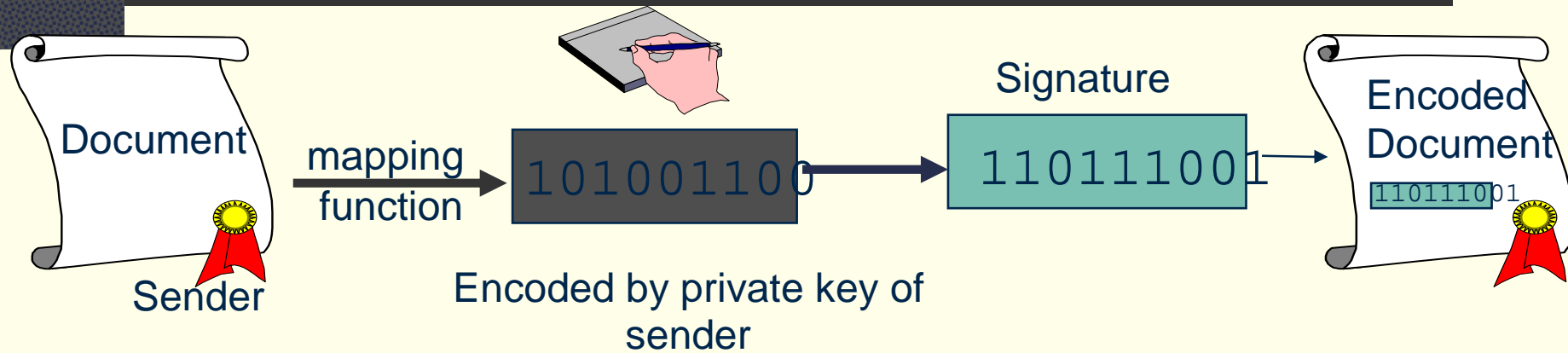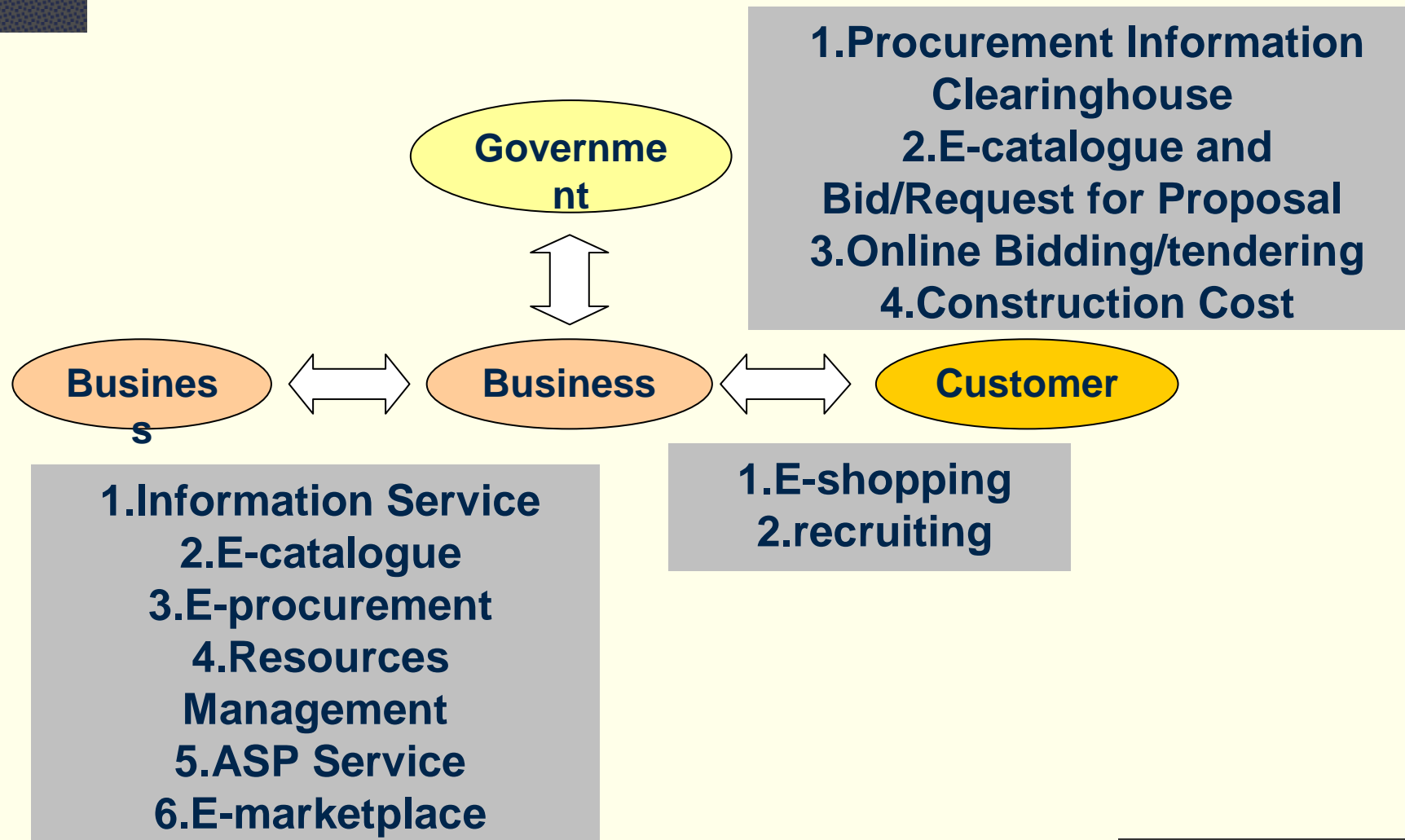
Future Development & Trend of IT in Taiwan Construction Field

Potential Application of IT in Construction Field

Government

1.Procurement Information Clearinghouse
2.E-catalogue and Bid/Request for Proposal
3.Online Bidding/tendering
4.Construction Cost

Business

Business

Customer

1.Information Service
2.E-catalogue
3.E-procurement
4.Resources Management
5.ASP Service
6.E-marketplace

1.E-shopping
2.recruiting

Technology related to E-Commerce

Logistics	Document Management	EDI	Product Data Management	Business Process Reengineering
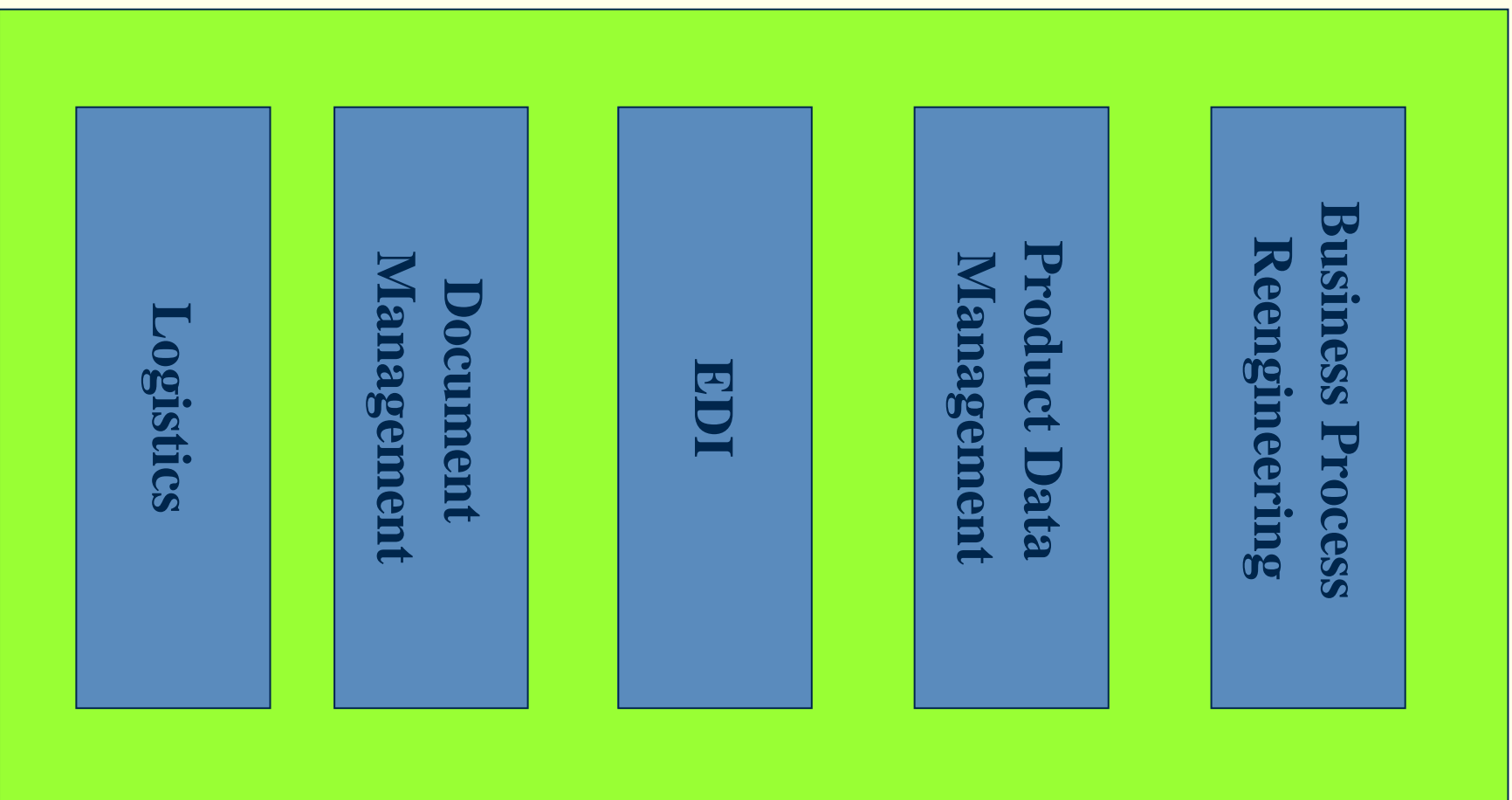
IT Components related to Construction Field

Decision Support

Communication

Project Management

Accounting

GPS & GSM

Digital Image Processing

Coding

CAD & CAE

GIS

Database Management
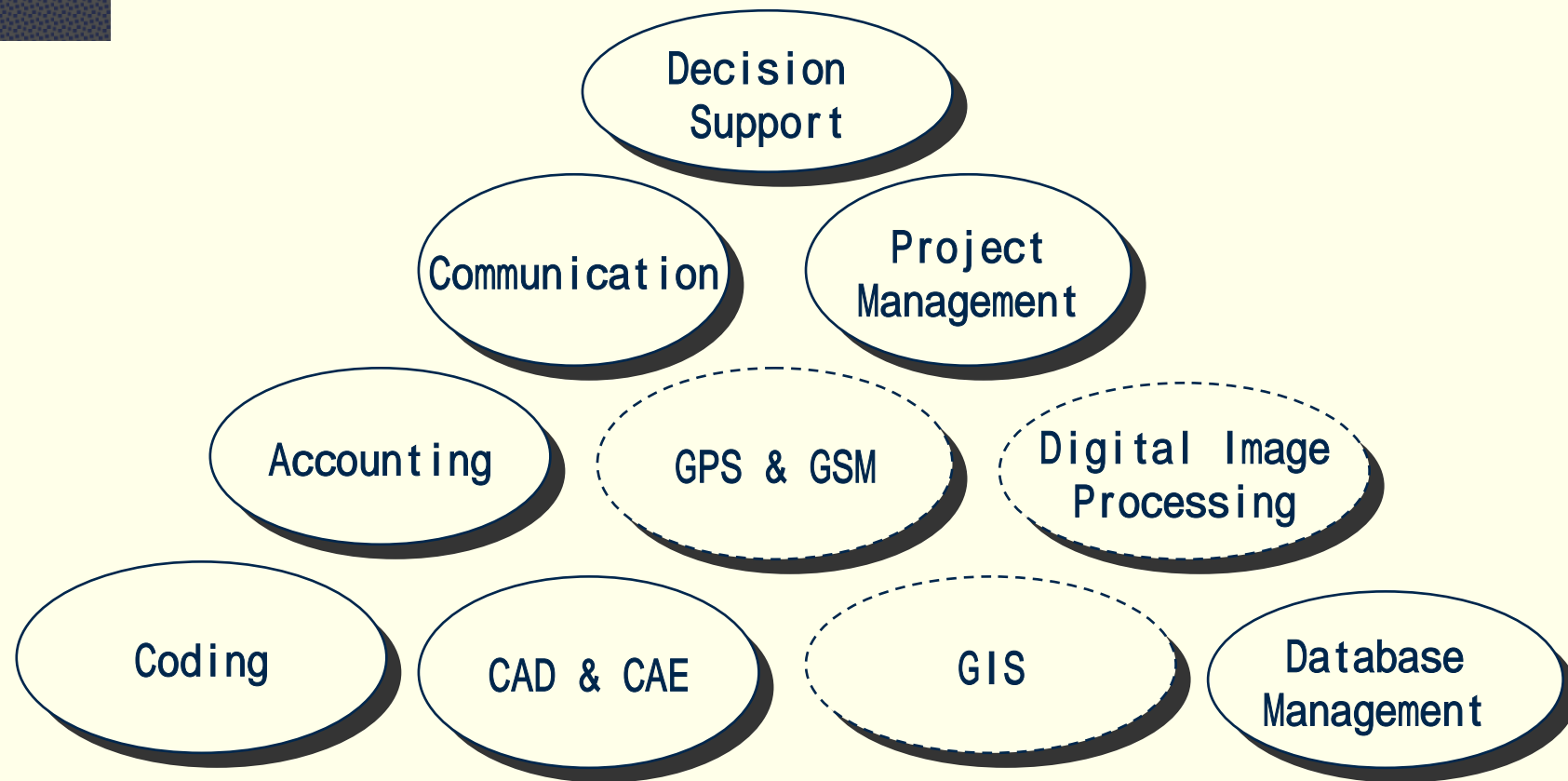
Application and Integration of IT

Observation on the future IT development of construction field

- **Evolving from the distributed units by assigned work to integrated group by value chain**

- **Different expertise or function will develop into chained competitive relationship**

- **Information itself becomes the essential binder during life cycle of construction stages; the efficiency on dealing with information is the success key factor of competence**

- **Beside the operation mechanism in the real world, the virtual market integration mechanism is also created**

Future Direction for Taiwan Construction-related public sectors on IT Application

1. Offer solid **infrastructure** on network communication

2. Assure **security** on online transaction

3. Assist enterprise to train IT **people**

4. Adjust related **laws** and specifications

5. **Encourage** investment on IT

6. Establish **standardization** of information exchange

7. Offer **consultant** on introduction of IT

8. Set up **promotion** organization

9. Carry out **pilot** project

Milestones for Construction Industries on IT application

- **Help construction industry get used to IT application on business and the integration of information flow**

- **Help construction industry applying IT application on on business with the integration of cash flow**

- **Help construction industry applying IT application on on business with the best allocation of resources**

Vision on promoting IT application on construction field (1/3)

Strategic aspect

- **Primarily led by future-established ministry of construction by cooperating with ministry of economic affairs set up some task unit to promote and realize the related IT measures**

- **Through pilot project, understand the merits and difficulties of IT application in construction field; then, improve**

- **By KPI (key performance index) evaluate the performance of construction IT**

Vision on promoting IT application on construction field (2/3)

Standardization aspect

- **Government sector or professional organization should be charge of IT standardization and localization of construction field**

- **The development of standardization should be internationally exchangeable**

- **IT standardization**

  Documentation   XML   aecXML

  Graphical information   STEP/IFC

Vision on promoting IT application on construction field (3/3)

Information technology aspect

- **Continuously reinforce IT application on construction field**

- **Aim at information sharing and automatic processing during construction life cycle**

- **Enhance cooperation between construction industry and information industry**

- **Develop localized software for construction industries**

Thank you

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URL:http://www.tcri.org.tw