Best practices of digital technology application in transport facilitation and logistics
I. Transport Facilitation

II. Single Window

III. PCS

IV. Using u-IT

V. With New Technology

VI. Future
Transport Facilitation ?
### Mission

Transport facilitation and logistics

### Concept

Interoperability and seamless Global Supply Chain

### Strategies

- The simplified electronic means of the port clearance of ships and logistics in transport domain
- Standardization in logistics activities, interface, and information in overall transport mode
- Improve logistics efficiency and strengthen logistics competitiveness of logistics service provider
Single Window
**General Concept of Single Window**

facility that allows parties involved in trade and transport to lodge standardized messages with a single entry point to fulfill all import, export, and transit-related regulatory requirements. In this point, if the message is electronic, then individual data elements should only be submitted only one time.
Single Window
For Transport and Logistics

Goal
- Expert
- Standard
- Collaboration
- Technology

Needs
- Improvement
  - Individual declaration method for each country
  - Manual processing
- Work Efficiency
  - Redefine Business Process
  - Combine with technology
  - Share Information Between IMO Country
- Apply Standard
  - Define Logistics Standard system
  - Enhance interoperability
Distribute Information

- Send EDI, XML
- WEB System

Data Sharing

- Sharing
  - Quarantine
  - Inspection
  - Terminal
**Single Window Guideline**

- Business Process
- Technical Factor
- Law Factor
- Regional Factor
- Human Factor

**Project Planning** → **Design Define Scope** → **System Design** → **Implementation** → **Post Implementation** → **Maintenance**

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**Single Window System**

<table>
<thead>
<tr>
<th>Management Module</th>
<th>(Control the process of the Single Window System)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Load Balancing, Transaction management)</td>
</tr>
<tr>
<td>Converting Module</td>
<td>• Translate one format into another format</td>
</tr>
<tr>
<td></td>
<td>• Generate to e-Form data</td>
</tr>
<tr>
<td>Validation Module</td>
<td>• Syntax, Semantic Checking</td>
</tr>
<tr>
<td></td>
<td>• Business Logic Checking</td>
</tr>
<tr>
<td>WEB Module</td>
<td>• Input, View, Download, Upload, etc.</td>
</tr>
<tr>
<td>Communication Module</td>
<td>• TCP/IP, ebMS, SOAP, MQ, SMTP, FTP, etc.</td>
</tr>
<tr>
<td></td>
<td>• Access Control, Secure Communication Channel</td>
</tr>
<tr>
<td></td>
<td>• Interface with User, Port Authority and Other organization</td>
</tr>
</tbody>
</table>
Single Window by UN/CEFACT

- Single Window is meant to be a TRADE FACILITATION mechanism
- A platform for collaboration between stakeholders
- Technology as a tool (NOT as the goal)
Steps towards Single Window implementation

**Single Window Implementation**
- UNECE Rec. 33, 34, 35
- UNECE SW repository
- UNNExT Guide on SW
- WCO Compendium on SW

**Cross Border Data Exchange**
- Data Models (e.g. WCO Data Model)
- UN XML, UN EDIFACT

**National Data Harmonization**
- UNTDED, UNCCTS, UN CCL
- UN LOCODE and code lists
- UNECE Rec. 34
- UNNExT Guide on Data Harmonization

**Document Simplification and Standardization**
- UN Layout Key, Master Document
- UNTDED, TF Toolkit and Forms Repository

**Business Process Analysis**
- Revised Kyoto Convention
- UN/CEFACT International Supply Chain Reference model
- Unified Modeling Methodology (UMM)
- UNNExT Guide on Business Process Analysis

**Legal and Institutional Framework**
- UNECE Rec. 4, 18 & 35
- UNCITRAL Model Laws on Electronic Commerce and on Electronic Signature
- UN Convention on the Use of Electronic Communications in International Contracts

**Policy Planning**
- UNECE Rec. 4, 18 & 33
- WCO Compendium on SW
Port Community System
A Port Community System?

- is a neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders in order to improve the competitive position of the sea and air ports’ communities.

- Optimises, manages and automates port and logistics processes through a single submission of data and connecting transport and logistics chains.
Typical PCS Service

PCSs in general provide a huge range of services and key features which can be summarised as follows:

- Easy, fast and efficient EDI information exchange, re-use and centralisation, available 24/7/365
- Customs declarations
- Electronic handling of all information regarding import and export of containerised, general and bulk cargo
- Status information and control, tracking and tracing through the whole logistics chain
- Processing of dangerous goods
- Processing of maritime and other statistics
Is national transport and logistics information platform in China

The main goals of LoginK

- integrate resource,
- improve informatization level in China logistics industry,
- and construct national traffic logistics information exchange network

The service type of LoginK consists of

- B2G (Single Window to Government Regulations, Electronic Way Bill Service)
- G2B (Public Services, Credit Service)
- and B2B (Value Added Services, Trading Service)

LoginK system is providing 2 kinds of information (data) exchange service

- exchanging e-document (EDI)
- information querying
Management Layer

National Level Industry Management System
(User Info, Route Info)

Centralized Exchange Mode

Exchange Layer

Exchange Node 1 → Data Route → Exchange Node 2 → Data Route → Exchange Node N...

User Layer


Peer-to-Peer Exchange Mode

Obtain Route Info

User Layer

Access Enterprise 6 → Send → Access Enterprise 7
Container logistics information service (Colins) provides container logistics information such as import/export container information, free time information, ship movement information, port area traffic jam information, gate open time information, etc. to terminal operators, shippers, shipping. It is a website for information sharing among companies.

The Ministry of Land, Infrastructure and Transport Port and Harbor of Japan strives to implement model projects for promoting port logistics informatization in the "comprehensive centralized reform program for container logistics centered on supercenter ports" from 2009 to 2011 (until the end of March 2012 Demonstration experiment project), Japan government has been developing and operating. The Port Authority of the Ministry of Land, Infrastructure and Transport plans to operate it for the time being.
Establishment of **Total Logistics Information system**
to support easy decision making for logistics group

**Web Site Integration**
- Need web site providing information related to maritime logistics information
- Need improvement of maritime logistics information service
- Consider user experience and reduce information search step and cost

**DB Optimization and Contents update**
- Need new data demand for maritime logistics information
- Need update information for liner analysis and policy making support system
- Need updated domestic and foreign logistics information DB
- Contents organization based on integrated web site
Best Case 3: Relationship of SP-IDC

Foreign Ports & Shipping Co
- Ports facility status
- Vessel movements and cargo tracking

SP-IDC
Unification DB

Value added service

Shipping Co
Terminal
Inspection Co
Carriers
Shipper /Forwarder

Vessel & Cargo Info
Loading & In/Out Info
Inspection Info
Cargo Trans Info
Loading & Discharging Info

- MOF (Ministry of Oceans and Fisheries)
- KCS (Korea Customs Service)
- MOJ (Ministry of Justice)
- NQS (National Quarantine Station)
- Towing / Ferry board Association
Myanmar – Port EDI System

Data Centre

Myanmar Port EDI System

1. Port-related Procedures System
2. Berth Allocation System
3. Invoice Issuing System
4. Statistics Management System
5. Logistics Monitoring System
6. Terminal Operation System

Myanmar Port Authority


Myanmar Port Authority
(SAD)
Ship’s Agent Dept.

Sule Pagoda Wharves
(Terminal)

Out of scope

Maccs (Myanmar Automated Cargo and Port Consolidated System)

Administrative Agencies

Ministry of Transport (DMA)
Animal and plant quarantine
Port Health Office
Immigration
Customs

Private Companies

Shipping companies
Terminal operator (Private Terminals)
Logistics operator (consignor, forwarder, carrier, etc.)
1. Move Goods & Money Faster Cheaper and Secure

2. Move Information from Anywhere at Anytime in a Trusted and Secure Way

3. PCS is playing a key role as facilitator but its importance is growing due to the new trends

**Technologies**
- Big Data -> Better Forecast.
- AI -> Risk Assessment
- IoT -> Container Digital Shadow
- RFID -> Geo Location
- Blockchain -> Secure Transfer, tracing and tracking

**Processes**
- Link Operational Process with Payments
- Link Export Procedures Import Procedures
  - Single submission of information
  - Digital Certificates

**Regulation**
- International Regulations
- Homologation of regulations (nations/áreas)
Using u-IT
### RFID based u-Port

#### Advanced Ubiquitous Hub Port
- **User’ Cost Cut**
- **Improvement of Logistics Productivity**
- **Country with Logistics Security**

#### Building Infrastructures
- **GCTS** (Global Container Tracking System)
- **Integrating Related Systems**

#### Cargo Info
- Factory
- Factory Location Info

#### Trailer Info
- Land Transportation
- Node Location Info

#### I/O Cargo Info
- ICD
- CT (GATE)

#### Tracking Info of the Cargo
- Vessel Location Info
- CT (Yard)
- Vessel (Marine Transportation)
- Foreign Terminals

#### Manufacturer · Forwarder
- Cargo tracking
- Property Management
- Efficient management of warehouses
- Home and Foreign Customs
- Notice of Dangerous Cargo

#### Forwarder
- Trailer Tracking
- Property Management
- Dangerous Cargo Info
- Trailer Info

#### Shipping Company
- Cargo Tracking
- Property Management
- Efficient Container Management
- Home and Foreign Customs
- Dangerous Cargo Info

#### Customs
- Integrated Declaration
- Effective Operation of Quarantine
- Collaboration of Public Institutions

#### Terminal
- Automatic Management
- Container Security
- Container Identification
- Efficient CY Planning
- Dangerous Cargo Info

GCTS (Global Container Tracking System)
Relationship between u-Port and other organizations

Foreign Countries

- Shipping Company
- Terminal
- Related Authority
- Manufacturer
- Forwarder
- Customs
- Transportation Info
- Stevedoring Info
- Vessel/Cargo Info
- Loading/Unloading Info

Their own systems

Republic of Korea

- MLTM
- Related Authority
- Manufacturer
- Shipping Company
- Terminal Operator
- Forwarder

Integrated Information

GCTS
Auto-Identification when Gate-In/Gate-Out

Terminal/ICD/CY

GCTS
- Transfer Container Information

Terminal Operation System
- Transfer Container Information

Telecommunication Company Transmission Tower

LED electronic display

Container Information

RFID
- Bar Code
- SMS

LED electronic display

SignPost

Container Reader

AP

Edge Middleware

Lead Shed Location
The Effects

Process Productiveness Enhancement

<table>
<thead>
<tr>
<th>Process Changing</th>
<th>Terminal In</th>
<th>Container Loading</th>
<th>Shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive COPINO EDI</td>
<td>Cargo In</td>
<td>Indicate shipment</td>
<td>44%</td>
</tr>
<tr>
<td>Check vehicle/Container</td>
<td>Indicate unloading work</td>
<td>Equipment</td>
<td></td>
</tr>
<tr>
<td>Print assigned location</td>
<td>Yard Loading</td>
<td>Shipment work</td>
<td></td>
</tr>
<tr>
<td>Pass Gate</td>
<td>Check loading work</td>
<td>Indicate check process</td>
<td></td>
</tr>
<tr>
<td>Move to assigned location</td>
<td></td>
<td>Arrange Inspector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check error or not</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust shipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>items</td>
<td></td>
</tr>
</tbody>
</table>

- **Process Changing**
  - 10 min. → 5 min. (Reduce 50%)  
  - 1 H. 50 Min. → 1 Hour (Reduce 45%)  
  - 11.5 Hour → 9 Hour by 1,000 TEU (Reduce 20%)

- **Lead Time Reduction**
  - +100%
  - +83%
  - +44%

- **The ratio of productiveness**
  - 8.4 Hundred Million USD

**Quantitative Effects**

- **Upgrade Process Productiveness**
  - 44%
  - Consider limitation of infra that come along side the pier

- **Upgrade Port Productiveness**
  - 20%
  - Contract to Based on sales of current traffics

- **Upgrade Annual Sales**
  - 8.4 Hundred Million USD
With New Technology
Visibility, Interoperability of Transport

- Transportation - Domestic, Cross-border Multi-Organization
  - Interconnect with e-Document, IoT Device
- Business Entities such as Shipping Agency, Freight Forwarder, Carrier, Manufacturer, Terminal, etc.

Bulk Cargo Visibility for real-time and secure management – Architecture
- Inspection & History System
- Data Collecting and Handling System
- Work flow/Business Process Model
- Information Model

Production Traceability

Inspection Traceability

Visibility & Safe Transaction

Enhance Productiveness, Safe Environment
Company A
Agreed Interface and standard

Government C
Agreed Interface and standard

Organization B
Agreed Interface and standard

Other country D
Agreed Interface and standard
Inconsistent information across organizational boundaries and “blind spots” throughout the supply chain hinder the efficient flow of goods

Complex, cumbersome, and costly peer-to-peer messaging

Manual, time-consuming, paper-based processes; high air courier expense and delays

Risk assessments often lack sufficient information; clearance processes subject to fraud

The administrative cost of handling a container shipment is comparable to the cost of the actual physical transport

Instant, secure access to end-to-end supply chain information; single source of the truth

Assurance of the authenticity and immutability of digital documents; trusted cross-organizational workflows

Better risk assessments and fewer unnecessary interventions

Far lower administrative expenses and elimination of costs to move physical paper across international borders

Global savings from more efficient sharing of information

*Blockchain changes the trend*

Never before could disparate entities securely and confidently process paperwork filings digitally
MAERSK LINE
- Developed Vessel logistics system by blockchain
- Sends the related information of whole processes to the relevant parties such as shipper, customs, ports, terminals, and insurance company, etc.
- Don’t need to make any some documents, such as application or shipping lists
- Goal: Paperless logistics system

Maritime logistics in Korea
- Developing logistics platform by blockchain and IoT
- Able to be tracking whole process from departure after loading (shipping) to arriving in Port (Terminal)
- Able to conduct cargo tracking in real time by carrier, consignor/consignee, etc., even though on-board shipping

Cold chain
- Save various information such as temperature, humidity, vibration, etc. from IoT device to blockchain system in shipping
- Ensure to clarify the responsibility when a problem arises in the transportation process because of being impossible to change the stored information
Future
Global Supply Chain

- Real-time tracking for consignment and transport means by blockchain
- Checking the status of transport means and person’s safety by IoT
- Global Collaboration project on developing standard model and how to sharing logistics information
- Global Research

- Additive Manufacturing
- Smart Box and Pallet
- Autonomous Transport vehicle in warehouse
- Using IoT and Blockchain Technology

- Standardization for Business Process, Information Model, Interface, Architecture Framework
- How to support visibility, interoperability, and sustainability
Global Logistics Network

- Intelligent Transport & Logistics
- Sustainable Transport & Logistics

Manufacturers
- e-Business (Trader)
- SME Business Entity (Broker)
- SME Business Entity
- B2C (End User)

Operational Transport and Yard Capacity Planning
Seamless Logistics Transport Lifecycle Management
Risk Management and Recovery

Strategic Network Planning
Data Analytics and Prediction
Operational Capacity Planning, Facility Automation and Improving
Risk Detection and Alternate Method Planning
Transport Route Optimization, Risk Detection

u-IT Technology (RFID, Sensor, IoT, etc.) based monitoring
On-Demand Service
Valuable Information

Flow of physical goods
Flow of data

Smart Logistics Network

- Partnership Collaboration with external information system
Tightly coupled relationship

Global Supply Chain

Catch and Follow up Future Needs

Global Logistics Network

Synch with Customer Business
Logistics Network
Optimized Logistics Operations
New Business

Customer Loyalty and retention

Operational Capacity Planning, Facility Automation and Improving
Risk Detection and Alternate Method Planning
Transport Route Optimization, Risk Detection

u-IT Technology (RFID, Sensor, IoT, etc.) based monitoring
On-Demand Service
Valuable Information

Distributed/Localized Logistics Base, Hub Logistics (Pickup and Delivery)
Operational Transport and Yard Capacity Planning

Operational Transport and Yard Capacity Planning
Seamless Logistics Transport Lifecycle Management
Risk Management and Recovery

Transport Route Optimization, Risk Detection

Flow of physical goods
Flow of data

Global Supply Chain

PCS, NSW, MSW, etc.

Manufacturers
- e-Business (Trader)
- SME Business Entity (Broker)
- SME Business Entity
- B2C (End User)
Q&A
감사합니다.

Thank you