

# **From Standards Adopter to Standards Author:**

## **The Evolution of Korea's National Standardization System with a Focus on ICT**

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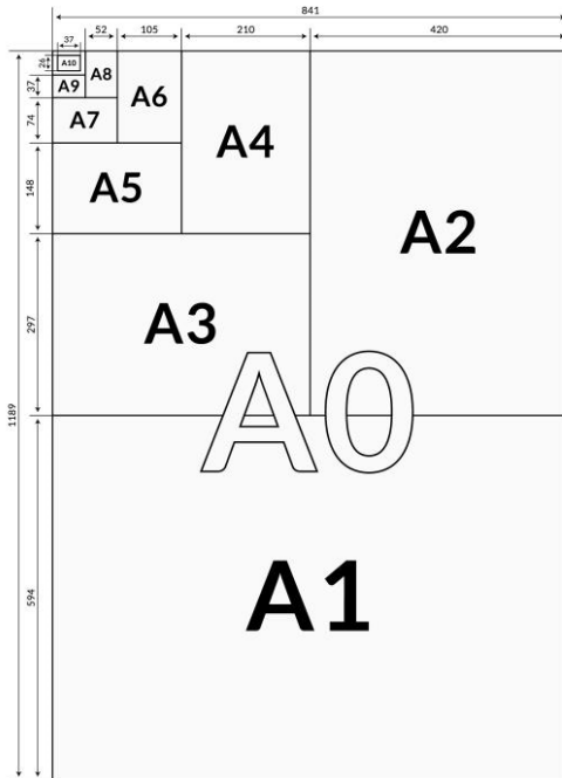
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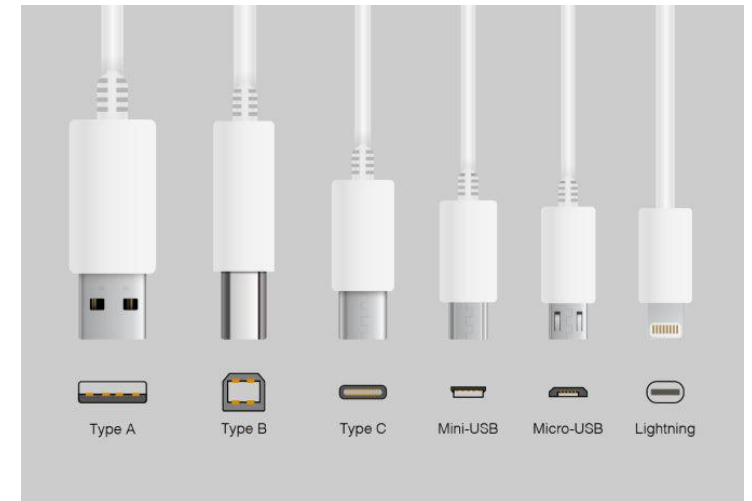
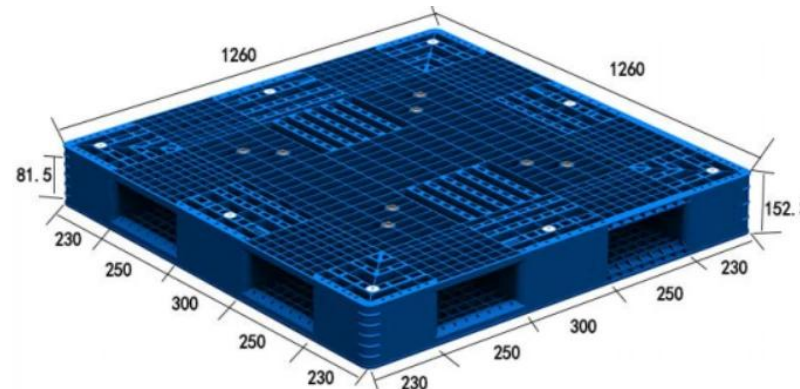
# 01 Introduction

## What is a Standard?

A Series Formats Sizes  
ISO/DIN Paper Standards



- “A document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.” (ISO/IEC Guide 2)
- “Document approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory.” (WTO Agreement on Technical Barriers to Trade, Annex 1.2)



# 01 Introduction

## Why Standards Matter

### Role of Standards

- A core infrastructure that supports a wide range of industries and economic activities
- Ensure the quality and safety of products and services
- Facilitate compatibility and interoperability across technologies and systems
- Support the diffusion of innovation and market expansion

### Importance for Developing Countries (latecomers)

- Enhance industrial competitiveness and support entry into global markets
- Build trust in export markets through alignment with international standards
- Enable participation in global value chains
- Support technological upgrading and institutional development

# 01 Introduction

## National Quality Infrastructure (NQI)

- National Quality Infrastructure refers to the **institutional framework that ensures the quality and safety of products and services.**
- ✓ **Standardization**
  - Development of technical specifications and standards
- ✓ **Metrology**
  - Establishment of measurement standards and measurement accuracy
- ✓ **Conformity Assessment**
  - Testing, inspection, and certification processes to verify compliance with standards
- ✓ **Accreditation**
  - Recognition of the competence of testing, inspection, and certification bodies

# 01 Introduction

**South Korea** provides a notable example of **economic development** through an **export-driven industrialization strategy**, in which **the advancement of its national standards system** played a pivotal role.



## 02 Evolution of Korea's National Standards System

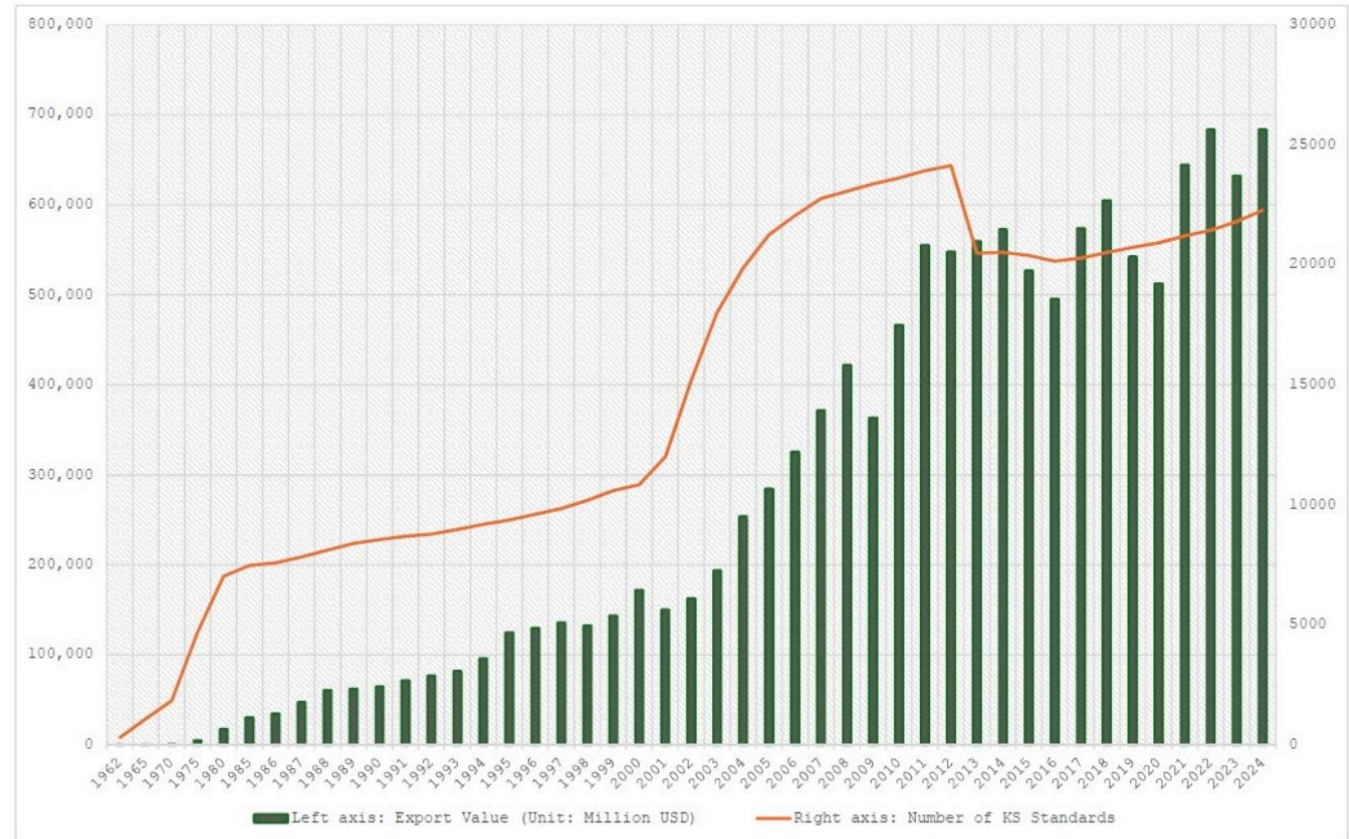
- Korea's economic development has been widely studied from various perspectives.
  - This study revisits Korea's development from the perspective of standards and standardization.
    - Standards provide a foundation for economic and social order
    - National Quality Infrastructure supported export-led development
      - Quality control for export products
      - High-precision measurement services
    - Government standardization programs supported manufacturing firms
    - Since the late 1990s: active participation in international standards (particularly in ICT)
- ⇒ **From standards adopter to standards author**

# 02 Evolution of Korea's National Standards System

## Standards and Industrial Development

- Korea's economic development strategy relied heavily on export-oriented industrialization.
- To export products, manufacturers needed to meet quality and safety requirements defined by standards.
- Standardization of products and processes helped improve productivity and product quality.

**Korea's export increases have been accompanied by the growth of Korean Industrial Standards (KS)**

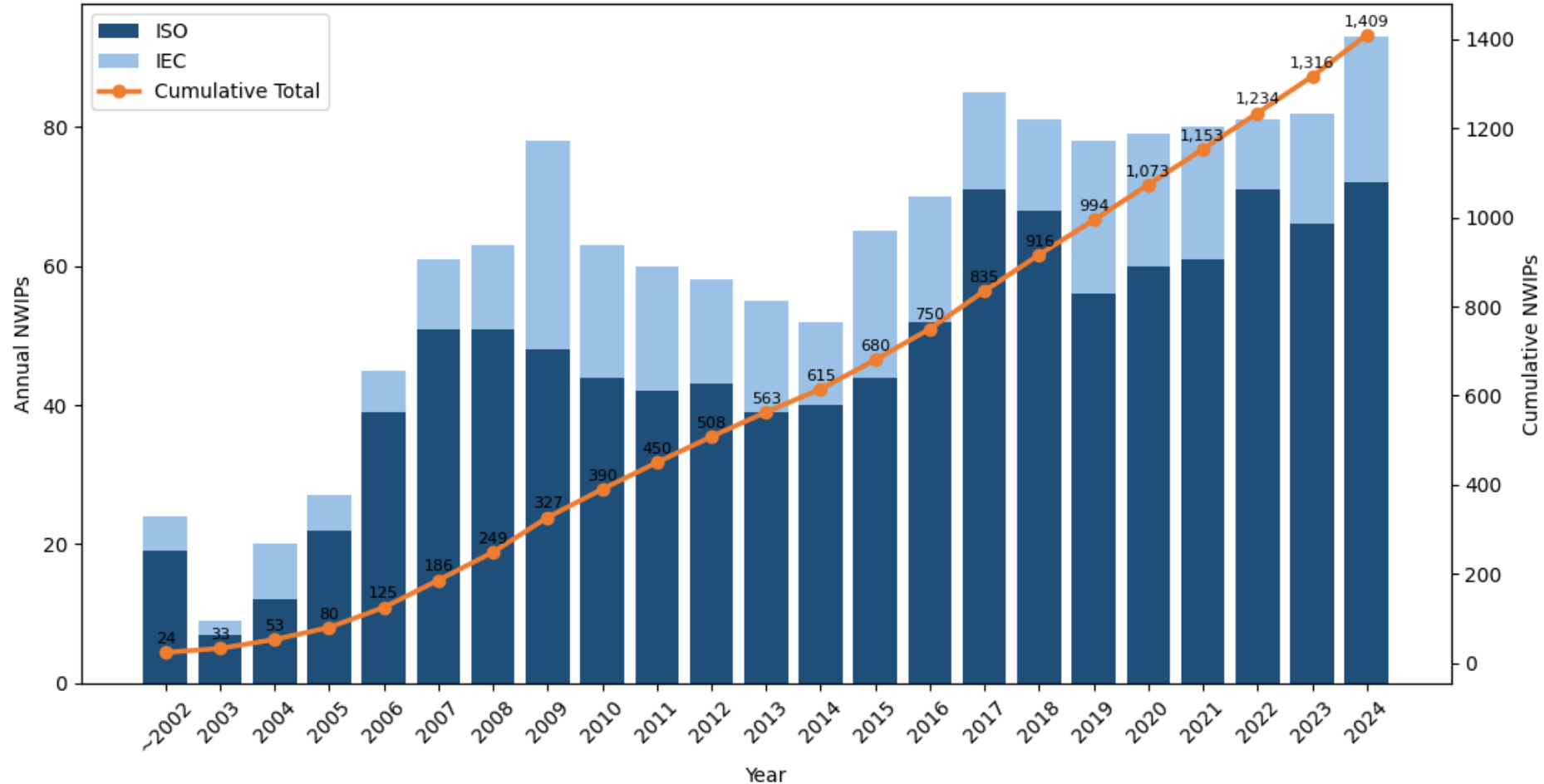


Source: Data on exports are from K-Stat Trade Statistics, Korea International Trade Association (KITA). Data on KS are from the Korean Agency for Technology and Standards (KATS).

Note: KS = Korean Industrial Standards.

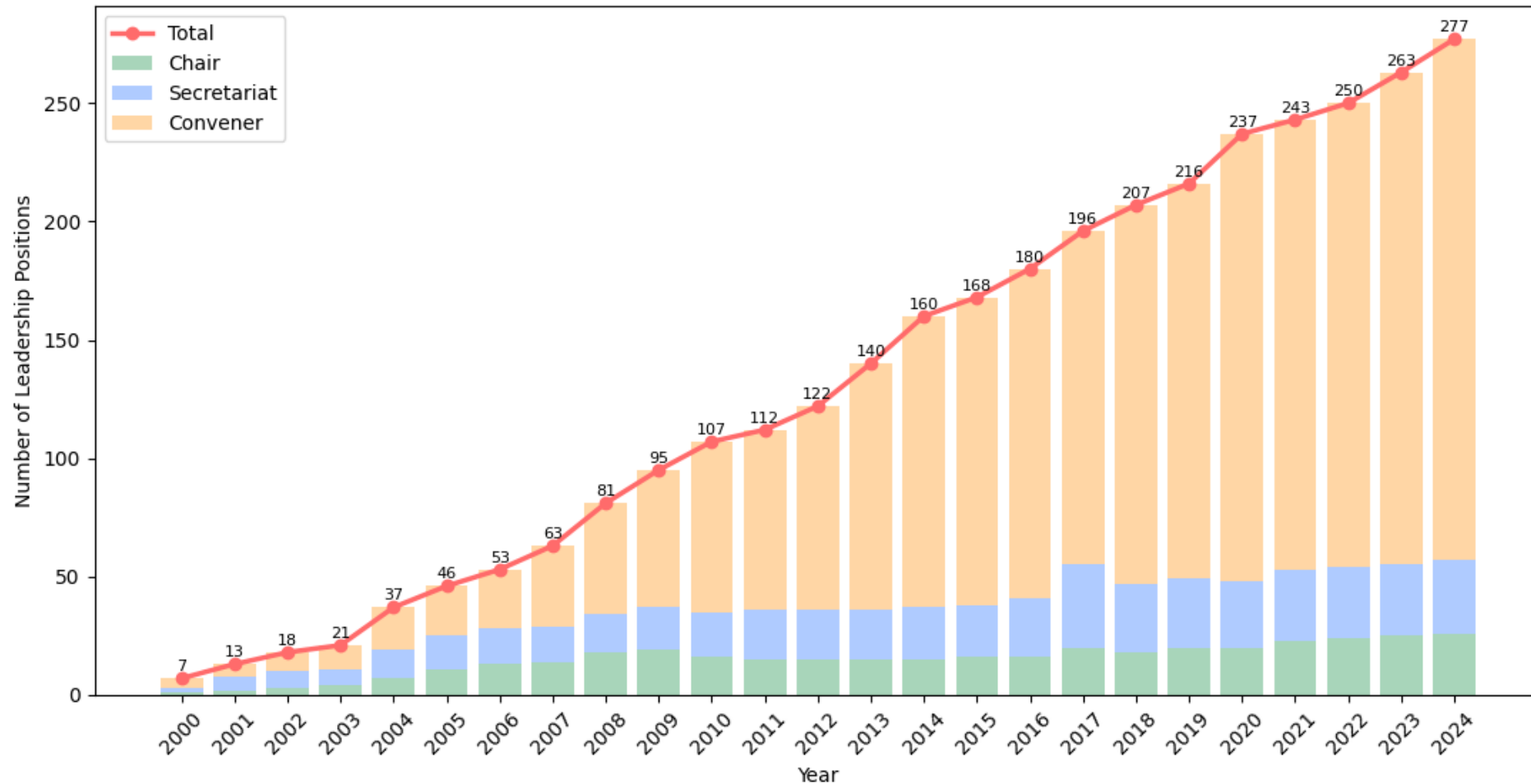
# 02 Evolution of Korea's National Standards System

The number of New Work Item Proposals (NWIPs) submitted by Korea has been increasing



# 02 Evolution of Korea's National Standards System

Korea's leadership roles in ISO and IEC have been increasing



# Korea's national quality infrastructure has developed through four stages

Stage	Founding (1961~1972)	Growing (1973~1995)	Upgrading (1996~2014)	Expanding (2015~)
Agency	Bureau of Standards, Ministry of Commerce and Industry	Industrial Advancement Administration	Korean Agency for Technology and Standards (KATS)	KATS
Characteristics of each stage	<ul style="list-style-type: none"> <li>Export-driven industrialization</li> <li>Promotion of industrial standardization for export</li> </ul>	<ul style="list-style-type: none"> <li>'Standards' included in the Constitution</li> <li>Institutional strengthening of industrial standardization</li> </ul>	<ul style="list-style-type: none"> <li>Framework Act on National Standards (1999)</li> <li><b>Expansion of participation in international standardization</b></li> <li><b>Emergence of ICT standardization ecosystem (ETRI-TTA-industry)</b> <ul style="list-style-type: none"> <li><b>Linking R&amp;D with standardization</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Pan-government Participation Standards System (2015)</b></li> </ul>
Metrology	<ul style="list-style-type: none"> <li>Metrology Act (1961)</li> <li>Central Bureau of Weights and Measures</li> </ul>	<ul style="list-style-type: none"> <li>Korea Standards Research Institute (KSRI) established (1975), later reorganized as KRISS (1991)</li> </ul>	<ul style="list-style-type: none"> <li>KRISS designated as National Metrology Institute (2004)</li> </ul>	
Standardization	<ul style="list-style-type: none"> <li>Industrial Standardization Act (1961)</li> <li>Ten-year industrial standardization plan (1971-1980)</li> <li>KS Mark (1963)</li> </ul>	<ul style="list-style-type: none"> <li>Korea Standards Research Institute (KSRI) established</li> <li>Five-year plan for industrial standardization (1988-1993)</li> <li><b>Electronics and Telecommunications Research Institute (ETRI) established (1976)</b></li> <li><b>Telecommunications Technology Association (TTA) established (1988)</b></li> </ul>	<ul style="list-style-type: none"> <li>1st – 3rd National Standard Development Plans</li> <li>Harmonization with international standards</li> <li><b>National Standardization Capacity Enhancement Program</b> in 2007</li> <li>COSD in 2008</li> <li><b>Standard Research Center (SRC) within ETRI</b></li> <li><b>National ICT Strategy (IT839)</b></li> <li><b>TTA 'ICT Standardization Roadmap' (Yearly)</b></li> </ul>	<ul style="list-style-type: none"> <li>4th – 5th National Standard Development Plans</li> <li><b>Transferred standardization responsibilities to other ministries</b></li> <li><b>'National Standardization Strategy for High Tech Industry' (2024)</b></li> <li><b>TTA 'ICT Standardization Roadmap' (Yearly)</b></li> </ul>
Conformity Assessment	<ul style="list-style-type: none"> <li>Export Inspection Act (1962)</li> </ul>	<ul style="list-style-type: none"> <li>KS Mark Order (1977)</li> </ul>	<ul style="list-style-type: none"> <li>KS Mark System from approval to certification by KSA (1998)</li> </ul>	<ul style="list-style-type: none"> <li>KS certification by KTC, KTR and KCL as well as KSA from 2015</li> </ul>
Accreditation		<ul style="list-style-type: none"> <li>Korean Calibration Laboratory Accreditation Scheme (1992)</li> <li>Korea Accreditation Board (KAB) (1995)</li> </ul>	<ul style="list-style-type: none"> <li>Korea Accreditation System (KAS) (2001)</li> <li>Korea Laboratory Accreditation Scheme (KOLAS) (2007)</li> </ul>	

# 03 Korea's ICT Standardization Cases

## CDMA

### Background

- **Rapid growth in mobile communication demand** after the 1988 Seoul Olympics led to **severe congestion in Korea's analog cellular system.**
- Limitations of the analog system created **the need for a next-generation digital mobile communication system.**

### Standardization & Development Process

- **1988** – ETRI proposed a national R&D project for digital cellular communication
- **1989** – Government launched a national project to develop a digital mobile communication system
- **1991** – ETRI signed a joint development agreement with Qualcomm to develop CDMA technology
- **1994** – **CDMA adopted as the digital mobile communication standard in Korea**
- **1995** – Successful CDMA commercial trial demonstration
- **1996** – **World's first commercial CDMA mobile service** launched

### Outcomes and Implications

- **World's first commercialization of CDMA**, showcasing Korea's technological capability in mobile communications
- Strengthened Korea's domestic mobile communications industry and positioned the country as a major player in the global market

# 03 Korea's ICT Standardization Cases

## WiBro

### Background

- The government initially allocated the **2.3 GHz band for fixed wireless communication**, but **actual demand remained limited**.
- To utilize the spectrum more effectively, Korea introduced the concept of “**portable Internet**” and promoted **WiBro under the IT839 Strategy**.

### Standardization & Development Process

- **2003** – WiBro development project launched, led by ETRI and Samsung Electronics, with participation from telecom operators (KT, SKT, Hanaro Telecom)
- **2003-2004** – Successful development of OFDM/OFDMA-based wireless Internet technology and prototype system
- **Nov 2004** – World's first uplink and downlink Internet connection using WiBro prototype base station and modem
- **Dec 2004** – WiBro Demo Day demonstrated real-time broadcasting on a moving bus
- **2006** – Commercial WiBro services launched by KT and SKT
- **2007** – **WiBro adopted as an international standard under ITU-R IMT-2000**

### Outcomes and Implications

- Demonstrated Korea's leadership in mobile broadband technology and international standardization
- Strengthened Korea's position in the global mobile communications market through early commercialization and international standard adoption

# 03 Korea's ICT Standardization Cases

## DMB

### Background

- Growing demand for **multimedia content on mobile devices** created the need for new mobile broadcasting services.
- Korea sought to develop its **own mobile broadcasting technology** to reduce reliance on foreign technologies and strengthen competitiveness in digital broadcasting.

### Standardization & Development Process

- **2002** – Digital broadcasting research group established and terrestrial DMB development initiated
- **Aug 2004** – Terrestrial DMB system technology commercialized
- **Dec 2004** – Adopted as a World DAB Forum Technical Committee standard
- **2005** – Adopted as an international standard by ETSI
- **2005** – Terrestrial DMB broadcasting services launched in the Seoul metropolitan area
- **2007** – Selected as a recommended international standard by the ITU

### Outcomes and Implications

- Established Korea's leadership in mobile broadcasting technology and international standardization
- Enabled the spread of mobile TV and multimedia broadcasting services, strengthening Korea's global position in ICT

# 04 Lessons from the Evolution of Korea's Standards System

## ✔ Standards as a foundation for industrial development

- Standardization supported Korea's export-oriented industrialization and technological upgrading by improving product quality and market access

## ✔ Strong government leadership and policy coordination

- Government strategies (e.g., National Standard Development Plans, IT839) guided the development of standards systems

## ✔ Institutional ecosystem supporting standardization

- A coordinated institutional framework involving ETRI (ICT R&D), TTA (ICT standardization), KATS (national standards authority and policy coordination), and industry enabled effective development and implementation of standards

## ✔ Strategic linkage between technology development and standardization

- Early integration of R&D and standardization facilitated successful ICT innovations

## ✔ Active participation in international standardization

- Increasing engagement in international standards organizations strengthened Korea's influence in global standards-setting

# 05 Conclusion

## From Standards Adopter to Standards Author

- Korea's experience shows that standards can play a strategic role in economic development and technological upgrading.
- The development of National Quality Infrastructure (NQI) provided the institutional foundation for industrial growth and export competitiveness.
- Since the late 1990s, Korea has strengthened its role in international standardization, particularly in ICT sectors.
- A coordinated institutional ecosystem linking government, research institutes, standardization bodies, and industry has been a key driver of success.
- For developing countries, Korea's experience highlights the importance of linking technology development, industrial policy, and standardization strategies.