

[Field Research]

# A Study on the Mutual Recognition Agreements of Standards, Test and Certification of Smart City

Yong-Jae Kim<sup>1</sup>

Received: February 22, 2016. Revised: March 29, 2016. Accepted: April 15, 2016.

## Abstract

**Purpose** – This paper aims to analyze and investigate to find out the appropriate ways to make an easy TBT of smart city. It is an important issue between Korea and China because TBT of smart city has lots of advantages in IT, S/W, IOT, and Home network.

**Research design, data and methodology** – First, the paper made use of reviewing 2nd data analysis and focused on group interview, and then compared with analysis on the international rule and system such as smart city system, technical regulation, and standard through test certification procedure and inspection. Second, this paper reviewed electric/electronic test, certification, and calibration. Third, through analyzing MRA between Korea and China, the paper focused on SDoC, Mutual Acceptance of International certification, and IECCB scheme.

**Results** – Through the comparison and analysis, this paper found that it is important to promote multi-track agreements with the countries that need short-term promotion. Moreover, it is necessary to conclude an agreement with the leading countries in Middle East and Central America.

**Conclusions** – Through the above the reviews and analysis, we can see the importance of promotion in FTA and MRA with the efforts to remove the obstacles and promote to make an easy TBT by MRA between Korea and China.

**Keywords:** NTBs, TBT, MRA, Test, Certification.

**JEL Classifications:** E23, F15, F23, F41, G28.

## 1. Introduction

In this study, the elimination strategy of TBT with the aid of technical regulations or standards is excluded, and the only conformity assessment shall be considered as the strategic measure of eliminating TBT. The measure is TBT related Specific Trade Concern (STC) to WTO in every membership country with international standards by their technical regulations. However, each country has various situations because they retain their own conformity assessment areas and measures. Therefore, it is necessary to get an appropriate level to harmonize with them.

## 2. Expansion Strategy to Remove/Ease the TBT

### 2.1. Definition of TBT Concept

TBT is an abbreviation for 'Technical Barriers to Trade'. This has various meanings that hinder free movement of goods, services as the trading partner countries adopt, and application to different technical regulations, standards, certification procedures and inspection systems, etc. TBT agreement requires membership countries to follow the rules of 'Harmonization' and 'Transparency', when they adopt technical regulations, standards, and conformity assessment. The rule of 'Harmonization' refers to WTO membership countries enacting and reviewing the following technical regulations, standards, and conformity assessment procedures in line with international standards. The rule of 'Transparency' is to reveal their operating standards and technical regulations, etc. based on enacted or legislative purpose.

---

<sup>1</sup> Author, Professor of Department of Business Administration, Korea Polytechnic University, Siheung, Korea. Tel: +82-31-8041-0676, E-Mail: yjkim@kpu.ac.kr

## 2.2. Tools for Distribution of TBT

TBT makes the countries harmonize technical regulations, standards or conformity assessments with international standards. It does not occur in case of being transparent. However, STC must be done to settle TBT, if a specific country does not comply with the principles on the legislation and amendment of the laws related to technical regulations, standards, or conformity assessments. In the conformity assessment of ICT section, various methods for solution exist on TBT depending on the issue than filing a lawsuit to WTO if a specific country operates the conformity assessment section differently from TBT (Kim, 2016).

As it is described specifically in the TBT agreement, the tests and certification results implemented to the exporting country may be accepted through various channels. In other words, the tests and certification results implemented to the partner country may be recognized through Mutual Recognition Agreement (hereinafter 'MRA') or mutual acceptance plan of an international certified test report. Also, offshore manufacturers can present the conformity assessment results required by the partner country in easy way if SDoC system is introduced. Accordingly, this study discusses the conclusion of MRA, introduction of SDoC on the conformity assessment system, mutual acceptance of international certified test report and test-certification infrastructure setup support, etc. as to eliminate TBT due to the dissimilarity of conformity assessment. Such a plan will conclude MRA, and also be possible to be an international certified test report with mutual acceptance (Kim & Park, 2015).

## 3. Objective of Paper

### 3.1. Definitions of Objective of Paper

The definitions for this project are as follows. The First one is the comparison and analysis of international standards such as ISO, IEC, KS, and test certificates with Chinese standard / testing / certification / calibration system support of Korean exporters. The second is MOU with Tsinghua University (assistance to Korean smart city companies' export into China through standardization/ testing/ certification of smart city technology). The third is MRAs testing/certification/calibration organizations between Korea and China: mutual recognition of test certificates, assistance to Korean companies' entry into China, etc. Finally, to get certification authority, the propositions on relevant policies and guidelines should be defined for standard/testing/certification/calibration and MRAs with Chinese standardization and testing/certification/calibration organizations.

### 3.2. Progress Plan

The Progress plans are the propositions on the relevant policies and guidelines for standard/testing/certification/calibration, and research on joint networking/collaboration

plans and guidelines for industrial standards and testing/certification/calibration, formulation of a Korean exporter support policy. With the analysis of Chinese standard/certification systems, and formulation and execution of standard/testing/certification/calibration policies, this paper analyzes the difficulties such as establishment and operation in testing, certification organization council for mutual recognition in testing, and calibration certificates between Korea and China. The final Progress plans are the propositions on the relevant policies and guidelines for standard/testing/certification/calibration, and research on collaboration plans and guidelines. For industrial standards/ testing/certification/ and calibration, a policy formulation and action plans are designed to resolve Korean exporters' difficulties associated with Chinese standard/certification systems, formulation & execution of standard, testing, certification, and calibration policies. Through the analysis of difficulties, issues, and MRAs, this paper tries to find out the solution for Korean exporters' difficulties with the acquisition of certification authority.

### 3.3. Key Drivers of Paper

The key drivers of paper are as follow. First, Korea Polytechnic University and Tsinghua University co-founded a joint smart city R&D center in order to pass on Korean unique smart city know-how to the Guangdong Smart City Project, and to help Korean smart city companies enter into Chinese market. The second is the participation in Chinese smart city projects and the establishment of a joint smart city R&D center between Korea and China. The third is about 'Dongguan Innovation Center' which deals with the formulation of policies, standards and bidding criteria, and the Analysis of controlling smart city management companies. The fourth is the definition for smart city and acquisition of success cases (transportation, logistics, procurement, standard, testing, certification, calibration, etc.). The fifth is the provision of Korean smart city construction experiences and technology. Finally, it is the smart city project for metropolitan cities (e.g., Dongguan project with the size of KRW450 billion, participation in the Chinese smart city project: Success cases in Creative Economy).

The following is an overview of Chinese smart city as shown in <Table 1>. Smart city is a new concept with rapid urbanization. It adds energy, transportation, water, and environment issues, and goes to the concept of U-city. In Korea, U-city has been operated and built in some cities from 2009 to 2012. It deals with infrastructure and well-being improvement project designed to respond to a rapid urbanization. The initiatives in major countries are like these. U.S. is to make smart energy and transportation investments at KRW3.6 trillion in 2010. China is to make KRW90 trillion investments in 320 cities by 2015, and EU is to reduce CO2 emissions by 20% till 2020. Japan is to make KRW1.2 trillion investments in the energy sector by 2014. The key players are IBM, Cisco, Schneider Electric, Siemens, Hitachi, and LG CNS, etc.

The followings are Korean initiatives. The Smart City Project is U-City and nation-wide promotion in the mid-2000s (Urbanization: Developed countries (80%+), Korea (90%+),

China (50%)). In terms of progress, it slows down in the real estate industry due to the lack of business model, resulting in low motivation for both businesses and people. Involved Organizations are Ministry of Science, ICT & Future Planning (ETRI), Ministry of Land, Infrastructure and Transport (Korea Institute of Civil Engineering & Building Technology), and Ministry of Government Administration and Home Affairs (National Information Society Agency). References are the new town cities such as Songdo, Sejong, Dongtan, and Paju, etc. The status quo is the reduction of government investments due to lack of revenue model and no sustainability.

Tsinghua University and Korea Polytechnic University's Plan & Strategy for Joint Smart City R&D Center are as follows. Smart homes and buildings are core components of a smart city. In terms of energy efficiency, smart meters are optimized for efficient energy consumption by houses and buildings. In terms of various services, smart homes provide a wide range of services to the tenants through a digital home network. In terms of efficient management, buildings linked through a smart grid can be managed efficiently in long-term and comprehensive perspectives.

Here are the components of Smart City including Accenture, IBM, Wikipedia, EDF and Oracle. Accenture has smart grid (key technology enabler), energy, heating, buildings, mobility, water, waste (core elements of a city), regulatory environment, financial framework and stakeholders (fundamental environment). IBM has transportation, public safety, energy & utilities, healthcare, education and development. Wikipedia has smart economy, smart mobility, smart environment, smart people, smart living and smart governance. EDF has interoperability of technical solutions through open standards. Oracle has management & transaction processing, foundational technologies for business intelligence, data integration and infrastructure shared services.

A smart city is not a service or platform but integration of services and technologies designed to enrich citizens' lives or improve the efficiency of local governments(Kang et al., 2013).

## 4. Demand for Scope

### 4.1. Demand for Smart city

As Chinese trade and technology restrictions gets stricter, effective response to the restrictions are required with Korean exporters' assistance in order to make export/FDI into Chinese market since the Korea-China FTA. Due to the lack of smart-city standard and demand for conformance assessment system, there is a strong demand in China for benchmarking Korean know how in smart city standard/ testing/ certification/ calibration and measurement systems. Successful case of the creative economy: Agenda of the creative economy council. Because Chinese government has entrenched an integrated CCC-forced certification system to impose more strict technical restrictions, Korean companies should be better poised to enter Chinese market. Major testing organizations in Korea have striven to provide consulting services related to the establishment organization for both Chinese and Korean companies, and test certificate and mutual recognition of test certificates. From the 9th Korea-China conformance assessment conference in 2013', there were meaningful discussions about industrial safety goods in Korean testing and certification organizations' entry into China. Korean Agency for Technology & Standards (KATS) has initiated various MOU and MRA arrangements between Korean and Chinese standardization, testing and certification measurement organizations.

<Table 1> Chinese Major Smart City Trial Projects

Category		Details
Security system & Infrastructure	Operational System	Plan & action plan, organizational design, policy & regulations, financial allocation, system operation & management
	Network Infrastructure	Wireless network, broadband network, next-generation broadcasting
	Public Platform & Database	Metropolitan public database, information security, metropolitan public information platform
Smart City Construction	Metropolitan Construction & Management	Metropolitan development plan, digital city management plan, construction industry management laws, real estate management, landscaping management, historic preservation plan, green building, buildings' energy efficiency plan
	Enhancement of Metropolitan Functions	Sewage system, water utilization plan, gas system, waste classification & treatment system, lighting & heat treating system, integrated management of underground pipeline & space
Smart Management & Services	Government Services	Decision-making process improvement plan, information disclosure, online work processing, administrative service system
	Public Services	Public education, labor & legal services, social services
	Special Supportive Services	Intelligent transportation, energy management, environment & land management, emergency service, security, logistics, social security network, smart home, payment service, intelligent finance
Smart Businesses & Economy	Industrial Plan	Industrial plan & innovative investment
	Industrial Development	Changes in traditional industry elements
	Development of New Businesses	High-tech businesses, modernized service providers, etc.

Source: Kang et al. (2013)

## 4.2. Scope of Paper

This paper is designed to establish a system for mutual recognition of trade and technology standards between Korean and China to support Korean exporters. Comparison analysis of Chinese and Korean was from standard, testing, certification, Calibration systems. The first scope is to make propositions on relevant policies and guidelines. The second scope is to research on collaboration plans and guidelines. The third scope is to formulate a policy and action plan designed to resolve Korean exporters' difficulties associated with China. The fourth scope is to formulate and execute standard, testing, certification, and calibration policies through the analysis of related difficulties. The fifth scope is to enter into MRAs for acquisition of testing and certification authority. The countries in Europe or US, where standardization has been stabilized for years, have lower-level standards with national standards. Such national standards are acknowledged as local standards or international standards. That is, a bottom-up evolution results in a virtuous cycle.

## 5. Purpose of Paper

### 5.1. Purpose of Research

The purpose of this paper is to establish a trade and technology system for mutual recognition of standards and test certificates after Korea-China FTA. It is also related with passing on Korean advanced smart city technology and standardization system to China so that Korean-style system transfer base can be built and more strict technical restrictions can be effectively managed. MRAs are expected to accelerate the establishment of a test and certification in China, and they will help Korean companies enter China in long term. The benefits are from the comparison and analysis about Chinese and Korean standard/testing/certification/calibration systems, formulation of collaboration plans and guidelines for industrial standards and testing / certification / calibration, formulation of a policy and an action plan designed to support Korean exporters.

### 5.2. Objectives of Paper

Through resolving Korean exporters' difficulties and helping Korean testing/certification/calibration organizations and making export/FDI the Chinese market, Korea can be Chinese highest-priority partner in the standard /testing /certification /calibration area as well as to strengthen an alliance with China and Chinese key MRA technology partner.

## 6. Ultimate Goals of Paper

The ultimate goals of this paper are as follow. First one is the proposition & enforcement of standards. It is to compare and analyze the smart city standards between Korea and China as

well as to study on smart city standard application guidelines. The second is the international standardization activities including international conferences and convening/support of seminars. It is to sign an MOU with Tsinghua University for standard/testing/certification, sign an MOU with Chinese standardization research institute, sign MOUs with smart cities and participate in standard/testing/certification conferences. The third is the establishment of foundation. It is to compare and analyze Korean & Chinese standard certification. By organizing and operating the 'Standard Certification Collaboration Council for the Chinese Market', the analysis about the difficulties associated with standards, performance testing, certification, simulation-based deduction of success and failure cases.

## 7. Strategy of Remove/Ease TBT

### 7.1. Strategy of Annual Remove/Ease TBT

The strategies for a year are as follow. It is comparative analysis on the testing/certification/calibration of smart city standards between Korea and China, study on smart city standard application guidelines, organization and operation the 'standard certification collaboration council for the Chinese Market make preparations for the acquisition of certification authority. The annual paper strategies for 5 years are as follow. It is to make propositions on relevant policies & guidelines for Korean exporters' difficulties, issues, and the performance of simulation-based deduction of success or failure cases of Korean exporters as well as have success case study.

Through the analysis of related difficulties, it can be possible to establish foundation for the acquisition of authority for testing / certification / calibration, and perform simulation-based deduction of success cases & failure cases of Korean exporters as well as have success case study.

### 7.2. Annual Schedule for Key Activities of Paper

The annual schedule for the key activities of paper is composed of four activities. The first is proposition and enforcement of standards. It is to formulate an action plan to establish and operate each area's implementation systems, to collect and analyze standards with smart-city standards, to compare analysis with ISO/IEC, and study on smart-city standard application guidelines. The second is the international standardization activity. It is to sign an MOU with Tsinghua University for standard/testing/certification, sign an MOU with Chinese Standardization Research Institute, sign MOUs with smart cities at Dongguan in china and participate in standard/testing/certification conferences. The third is the establishment of foundation. It is to compare and analyze Korean & Chinese standard certification, study on Korean & Chinese standard / testing / certification / measurement policies & systems. It is also to establish foundation for the acquisition of certification authority for smart city, electric/electronic, IT and construction, and organize & operate the 'Standard

Certification Collaboration Council for the Chinese Market. It establishes foundation for the acquisition of authority for testing / certification through MRA, and performs simulation-based deduction of success cases & failure cases through the Chinese Market Entry Council. The fourth is expansion & promotion. It is to have seminars with success cases, application guidelines, and to expand the Chinese application guidelines.

### 7.3. Implementation Process

The implementation processes of this paper are as follows. The first is the identification of Chinese standard / testing / certification / calibration systems. The second is the comparative analysis between ISO/IEC and KS. The third is the study on smart city at Dongguan in china, electric/electronic, IT and construction. The fourth is the deduction of an action plan for smart city, electric/electronic, IT and construction. Finally, it is the submission of reports designed to develop Chinese export standards and testing/certification application guidelines.

## 8. Research Goals

### 8.1. Research Goal & Overview

The project goals and their descriptions are as follows. First is the proposition & enforcement of standards. It is to compare & analyze the smart city standards between Korea and China as well as to study on smart city standard application guidelines. It compares and analyzes between international standards such as ISO/IEC and KS. Second thing is to sign an MOU with Tsinghua University with smart cities at Dongguan in china and participate in standard/testing/certification conferences. The third is the establishment of foundation. It is to compare and analyze Korean & Chinese standard certification. It is to compare & analyze Korean and Chinese policies and systems, perform simulation-based deduction of success/failure cases and difficulties through the standard certification collaboration council for the Chinese Market as well as to perform seminars on success cases of Korean exporters in China.

### 8.2. Domestic Electric & Electronic Certification System and Related Laws

#### 8.2.1. Conformity Assessment System of Korea

SDoC(Supplier's Declaration of Conformity) guarantees market autonomy and raises the efficiency of restriction as a system for the supplier to guarantee by evaluating whether its own product is appropriate for the concerned standard by escaping from the conventional compulsory certification system which requires certification in relation to the product manufacture.

- In the process of switching as SDoC from the third party certification method
- Ex) Self confirmation system of electric supply (testing at a designated testing agency+ reporting to a certification agency)

SDoC has merits in cost reduction, time saving and product information protection aspects compared to the certification system while having vulnerability in terms of product safety issue, etc. Therefore, an effective post market surveillance of the regulation authorities must be supported to be operated effectively. WTO's TBT Committee has suggested that the SDoC is more effective TBT elimination method than the MRA (WTO, 2012; Oh, 2014; Lee, 2013).

#### 8.2.2. Acceptance of International Certified Test Report

In addition to the method of concluding an MRA, various methods should be considered with the test reports estimated the partner country or a third country. Among them, the most widely used method is the one that accepts test reports of testing agencies recognized by ILAC(APLAC) and CB Scheme. However, the advantage of this is applied to the same way to all the countries since it normally uses the method of accepting the test reports produced offshore with the method of unilaterally revising the homeland system rather than being a form of MRA with a specific country or a local community.

#### 8.2.3. Test-Certification Based Infrastructure Setup Support

Industrial products vary depending on the technological or industrial development standard, etc. But a number of countries in Southeast Asia or Central Asia have not reached the standard that can set up a legal system. Testing agencies or certification agencies to assess the conformity do not exist either. Therefore, these countries are importing industrial products from overseas with the methods of applying legal systems of nearby countries, recognizing the test reports from international organizations or the certification marks of other countries. Therefore, while the TBT may seem to be low at a glance, the high incompleteness of suitability assessment system is a market entrance barrier for the offshore manufacturers.

### 8.3. Comparative Analysis between TBT Distribution Tools

The systems have different characteristics. If the comparative analysis is performed with the scope of effect, intensity, and usage status in Korea, they can be summarized as shown in <Table 2>.

Although MRA is a system that all the parties can conclude agreement and advantage, Korea is under the state of concluding only the stage 1 agreements with 5 countries such as China, Japan, USA, Vietnam, and India.

<Table 2> Comparative Analysis of Characteristics between TBT Distribution Tools

	MRA	SDoC	Mutual Acceptance of International Certification		Infrastructure Setup Support Project
	MRA	SDoC	ILAC/APLAC	CB Scheme	Infrastructure Setup Support Project
Scope of Effect	Partner country of agreement	All countries	Participating countries	Participating countries	Beneficiary countries
Intensity of Effect	In stages	Limited to the products that have applied the system	By accepted field	By accepted field	Different according to the supported standard
Current Status of Usage In Korea	Completed stage 1 conclusion with 5 countries and negotiating with a number of countries	Applied to the products with low level of harm	Field of private sector standards	EMC field is not used	Under support
Remarks	Need to promote upper stage with more countries	Necessity to extend applied products is low in a short run	Handle flexibly depending on the acceptance situation of foreign countries	Handle flexibly depending on the acceptance situation of foreign countries	Need to extend support

### 9. Conclusion

The paper intends to draw conclusions and make policy implications as follow. First, we must promote a multi-track simultaneous agreement with the countries that have necessity of short-term promotion. Second, the countries with necessity of short-term promotion on the preferential basis are China, Japan, USA, Vietnam, and India, etc. Third, it is necessary to conclude agreement with leading countries among the countries of Middle East and Central America on the preferential basis. It is necessary to prepare negotiation on the preferential basis with Saudi Arabia or Iran, etc. with large trading scale among the countries of Middle East and conclude agreement on the preferential basis with Brazil which has large trading scale and plays a role of leading country in the region among the countries of Central America. Fourth, support on the countries that don't have fully preparation for the conformity assessment system needs to be gradually extended. However, the method of support on these countries also must be various depending on each country.

### References

Kang, Yanrong, Zang, Lei, Chen, Cai, Ge, Yuming, Li, Hao, Cui, Ying, Whyte, Jeanette, & Hart, Thomas (2013). Comparative

Study of Smart Cities in Europe and China. White Paper of EU-China Smart and Green City Cooperation, Retrieved May 21, 2013 from [http://euchina-ict.eu/wpcontent/uploads/2015/01/Smart\\_City\\_report\\_draft-White-Paper--March-2014.pdf](http://euchina-ict.eu/wpcontent/uploads/2015/01/Smart_City_report_draft-White-Paper--March-2014.pdf)

Kim, Min-Jeong, & Park, Jeong-Jun (2015). Analysis of TBT Provisions and their Relevant Legal Issues in Korea's FTA Agreements. *International & Regional Research*, 24(4), 31-73.

Kim, Yong-Jae (2016). Development strategy for expanding TBT. *Convergence Research Letter*, 2(1), 537-542.

Lee, Z. (2013). An Empirical Study on the Effect of WTO/TBT Technical Regulations. *Journal of International Trade & Commerce*, 9(3), 392-393.

Oh, Sun-Yong (2014) Analysis of the TBT Agreement based on the WTO Case on TBT. *Kyungpook National Univ. Law Journal*, 47, 495-518.

WTO (2012). *Director-General's Report on Trade-related Developments(Mid-October 2011 to mid-May 2012)*. Geneva, Switzerland. Retrieved January 30, 2016, from [https://www.wto.org/english/news\\_e/news12\\_e/dgreportsu\\_m\\_e.pdf](https://www.wto.org/english/news_e/news12_e/dgreportsu_m_e.pdf)