Presented by the MOEF, Republic of Korea

Knowledge Sharing Program

2020/21 KSP Policy Consultation Report

Mexico

Strategies to Contribute to the Transformation of the Public Procurement System in 2018-2024 for the Mexican Federal Government

Ministry of Economy and Finance

KDI Korea Development Institute

KITC KOREA IT CONSULTING

KIP 한국조달연구원 Korea Institute of Procurement

Government Publications Registration Number
11-1051000-001107-01

Knowledge Sharing Program

2020/21 KSP Policy Consultation Report

Mexico

Strategies to Contribute to the Transformation of the Public Procurement System in 2018-2024 for the Mexican Federal Government

Ministry of Economy and Finance
KDI Korea Development Institute
KITC KOREA IT CONSULTING
KIP 한국조달연구원 Korea Institute of Procurement

2020/21 KSP Policy Consultation Report

Project Title	Strategies to Contribute to the Transformation of the Public Procurement System in 2018-2024 for the Mexican Federal Government
Prepared for	United Mexican States
In Cooperation with	Ministry of Finance and Public Credit (SHCP) National Polytechnic Institute (IPN)

Supported by	Ministry of Economy and Finance (MOEF), Republic of Korea Korea Development Institute (KDI)
Prepared by	Korea IT Consulting (KITC) Korea Institute of Procurement (KIP)
Project Directors	Jungwook Kim, Executive Director, Center for International Development (CID), KDI Sanghoon Ahn, Former Executive Director, CID, KDI
Project Manager	Taihee Lee, Specialist, CID, KDI
Project Officers	Jee Hee Yoon, Senior Research Associate, CID, KDI Eunmin Jeong, Research Associate, KITC
Senior Advisor	Kyuyun Choi, Former Administrator of Public Procurement Service, Republic of Korea
Principal Investigator	Kyuhyeog Chae, Executive Director, KITC
Authors	Chapter 1. Mijung Lee, Research Fellow, KIP Carlos Francisco Castañeda Girón, General Manager, U-GOB Lab Chapter 2. Daesik Kim, Senior Research Fellow, KIP Oliver Antonio Mayo Cruz, Legal Procurement Specialist Chapter 3. Kyuhyeog Chae, Executive Director, KITC Fabio Camilo Betancourth Rincon, Independent Consultant Chapter 4. Teaksoon Lee, Managing Director, KITC Patsi Margarita Garrido Castro, Assistant Director, Ministry of Finance and Public Credit
English Editor	Korea Translation Research Institute (KTRI)

Government Publications Registration Number 11-1051000-001107-01

ISBN 979-11-5932-649-3

979-11-5932-641-7 (set)

2020/21 KSP Policy Consultation Report

Strategies to Contribute to the Transformation of the Public Procurement System in 2018-2024 for the Mexican Federal Government

Preface

The Knowledge Sharing Program (KSP) was launched in 2004 by the Ministry of Economy and Finance (MOEF) as its formulator, and the Korea Development Institute (KDI) as the executing agency. KSP aims to provide policy studies, consulting, and training for partner countries to meet their circumstances based on Korea's development experience and knowledge accumulated over the past decades.

We strongly believe that knowledge is an essential resource to read and copy with the changes of the time. Knowledge is more valuable when communicating and sharing with others than building it on its own. Much to our delight and honor, we have been able to share Korea's knowledge with the Mexican Federal Government in many fields including SMEs development since 2012 through the KSP program.

During the period of implementing the 2020/21 KSP with Mexico, the project group performed a survey on policy consulting demands, selection of local cooperation consultants, detailed field research by subject, a training session for policy practitioners, a high-level policy dialogue, and a final reporting. In addition, despite COVID-19, researchers have visited Mexico to conduct an in-depth investigation and interim reporting workshop for the research results. Finally, the draft of the final report was presented during the high-level policy dialogue and the final reporting held through the on/off-line method in Mexico and Korea simultaneously in the presence of high-level government officials.

This report contains the outcome of the more than 6-month study performed on Mexico by the Korea Institute of Procurement (KIP) and Korea IT Consulting (KITC). Mexico was selected as a beneficiary of KSP in 2020. The 2020/21 KSP with Mexico, under the title of 2020/21 KSP with Mexico: Strategic Accompaniment to Contribute to the Transformation of the Public Procurement System of the 2018-2024 Mexican Federal Government, intends to share the Korean experience and derives its policy implications for Mexico in the subjects of 1) Diagnosis of Public Administration Digitalization in Mexico, 2) Comparative Analysis of the Legal and Institutional Arrangements on Digital Public Procurement, 3) Technical Support in Developing Digital Public Procurement, and 4) Enhancing Utilization of Digital Public Procurement System.

We would like to take this opportunity to express deep gratitude to Ms. Thalía Concepción Lagunas Aragón, Administrative Officer of the Ministry of Finance and Public Credit of Mexico (SHCP, in its Spanish acronym); Mr. Alejandro González Ruiz, Director General at SHCP; Dr. Javier Dávila Torres, Director General at the Mexican Agency for International Development Cooperation (AMEXCID, in its Spanish acronym); Dr. Arturo Reyes Sandoval, Director General of the National Polytechnic Institute (IPN, in its Spanish acronym) and Mr. Ricardo Monterrubio López, Secretary of Innovation and Social Integration of IPN, who have provided active support for this KSP project, and to Mr. Luis Misael Pérez Hernández, Director at SHCP, who gladly played the role of the coordinator for this policy consulting project.

We are also obliged to numerous researchers who have exerted the enormous efforts in conducting researches for this project, and to the government agencies and local experts of Mexico who have assisted this project throughout its stages. We would like to extend our great thanks to the referee and advisors who have provided invaluable advice during the interim and completion phases of this report, as well as to Dr. Kyuyun Choi (Senior Advisor, Former Administrator of Public Procurement Service), Dr. Tai Hee Lee and the members of the Center for International Development (CID) of the KDI who have planned, promoted, and supported this project.

We firmly believe that the KSP will serve as a stepping stone to further elevate mutual learning and economic cooperation between Mexico and Korea.

Ji Yun Choi
CEO
Korea IT Consulting

Contents

Chapter 3
Technical Support in Developing Digital Public Procurement

Contents

Contents | List of Tables

Chapter 1

Chapter 2

Chapter 3

Contents | List of Tables

Chapter 4

Contents | List of Figures

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Contents | List of Figures

2020/21 KSP with Mexico

Eunmin Jeong (Korea IT Consulting)

2020/21 KSP with Mexico

Eunmin Jeong (Korea IT Consulting)

Mexico's 58th President, Andrés Manuel López Obrador, has prioritized the eradication of corruption that has hindered Mexico's economic and social development for the past several years. For this purpose, the role and importance of public procurement, including the public procurement system (CompraNet), developed and operated since 1996, was emphasized more than ever, and the government budget was managed in a more transparent and efficient way. This is a global trend, and advanced countries such as the U.S. and EU are actively using public procurement as a policy adjustment and operational means to strengthen fiscal soundness.

However, the need for the system upgrading and policy improvement emerged due to computerization that was limited to some procedures, a lack of professional manpower, the payment of the overseas procurement system license fees, the insufficient utilization of the system by government departments, and the low participation rate of SMEs. Similar to Mexico, the Korea ON-line E-Procurement System (KONEPS) was developed in 1997 and has been successfully operated until today. Based on the knowledge and experience of Korea, which is strengthening the strategic role of public procurement through the next-generation KONEPS, policy recommendations to improve the Mexican public procurement system were suggested.

Korea Development Institute (KDI) commissioned the project from the Ministry of Economy and Finance (MOEF) and developed the action plan to initiate 2020/21 KSP with Mexico. The project manager was selected according to the systematic planning and management of the project. The project required professional expertise and understanding in public procurement and e-procurement, and was pursued through open bidding to select the organization that would be re-entrusted with the project. Korea IT Consulting (KITC) and Korea Institute of Procurement (KIP) were selected through the public bid announcement. To deliver Korea's relevant experiences, Korean experts with subject-specific expertise

were selected, and local consultants who can provide information on Mexico's procurement system were selected.

Based on the initially agreed research topic, the final research topic was selected after detailed consultations, and a policy advisory team was formed as following:

#	Sub-topics	Researchers	Local Consultants
1	Diagnosis of Public Administration Digitalization in Mexico	Mijung Lee (Korea Institute of Procurement)	Carlos Francisco Castaneda Giron (U-GOB)
2	Comparative Analysis of the Legal and Institutional Arrangements on Digital Public Procurement	Daesik Kim (Korea Institute of Procurement)	Oliver Antonio Mayo Cruz (Legal Procurement Specialist)
3	Technical Support in Developing Digital Public Procurement	Kyuhyeog Chae (Korea IT Consulting)	Fabio Camilo Betancourth Rincon (Independent Consultant)
4	Enhancing Utilization of Digital Public Procurement System	Teaksoon Lee (Korea IT Consulting)	Patsi Margarita Garrido Castro (Administrative Office-SHCP)

- Senior advisor: Kyuyun Choi, Former Administrator of Public Procurement Service, Korea
- Project manager: Tai Hee Lee, Specialist, Center for International Development(CID), KDI
- Principal Investigator: Kyuhyeog Chae, Executive Director, Korea IT Consulting
- Project Officer: Jee Hee Yoon, Senior Research Associate, CID, KDI
  Eunmin Jeong, Research Associate, Korea IT Consulting

The KSP project is largely composed of 1) Launching Seminar and High-level Meeting, 2) KSP Policy Seminar and In-depth Study, 3) Interim Reporting Workshop and Policy Practitioners' Workshop, and 4) Final Reporting Workshop and Senior Policy Dialogue. Initially, the plan was to conduct an on-site survey through three local visits and to share the research results of the project. However, due to the spread of COVID-19, international travel was restricted between two countries. A non-face-to-face project implementation plan was then established for the effective and efficient project execution. In addition, (non-)regular online video conferences and workshop were held.

The Launching Seminar and High-Level Meeting was held on February 9, 2021 to adjust scope of research and finalize research topics. Through the online seminar, teams were able to identify high-level and the various stakeholders' interest and support for the KSP project.

In the KSP Policy Seminar and In-depth Study stage, the interim research results were presented by Korean researchers and local consultants through online on April 30, 2021. It was an opportunity to learn what additional detailed investigations were needed, to

share the research results so far, and enhance the understanding of those involved in the public procurement system. Although a non-face-to-face in-depth study was conducted in cooperation with local consultants, discussions were limited and data required were difficult to obtain due to security reasons.

Therefore, in order to improve the effectiveness of the project and accomplish research results, the MOEF and KDI concluded that it was necessary to conduct a detailed In-depth Study. Accordingly, Korean researchers visited Mexico City from June 4, 2021 to June 13, 2021 to improve the quality of the final deliverables.

During the visit to Mexico, Korean researchers consulted with various Mexican officials and stakeholders in the public procurement sector and an Interim Reporting Workshop was held on June 11, 2021. It was a meaningful time to discuss interim research results in detail, final policy recommendations, the project progress and schedule, and follow-up projects. Through the field survey, a lot of aspects that could not be grasped through non-face-to-face surveys were clarified, and receive Mexico's feedback on final policy recommendations. Furthermore, a considerable amount of consensus were built on the final policy recommendations.

In addition, Mexico's mainstream media such as Cronica, Entorno Inteligente, and DotNews posted articles on the visit of Korean researchers to Mexico and the KSP project, expressing great interest and expectations for this research.

On the other hand, the Policy Practitioners' Workshop was planned as an invitational training for Mexican policy-makers to Korea. However, due to COVID-19, training videos were made and distributed to share Korea's procurement-related experiences and knowledge.

Lastly, the Final Reporting Workshop was held on July 29, 2021 as a held online to share the final research results. In addition, a summary of the report was produced on video and distributed for better understanding of the final research results. On the same day, Senior Policy Dialogue was conducted to improve the effectiveness of the final policy recommendations and to seek the ways to link it to follow-up projects.

It was not easy to carry out the project and to conduct research in the midst of COVID-19. Nevertheless, this project was successfully completed thanks to the Mexican contingent, who placed tremendous efforts on for a better system and better Mexico. It was a great chance to see how solid the cooperation between the two countries is.

Executive Summary

Kyuhyeog Chae (Korea IT Consulting)

Executive Summary

Kyuhyeog Chae (Korea IT Consulting)

The Mexican federal government started operating CompraNet, a digital public procurement system in 1996, and is operating an advanced version of Version 5.0 as of 2015 through continuous improvement. However, the current CompraNet is required to be upgraded due to computerization that is limited to some of the public procurement processes, lack of professional manpower, the payment of the overseas procurement system license fees, the insufficient competition for recruitment in general by government departments, and the low participation by SMEs.

Also, in Mexico, the 58th President López Obrador, who took office in July 2018, put the eradication of corruption that had hindered the economic and social development of Mexico for the past several years as the top priority of the national administration and is trying to manage the government budget in a more transparent and efficient way. For that public procurement was transferred from the Ministry of Public Administration(SFP) to the Ministry of Finance and Public Credit(SHCP). Therefore, it can be said that Mexico's public digital procurement system is facing a major change.

Accordingly, the SHCP, a central government agency in charge of public procurement, is reexamining the development and operation status of CompraNet and PDCP in order to have a new system and solve the current problems including the experience of KONEPS (Korea ONline E-Procurement System), Korea's electronic (digital) public procurement system.

The Korean Public Procurement Service (PPS) has continuously developed since the opening of the modernized electronic public procurement system, KONEPS, in 2002, and was already evaluated as a level that no longer needs improvement by the OECD in 2004. While KONEPS was being improved, many institutions and regulations were developed in relation to public procurement and electronic public procurement.

The 2020/21 KSP with Mexico was designed to contribute efficiency and transparency of the government with the title of the "Strategies to Contribute to the Transformation of the Public Procurement System in 2018-2024 for the Mexican Federal Government". To this end, we divided it into four sub-topics: 1) Diagnosis of Public Administration Digitalization in Mexico, 2) Comparative Analysis of the Legal and Institutional Arrangements on Digital Public Procurement, 3) Technical Support in Developing Digital Public Procurement, and 4) Enhancing Utilization of Digital Public Procurement System.

The research team conducted a survey on the current state of Mexico's public procurement system and electronic procurement platform through collaboration with Mexican public procurement officials and local consultants. In this process, several issues were discovered:

- Lack of sufficient capacity building (education and training) for officers;
- Insufficient system to activate suppliers' participation in e-procurement;
- Necessity of operating public procurement service effectively;
- Issues of standardization of development and maintenance;
- Insufficiency of an agreed-upon near-future target model of e-Procurement system;
- Necessity of establishment of vision of e-Procurement in nation-wide;
- Insufficiency of legal system for e-Procurement system vitalization;
- Absence of concrete e-Government Act (Regulations).

Based on this analysis of the current situation and the experiences of the Korean public procurement system and KONEPS, an electronic procurement system, the direction to improve the current issue can be determined from the organizational, institutional (process) aspect, and technical aspect. First, items to be improved from the organizational point of view are summarized as follows:

- Enhanced Help Desk (Call Center);
- Technical Team for e-Procurement System;
- Planning Team for e-Procurement;
- New Public Procurement Agency.

Second, improvements in the institutional (process) aspect are as follows:

- Institutionalization of the Mexican Public Procurement Council;
- Improvement of SMEs support policies;
- Establishment of e-Government performance management;
- Establishment of e-Gov & e-Procurement Legal System.

Third, the following improvement directions were derived from the technical aspect:

- Activation of mobile service channel;
- Development of e-Government Standard Framework;
- Integration of e-Procurement system & other systems.

In many cases, the improvement directions discussed above cannot be carried out at the same time considering the urgency, budget security, precedence relationship between tasks, and ripple effect. Accordingly, the research team grouped the implementation tasks in line with the direction of improvement into short-term, medium-term, and long-term tasks and presented them as follows.

<Table> Strategical Implementation Tasks for Improvement of Mexico's e-Procurement

Short Term	- Enlargement of compulsory e-Procurement Usage Agencies - Establishment of Independent procurement training organization - Staffing for Planning /Technical Team /Help Desk - Target Model including Mobile Service
Mid Term	- Lawmaking and visioning for e-Procurement - Establishment of Integrated Call Center - Development of SMEs support system and financial policies - Establishment of e-Gov performance evaluation Manual - Development of e-Gov Standard Framework
Long Term	- Independent Public Procurement Agency - Enactment of the e-Government Act

If these strategic implementation tasks are faithfully realized, transparency, effectiveness, and efficiency considered as the value of public procurement will be secured, as well as contributing to economic growth by concomitantly contributing to the enhancement of national competitiveness, and the professionalism of public procurement officials will be further enhanced. And, after this KSP, although not included in this report, if the following actions are taken immediately, we believe that it will be more helpful for the implementation of the above strategic tasks.

- Securing public procurement innovation initiatives with the establishment of the Public Procurement Innovation Committee(tentative)Integration of e-Procurement system & other systems.
- Initiation of BPR/ISP through strengthening exchange and cooperation with Korea.
- Redefining roles and responsibilities of public procurement organizations within SHCP.
- Re-staffing in accordance with redefined Roles and Responsibilities.

Through various thematic studies related to the digital public procurement platforms in Mexico, we have come to the following conclusions. When problems are diagnosed and improvement directions are received from consultants from various backgrounds, viewpoints, and cultural differences, there are always best practices, and there is inevitably a temptation to fit the analysis target into the best practices they think. However, all cases must be understood in context, and the best practices are not an exception. This is because the best practices are not the general theories that can be applied anytime, anywhere.

According to the research results of the various organizations including the OECD, it can be confirmed that public procurement and an e-procurement system could be the most important foundation for improving efficiency and transparency, even though they have different spatial and cultural backgrounds.

The case of Korea's public procurement and e-procurement system has been in line with the central government-centered centralized procurement system and SME promotion policy, and e-procurement has been developed as a part of the government innovation to improve efficiency. And as a result, government transparency, which is the purpose of e-procurement, has been improved, and public procurement plays a major role in the various policy instruments of the country.

The public procurement system and the electronic public procurement system are entirely a matter of will if the current address is confirmed and the goal and improvement directions are set correctly. Mexico is divided into federal and provincial governments, and the decentralized procurement is the basic system. However, if the electronic public procurement system is at the center of the public procurement system and the institutions to revitalize it are supported so that the public procurement and e-procurement system can contribute to Mexico's economic and financial reform, the spatial and cultural differences between Korea and Mexico need not be considered; at least in the field of public procurement.

01

CHAPTER

Diagnosis of Public Administration Digitalization in Mexico

Mijung Lee (Korea Institute of Procurement)
Carlos Francisco Castañeda Girón (U-GOB Lab)

Keywords
Informatization Level Diagnosis, Digital Transformation, Digital Government, Coordination Mechanism, CompraNet

Diagnosis of Public Administration Digitalization in Mexico

Mijung Lee (Korea Institute of Procurement)
Carlos Francisco Castañeda Girón (U-GOB Lab)

Summary

Recently, the majority of governments are making strategic plans for digital government (or e-government) and government innovation, using the concept of "digital transformation" as a keyword to change the public administration and the government's innovation framework. Digital transformation in the public sector can be defined as the use of digital technologies for public service users to improve the level of service accessibility and expand the social value of public services. Therefore, the diagnosis of Mexico's public administration informatization level, to examine in this chapter, has a key element of digital transformation (digital government) in public administration in order to improve CompraNet, an e-procurement system. The key element is the harmony, linkage and coordination between the public administration information system and the e-procurement system (digital government).

The model for diagnosing the level of the informatization of the public administration in Mexico was revised mainly based on Korea's e-government maturity and performance management model, focusing on the linkage and coordination of the e-procurement system with other information systems from the perspective of digital transformation. This model consisted of 5 diagnostic areas, 15 diagnostic items, and 50 diagnostic indicators, including the vision and policy, governance (including organization), service, IT infrastructure/technology, and users. It is evaluated as an initial stage up to 0-1, a development stage up to 1.1-2.0, a promotion stage up to 2.1-3.0, diffusion stage up to 3.1-4.0, and an optimization stage up to 4.1-5.0. This evaluation methodology is to derive which items are vulnerable among the diagnosis items. In this section, Mexico's efforts to harmonize with national digitalization for the efficiency and transparency of public procurement in the process of digital transformation in the public procurement field are measured according to the diagnostic model of this study.

According to the diagnostic model of this study, as a result of diagnosing the level of informatization of public administration in Mexico, it is in the spreading stage with a minimum score of 3.1 and a maximum of 3.7 points by diagnosis area. In the vision and policy sector (3.1 points), the e-government performance evaluation item was the weakest with 1.6 points among the four diagnosis items. In the governance sector (3.1 points), the e-government evaluation system item was the weakest with 1.3 points among the three diagnosis items. In the service sector (3.1 points), the data management item was the weakest with 1.5 points among the three diagnosis items. It was derived that the feedback functions through the performance evaluation system, data standard and analysis management for the digitalization of public procurement in common in these three sectors is not established competitively. In the IT infrastructure and technology sector (3.7 points), in the three diagnostic categories, the minimum score was 3.3 points and the maximum point was 4.7 points, and it was found that the reinforcement of services using mobile and broadband, which shows rigidity among the technology bases, is required. Utilizing the service using the device most used by the general public will be the most fundamental approach for the activation of the e-procurement system. In the user sector (3.3 points), it was found that among the two diagnosis items, training plans and performance management for enhancing IT manpower competency were found to be the weakest. Investing in the specialization of IT manpower in the mid- to long-term is highly important because it is to nurture the driving force to continuously improve e-procurement.

In order to successfully lead the digital transformation of public procurement, Mexico should consider the following improvement directions for each diagnosis sector.

- **Sector 1. Vision and Policy**: It is necessary to prepare the Digital Government Act to prepare a system for e-Government implementation and performance evaluation, and to use this as a milestone to improve the e-procurement system. In addition, in order to realize the technological roadmap for improving the e-procurement system, accompanying governance, operation management, and policy issues should be drawn and reflected in the mid- to long-term basic plan and short-term action plan.

- **Sector 2. Governance**: It is necessary to establish the evaluation standards and indicators for the e-procurement project develop an evaluation methodology according to it and make it a manual, and strengthen the feedback function to solve problems that appeared in the operation process.

- **Sector 3. Service**: For the transformation of big data and AI-based public procurement digitalization in Mexico, first, the e-government standard framework should be

developed and work redesign to automate data sharing in other public systems related to e-procurement should be preceded.

- **Sector 4. IT infrastructure and technology**: Since the use and usefulness of mobile and broadband exists in Mexico's IT infrastructure environment, it is necessary to activate service channels through mobile and broadband to expand the participation of e-procurement users.

- **Sector 5. User**: Mexico should develop mid-to-long-term education plans and policy programs to enhance IT manpower's competency and activate the suppliers' use of e-procurement. It is necessary to have a help desk that can provide the professional counseling for users (public officials and suppliers) to solve problems in real time, so that technology acceptance can be made quickly.

1. Introduction

Recently, the majority of governments are making strategic plans for digital government (or e-government) and government innovation, using the concept of "digital transformation" as a keyword to change the public administration and the government's innovation framework. The examples include the UK's 'Government Transformation Strategy 2017-2020', Australia's 'Digital Transformation Strategy 2018-2025', and New Zealand's 'Strategy for a Digital Public Service' (NIA, 2020).

The current government of Mexico's President Andrés Manuel López Obrador has set the elimination of corruption as a core goal of the state administration. In the Plan de Nacional de Desarrollo 2019-2024 (Plan de Nacional de Desarrollo 2019-2024), the detailed plans of the e-government policy are derived within the framework of eradicating corruption in the public sector and the efficient and effective management of public administration. Mexico's e-government policy is also based on the "digital transformation" of the public sector as it presupposes a change in the innovation frame of public administration that focuses on "the effective management of the public administration".

In this context, in the President's Government's 2nd National Administration Report (2019.09~2020.09), the Ministry of Finance and Public Credit (SHCP) was implemented as follows: 1) added an online shopping mall (Tienda Digital) module, 2) promoted electronic procurement documents, and 3) prepared new guidelines for public officials on the use of CompraNet (Mexico's current e-procurement system name), etc. The SHCP stated that it will prepare a continuous improvement policy for e-procurement in the future.

It is necessary to comprehensively diagnose whether CompraNet has governance that can be linked with other e-government systems, and the level of informatization capabilities possessed by CompraNet users. In improving and operating CompraNet in the future, it is necessary to determine whether it has elements that can support and lead innovation as a whole. The purpose of this Chapter is to comprehensively diagnose the linkage between the Mexican e-government and e-procurement system and the user's informatization capability to maximize the utilization and efficiency of CompraNet in Mexico, and to present policy improvement directions in relation on CompraNet.

2. Significance of Public Administration Digitalization

In general, the significance of public administration informatization lies in the change in the way a government works and the improvement of the social value of public services. This has the same context in the concept of digital transformation, which is referred to as a recent global trend. Several scholars and research institutes define the digital transformation as shown in <Table 1-1>. Putting these definitions together, a key attribute of digital transformation is to leverage a digital technology foundation to transform the way organizations and services operate and deliver. Digital transformation in the public sector can be defined as the use of digital for public service users to improve the service accessibility and expand the social value of public services.

<Table 1-1> Definition of Digital Transformation

Concept	Definition
Gartner	- To create a new digital business model using the current and digital infrastructure of an IT infrastructure such as cloud.
Forrester	- Not simply using digital technology, but making it possible to perform complex tasks with a small number of people. - The process of transforming into a new digital organization using digital technology, such as an organizational operation that can quickly adapt to the digital environment.
Deloitte	- Changes in the operation method of services using digital technology and changes in the method of providing services to the service users.

Source: Authors.

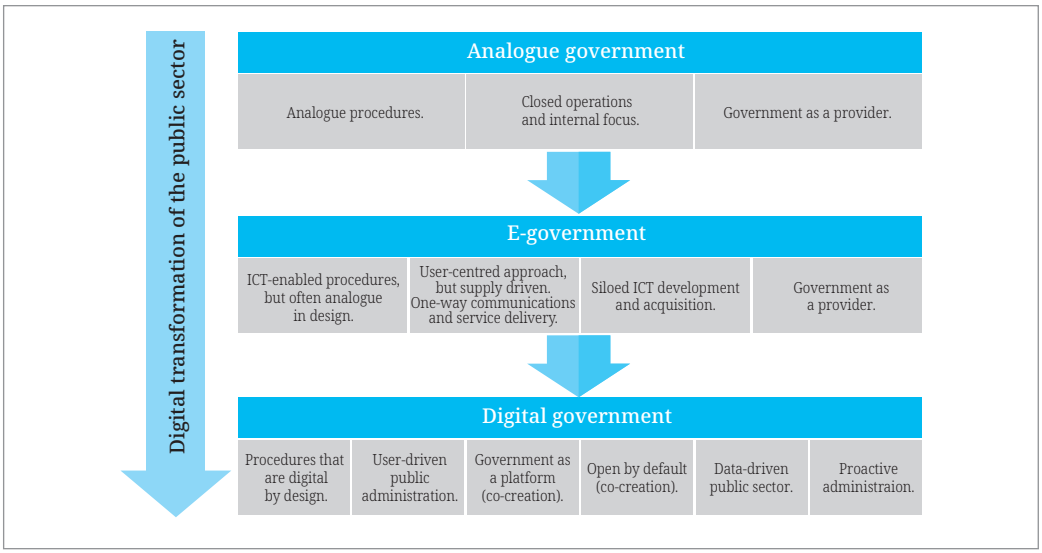
Diagnosing the level of digitization in the public sector from the perspective of this digital transformation is to clearly diagnose the current state and see if it has innovative elements. This means that it is necessary to be able to comprehensively evaluate whether the foundation and environment for the next steps in the future can be established.

Since the Mexican e-procurement system was first developed and has grown since 1996, the direction for improvement lies in the upgrade (or remodeling) of the e-procurement system. It is necessary to focus on 'integration', the final stage of e-government maturity. 'Integration' of e-government is the concept that best expresses the fundamental change in the way the government works, which is emphasized by digital government, which is a recent issue. The OECD (2018) defined digital government as 'a government that uses digital technology as part of the government's modernization strategy to create public value'. And the World Bank referred to the digital government as 'a government that has radically changed the way it carries out its mission.'

As shown in [Figure 1-1], assuming that it is the stage of conceptually transitioning from e-government to digital government, the last stage of e-government, 'integration', ultimately corresponds to digital government in that it presupposes user-centered government innovation and changes (OECD, 2020).

Therefore, the diagnosis of Mexico's public administration informatization level, to examine in this chapter, has a key element of digital transformation (digital government) in public administration in order to improve CompraNet, an e-procurement system. The key element is the harmony, linkage and coordination between the public administration information system and e-procurement system (digital government). It is to look at whether an environment that can cause changes in the innovative framework is in place.

[Figure 1-1] The Digital Transformation of the Public Sector



Source: OECD (2020).

3. Diagnostic Model for Mexico Public Administration Informatization Level

3.1. Design of Diagnostic Model

3.1.1. Existing Research on Diagnosis Model for Public Administration Informatization Level

Existing research on the diagnosis model of the public administration informatization level mainly focuses on the maturity model of the e-government development and the digital government maturity diagnosis model. In particular, the representative studies on the maturity diagnosis model of the digital government are the 5 Levels of the Digital Government Maturity of Gartner (2017), the Digital Government Index of the OECD (2020), and A study on the digital transformation maturity measurement model in the public sector of the National Information Society Agency (NIA, 2020).

In the Digital Government Maturity Model of Gartner (2017), 7 diagnostic sectors, value focus, service model, platform, ecosystem, leadership, technology focus, and key metrics, were evaluated for maturity in five stages: Initial, Developing, Defined, Managed, and Optimized. This model categorizes into 4 types in consideration of the urgency and readiness according to the maturity level assessment, and presents the desirable work directions for each type. This model ultimately presents the direction for digital government innovation, improves the organizational efficiency through an efficient digital government, and pursues the effects such as transparency and openness, and long-term cost reduction (see Table 1-2 and Table 1-3).

<Table 1-2> 7 Diagnosis Items of Digital Government Maturity Model

Items	Descriptions
Value Focus	- Short-term and long-term political priorities pursued by governments at various levels of maturity
Service Model	- Proactive prevention such as government and non-government channels (automatically when a specific pattern is discovered or a specific situation occurs) / Provided according to the balance of the after-service
Platform	- The digital business platform consists of IT, citizens, things, ecosystems and data usage/ intelligence - All five digital government platforms can also be included in different maturity levels depending on the agency's objectives, but each maturity level tends to emphasize the different areas

<Table 1-2> Continued

Items	Descriptions
Ecosystem	- Dependence on suppliers, partners and intermediaries in providing services - In the advent of the digital government innovation, suppliers, partners, and intermediaries work together according to their personality and role to jointly create new public-private services and engage users in the design and implementation to further develop services
Leadership	- Degree of leadership participation in the development and the implementation of IT and digital strategies - Collaboration between technology and business leaders is key to a successful digital transformation, but the key role in achieving progress in digital transformation varies by level
Technology Focus	- Types of technologies that are more widely used (e.g. APIs, data sharing and use, connectivity) - Several skills are required for digital transformation, but appropriate skills are needed to focus on each stage of the digital maturity level.
Key Metrics	- The number and percentage of online services accessible through mobile devices, integrated and transformed services. - Changed to metrics to adequately measure the achievement of governmental organizations' goals, mainly focusing on operational efficiency for organizational workflows such as corporate registration and licensing. Higher levels of digital maturity key indicators measure the performance of entirely new services and business models made possible through data and analytics.

Source: NIA (2020).

<Table 1-3> 5 Levels of Digital Government Maturity Model

Levels	Descriptions
Level 1 Initial (E-Government)	- At this level, the focus is on moving services online for user convenience and cost savings, but data and its uses are siloed and extremely limited.
Level 2 Developing (Open)	- E-government and open government programs often coexist, with different leadership and priorities. - Open government often takes the form of public-facing programs intended to promote transparency, citizen engagement and the data economy (smart city programs such as the Copenhagen Data Exchange).
Level 3 Defined (Data-Centric)	- On this level the focus shifts from simply listening to the citizen or user needs to proactively exploring the new possibilities inherent in strategically collecting and leveraging data. - It's tempting at this point to engage in vanity projects or skip ahead before the proper groundwork is laid.; it's paramount to remain focused on designing and implementing data-centric strategies and processes.
Level 4 Managed (Fully Digital)	- By this level, the organization, agency or department has fully committed to a data-centric approach to improving government, and the preferred approach to innovation is based on open data principles. - It's possible at this stage to encounter privacy-related backlashes, as citizens can be uncomfortable with how their data is being collected and used. - Therefore, it is important to ensure that data is used within existing norms and regulations, and that this is clearly communicated.

<Table 1-3> Continued

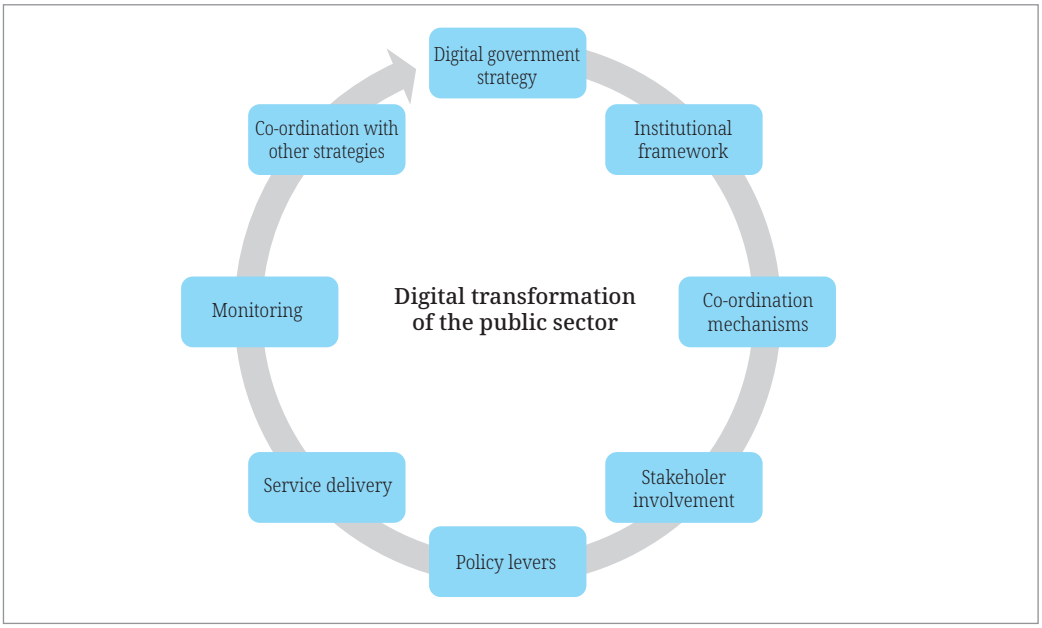
Levels	Descriptions
Level 5 Optimizing (Smart)	- At this point, the process of digital innovation using open data is embedded deeply across the entire government, with buy in and leadership from the top tier of policymakers. - The innovation process is predictable and repeatable, even in the face of disruptions or sudden events that require rapid responses.

Source: Gartner (2017).

According to OECD (2016a), strategies, institutional frameworks, coordination mechanisms, stakeholder relevance, policy instruments, services, monitors, and coordination among other strategies are the factors controlling digital transformation in the public sector (see Figure 1-2).

OECD (2020) has developed a digital government policy framework in six areas: 'Digital by design', 'Data-driven public sector, 'Government as a platform', 'Open by default', 'User-driven', and 'Proactiveness' (see Box 1-1). An advanced qualitative analysis mapped countries' digital government policies across different stages of the policy cycle. Four transversal facets were identified to better assess each dimension and provide comparable ground between them. These transversal facets provide a deeper evaluation of the strengths and challenges of policies across countries.

[Figure 1-2] Governing the Digital Transformation of the Public Sector: Dimensions of Analysis



Source: OECD (2016).

<Box 1-1> The 6 Dimensions of the OECD Digital Government Framework

1. From the digitization of the existing processes to digital by design:

Governments approach "digital" with an understanding of the strategic activities involved with successful and long-lasting transformation. They take into account the full potential of digital technologies and data from the outset in order to rethink, re-engineer and simplify government to deliver an efficient, sustainable and citizen-driven public sector, regardless of the channel used by the user.

2. From an information-centered government to a data-driven public sector:

Government recognize data as a strategic asset and foundational enabler for the public sector to work together and use data to forecast needs, shape delivery, understand performance, and respond to change.

3. From closed processes and data to open by default:

A government is committed to disclosing data in open formats, collaborating across organizational boundaries and involving those outside of government in line with the principles of transparency, integrity, accountability and participation that underpin the digital ways of working and the Recommendation of the Council on Open Government (OECD, 2017b).

4. From a government-led to a user-driven administration, that is, one that is focused on user needs and the citizens' expectations:

Government adopts an approach to delivery characterized by an "open by default" culture and ambitions of "digital by design" to provide ways for citizens and businesses to communicate their needs and for the government to include, and be led by, them when developing policies and public services.

5. From a government as a service provider to a government as a platform for public value co-creation:

A government build supportive ecosystems that support and equip public servants to design an effective policy and deliver quality services. That ecosystem enables collaboration with and between the citizens, businesses, civil society and others to harness their creativity, knowledge and skills in addressing challenges facing a country.

6. From reactive to proactive policy making and service delivery:

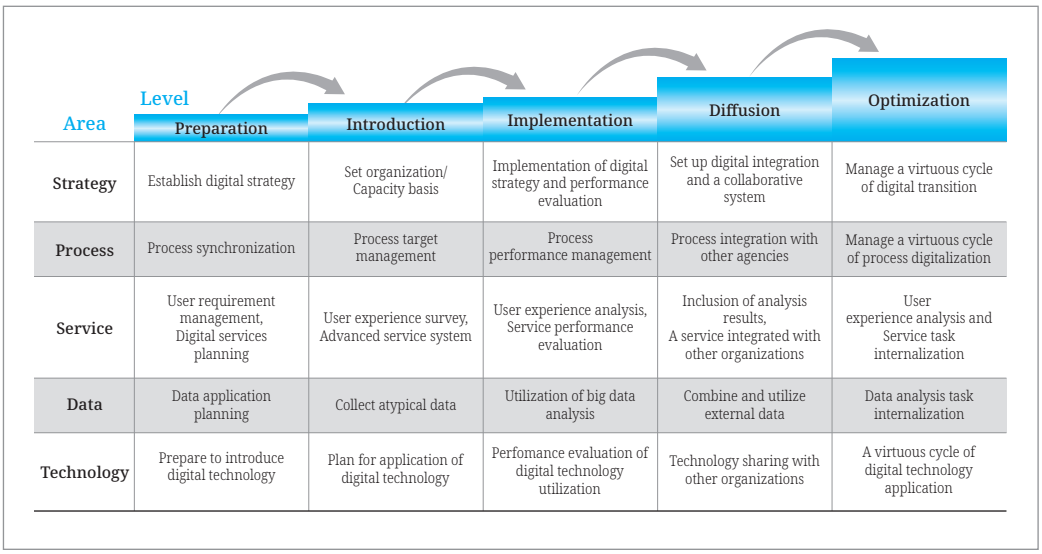
Governments reflecting these five dimensions can anticipate, and rapidly respond to, the needs of their citizens before a request is made. They also proactively release data as open data rather than reacting to a request for access to the public sector information. Transformed, proactive, government allows problems to be addressed from end to end rather than the otherwise piecemeal and reactive digitization of the component parts.

Source: OECD (2018a).

The public sector digital transformation maturity measurement model of NIA (2020) evaluated five diagnostic areas, including strategy, process, service data, and technology,

according to the maturity of five stages: preparation, introduction, promotion, diffusion, and optimization. This model was evaluated by subdividing the measurement index for each diagnosis area into five stages and calculating the average value of the scores for each item. This model is a tool that enables you to set conversion goals suitable for businesses that drive digital transformation, provide evidence for implementation, and achieve digital transformation goals (see Figure 1-3 and Table 1-4).

[Figure 1-3] Diagnostic Areas and Levels of the Public Sector Transformation Maturity Measurement Model



Source: NIA (2020).

<Table 1-4> 5 Levels of Digital Maturity Model for Public Sector

Levels	Descriptions
Readiness	- Recognizing the need for digital transformation
Introduction	- Partially attempting to digitize and building infrastructure
Driving	- Driving digital transformation according to systematic and consistent goals
Diffusion	- Flexibly delivering and procuring digital skills and capabilities as needed
Optimization	- Optimizing digital services and management systems to create new value

Source: NIA (2020).

3.2. Diagnostic Model to be Applied in Mexico's e-Procurement

The model for diagnosing the level of informatization of public administration in Mexico was revised mainly based on Korea's e-government maturity and the performance

management model, focusing on the linkage and coordination of the e-procurement system with other information systems from the perspective of digital transformation. This model selected the diagnostic items and indicators randomly that can be used at a global level such as Mexico from the Korean informatization level diagnosis model used by the Ministry of Public Administration and Security of Korea and the National Information Society Agency. This model consisted of 5 diagnostic areas, 15 diagnostic items, and 50 diagnostic indicators, including vision and policy, governance (including organization), service, IT infrastructure/technology, and users. In consideration of the recent trend of 'digital transformation', the use of intelligent technology, user experience and capabilities, and data management and utilization are included in the diagnostic indicators. The validity of the diagnosis area and diagnosis items of this model was verified through expert review. This model is a level diagnosis that focuses on the linkage between e-procurement and e-government in Mexico, and could be partially modified through a survey of basic data to diagnose the level of informatization of public administration in Mexico (see Table 1-5 and Table 1-6).

<Table 1-5> Definition of Diagnostic Areas and Diagnostic Items in the Diagnostic Model of Mexican Public Administration Informatization Level

Sectors	Items	Descriptions
Vision & Policy	Policy/Strategy	Whether e-procurement and national digital government policies are linked
	Willingness to push	Priorities for e-government and willingness to drive digital transformation of public procurement
	Digital Plan	Existence and connectivity of the e-procurement action plan under the e-government plan
	Performance	Whether to implement e-procurement performance management under the e-government performance management framework
Services	Information service	Whether to implement information services under the e-government standard development framework for e-procurement
	Data	Data standards and availability for e-procurement
	Use of Information	The level of use of information (open data) for e-procurement
IT infrastructure/technology	IT accessibility	Measurement of the level of access to information and communications
	IT utilization	Measurement of the level of use of information and communication
	IT literacy	Human development-oriented literacy measurement

<Table 1-5> Continued

Sectors	Items	Descriptions
Governance	E-government coordination system	Whether an e-government coordination mechanism exists, and whether there is a coordinating role for the e-procurement system
	E-government management system	Whether there is an e-government management and operation system, and whether it is involved in the operation of the e-procurement system
	E-government evaluation system	Whether there is an e-government evaluation mechanism, and whether it is involved in the evaluation of the e-procurement system
User	IT staff competency	Measuring the competency level of IT staff
	Culture	Measuring the level of cultural acceptance of new information technology and services

Source: NIA (2020).

<Table 1-6> Diagnosis Model of Mexican Public Administration Informatization Level : e-Procurement Linkage and Coordination

Sectors	Items	No.	Index	Assessment methods
Vision & Policy	Policy/ Strategy	1	Does Mexico have a vision and strategy for e-procurement?	Literature Review
		2	Is there a link between the e-procurement vision/ strategy and e-government policy tasks?	
		3	Is there a connection between the e-procurement task and the national digital strategy?	
	Willingness to push	4	Is e-procurement a priority policy in the current government?	Literature Review & Interview
		5	Are laws and regulations related to e-procurement in the current government?	
		6	What are the regulations of the organization related to the e-procurement in the current government?	
		7	What is the proportion of the e-Government budget for the e-procurement execution budget?	
	Digital Plan	8	Has the e-government basic plan (mid- to long-term) been established within the last 5 years?	Literature Review
		9	Has the basic e-procurement plan been linked under the e-government basic plan within the last 5 years?	
		10	Are the detailed goals, strategies, and action plans for e-procurement established?	

<Table 1-6> Continued

Sectors	Items	No.	Index	Assessment methods
Vision & Policy	Performance	11	Does an e-government performance management plan exist?	Literature Review & Interview
		12	Was the e-procurement performance evaluation conducted under the e-government performance management plan?	
		13	Are the performance indicators of e-procurement defined?	
Services	Information service	14	What is the level of web accessibility evaluation?	Literature Review & Interview
		15	What is the mobile service implementation rate of public service?	
		16	What is the mobile service quality level of public service?	
		17	Among the e-procurement information services, what proportion of the e-government standard development framework is applied?	
	Data	18	What is the standardization of your data?	Literature Review & Interview
		19	What is the type of data analysis/utilization among operational analysis services?	
	Use of Information	20	What is the current level of satisfaction with the e-procurement service?	Statistical data (If not, interview)
		21	What is the level of functional utilization of the e-procurement information service?	
		22	What is the record of using open data?	
IT infrastructure/ technology	IT accessibility	23	Number of phone subscriptions per 100 people	ITU & World Bank data
		24	Number of mobile phone subscriptions per 100 people	
		25	Internet users against the international Internet bandwidth	
		26	Percentage of households with computers	
		27	Percentage of households with Internet access	
	IT utilization	28	Percentage of Internet users	
		29	Number of wired broadband Internet subscriptions per 100 people	
		30	Number of wireless broadband internet subscriptions per 100 people	

<Table 1-6> Continued

Sectors	Items	No.	Index	Assessment methods
IT infrastructure/ technology	IT literacy	31	Total enrollment rate for secondary education institutions	
		32	Total enrollment rate for higher education institutions	
		33	Adult literacy rate	
Governance	E-government coordination system	34	Is there a dedicated agency for e-government coordination?	Literature Review & Interview
		35	What is the size of the workforce of the agency in charge of e-government coordination?	
		36	Is there Chief Information Officer for an e-procurement operating organization?	
		37	Are there any coordination mechanisms for the digitization of public procurement missions	
	E-government management system	38	Has the e-government management policy been established?	Literature Review & Interview
		39	Has the e-government management process manual/ guide been established?	
		40	Is the policy-making process such as the e-government development deliberation operated?	
		41	Are plans for the e-government business continuity established and operated? (Mock test)	
	E-government evaluation system	42	Has an e-government evaluation policy been established?	Literature Review & Interview
		43	Has an e-government evaluation process manual/ guide been established?	
		44	Is the e-government evaluation process operating?	
User	IT staff competency	45	Are the roles of the IT staff defined?	Literature Review & Interview
		46	Are training courses open/operated to strengthen the competence of IT-oriented personnel?	
		47	What is the performance ratio of the IT manpower to the education plan?	
	Culture	48	Degree of acceptance of the new technology changes	Interview
		49	Is there a culture of collaboration between organizations within the institution when promoting the informatization project?	
		50	Is there a culture of information sharing through the seminars or presentations within the organization?	

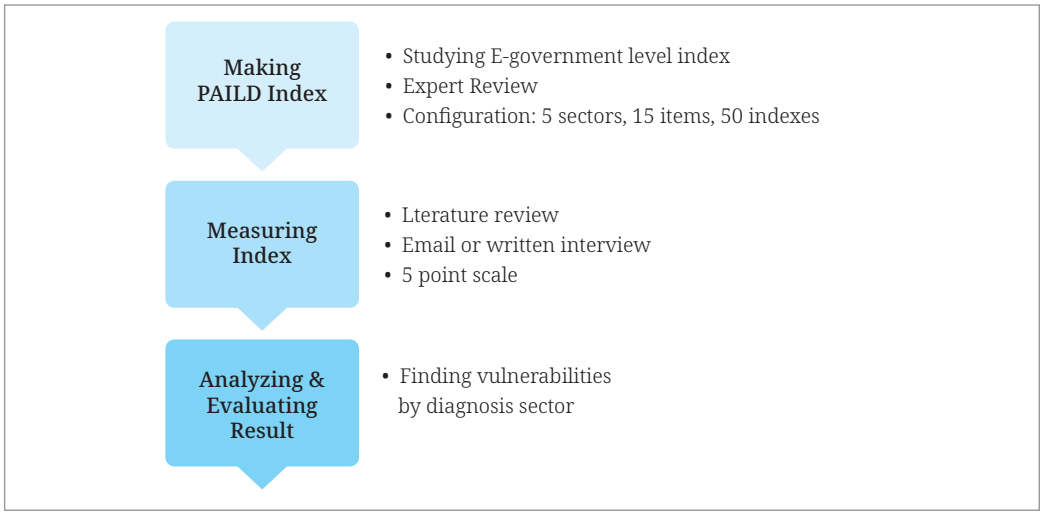
Source: Authors.

Due to the difficulty of visiting and face-to-face contact due to COVID 19, the evaluation is conducted through a literature review and, e-mail, written interviews, short visit interviews (7~10 June 2021) with local practitioners (e-procurement managers in SHCP-OM). There were a total of 11 people who responded to the visit interview for the diagnostic model, including 5 local practitioners, 3 suppliers, and 3 demanding organizations. The interview results of the suppliers and demanding organizations were reflected only in the service sector and user sector.

As for the research method, a literature search was conducted by a Spanish researcher, and it was confirmed by a local expert whether the contents were true and whether other related data could be provided. For each diagnostic item that could not be confirmed in the literature, an interview was conducted on the corresponding level.

The evaluation method is a 5-point scale, and the average value is evaluated for each item in each diagnosis sector. In this study, the maturity level was composed of five stages: initial, development, promotion, diffusion, and optimization by synthesizing Gartner (2017) and NIA (2020). It is evaluated as an initial stage up to 0-1, a development stage up to 1.1-2.0, a promotion stage up to 2.1-3.0 points, a diffusion stage up to 3.1-4.0 points, and an optimization stage up to 4.1-5.0 points. This evaluation methodology is to derive which items are vulnerable among the diagnosis items. This model is intended to be used as a means to consider the direction of improvement along with the development of the e-procurement of weak items in the process of the digital transformation in the public sector in Mexico (see Figure 1-4).

[Figure 1-4] Assessment Process for Mexico Public Administration Informatization Level Diagnosis



Source: Authors.

4. Design of Diagnostic Model

4.1. Digital Transformation in Mexico

In Mexico, the push for digitalisation, driven by the Coordination of the National Digital Strategy at the Office of the President, has achieved significant success. Today, roughly 90% of government transactions can be initiated on line and 75% can be completed digitally (IDB, 2018). Nevertheless, only 10% of Mexicans reported completing their last government transaction through digital channels, and government transactions often require several interactions to be completed. To reap the full benefits of digital government, Mexico might benefit from adopting an increasingly multi-channel, joined-up and user driven approach, which can affect societal well-being and hence support increased public trust in government (OECD, 2020).

In Mexico, according to the 2019-2024 national development, the electronic procurement system, CompraNet 5.0, developed in 2010, started to transition to an integrated platform, the Public Procurement Digital Platform (Plataforma Digital de Contrataciones Públicas, PDCP). The platform is designed to promote transparency in the public procurement process by standardizing and automating the entire public procurement cycle. The platform consists of a total of 20 modules, and as of 2021, six of the 20 modules (federal government digital store, supplier registration, demand and purchasing department registration, legal document creation, security, support) have been developed, and one module (contract procedure module) is under development. The remaining modules have not been prioritized for development by Ministry of Finance & Public Credit (Secretaría de Hacienda y Crédito Público, SHCP) Administrative Office (OM, Oficialía Mayor). Since the completion of 20 modules cannot be guaranteed by 2024, the complete digitalization of public procurement is expected to be somewhat delayed.

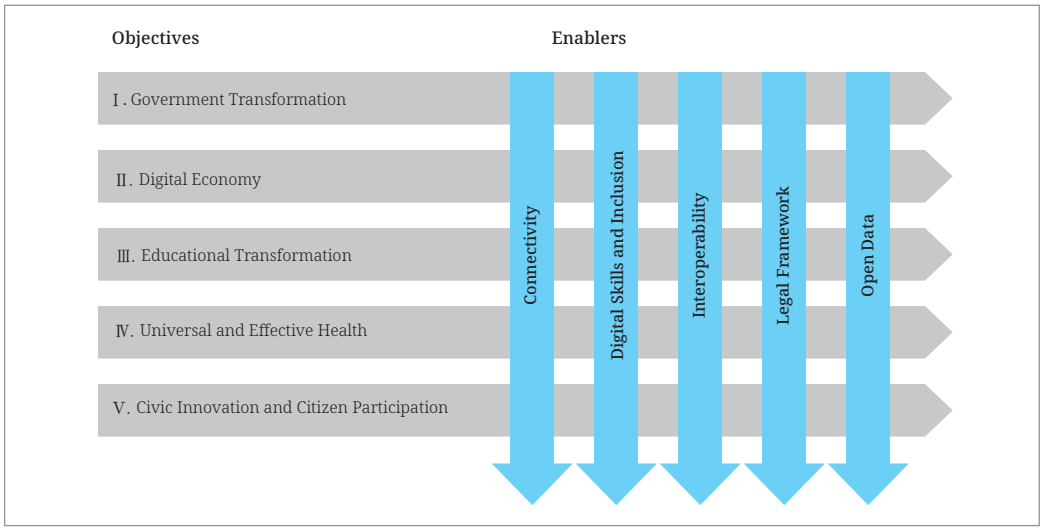
In this section, Mexico's efforts to harmonize with national digitalization for the efficiency and transparency of public procurement in the process of digital transformation in the public procurement field are measured according to the diagnostic model of this study.

4.2. Sector 1: Vision and Policy

A new National Digital Strategy (Estrategia Digital Nacional, EDN) was launched in Mexico under the 2012-18 federal administration, providing a clear articulation with the public sector reform programme and the National Development Plan. The EDN, its structure

and objectives have a significant focus on improving the public sector performance (Government of Mexico, 2013). The EDN identified the five strategic objectives that would drive the digital transformation of government, education, health, the economy and government-citizen relations (see Figure 1-5). These objectives are supported by the five key enablers: 1) connectivity; 2) digital skills and inclusion; 3) interoperability; 4) legal framework; and 5) open data.

[Figure 1-5] Structure of the Mexican National Digital Strategy: Objectives and Enablers



Source: Government of Mexico (2013).

Mexico identified early on the power of digital and the country has firmly established itself as a leader in Latin America and the Caribbean and, progressively, the world, as its performance in international metrics show. Mexico ranks 23rd in the UN's Online Service Index, up from 35th in 2014, and 5th in the OECD Open, Useful and Re-Usable Data (OURData) Index, up from 10th in 2014.

Mexico has successfully adopted a model where the political push comes from the centre, via the Coordination of the National Digital Strategy (Coordinacion de Estrategia Digital Nacional, CEDN) located in the Office of the President, with the implementing drive and support coming from the Ministry of Public Administration. Measured by the rate of the digitalisation of public services, this model has delivered. Mexico has consolidated itself as a regional leader when it comes to the level of the digitalisation of government transactions (IDB, 2018; OECD, 2018a).

One key weakness of the current Mexican model is that a disproportionate level of the political drive – and thus the ability to exert influence across the sectors – depends on the

individual executives within the Office of the President, who might often struggle to find the time required to effectively steer the digitalisation agenda (Bracken and Greenway, 2018). The digital transformation of the government entails a continuous evolution, which demands a sustained effort (OECD, 2020).

On April 30, 2019, the President's government announced the National Development Plan 2019-2024 (Plan de Nacional de Desarrollo 2019-2024), which contained the vision of the new government's state administration. Chapter 1 of this plan expressed the government's strong will to prepare an efficient e-procurement system for the proper use and management of the public budget.

On August 30, 2019, the "Programa Nacional de Combate a la Corrupcion ya la Impunidad y Mejora de la Gestion Publica 2019-2024" derived from this plan. This detailed plan was jointly proposed by Ministry of Finance and Public Credit (SHCP), Ministry of Public Administration (Secretaria de Funcion Publica, SFP), and the National Digital Strategy Coordination Office (CEDN). Reasonable public expenditure and efficient and effective public management are prioritized in the third of the five goals of this detailed plan, "Efficient and Effective Management of Public Administration". It establishes a measure to oversee the conduct of each government agency, which is carried out on the basis of the principles of economics, efficiency, transparency and honesty. At the same time, it can be said that the direction is consistent within the large framework of the National Development Plan (PND) in that it can bring about the effect of reducing the budget for welfare creation (see Figure 1-6).

Two distinct aspects of the Mexican federal government's austerity policy implementation are the oversight of government agencies' financial administrations (UAF) to implement the integrated procurement process, and the effective strategies for cost control, monitoring and cost reduction in public contracts. The detailed strategies to achieve this are as follows:

- **Strategy 3.1.** Establish strict standards for public resource enforcement and budget reduction systems.
- **Strategy 3.2.** Ongoing review of measures to integrate public administration.
- **Strategy 3.3.** Consolidate purchases, leases (and/or), and service contracts for recurring, expiring or generalized use in terms of the expenditure size to improve the economies of scale, administrative efficiency, price and quality terms, and Eradicate cheating by public officials participating in the process.

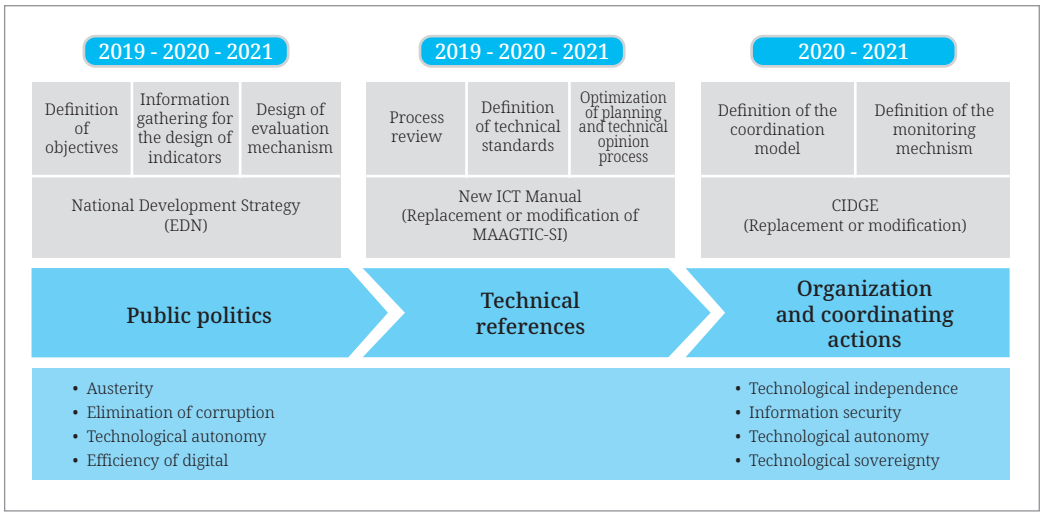
- **Strategy 3.4.** Enhance the quality and efficiency of federal spending based on the results of a follow-up, monitoring, evaluation and the inspection measures of the budget programme.

- **Strategy 3.5.** Strengthen the mechanisms for identifying the strengths, opportunities, weaknesses and the threats of the budget programs and encourage their use in the design, operation and measurements of the outcomes.

- **Strategy 3.6.** Promote the administrative change in federal government to provide the direct benefits to the public through the use of ICT.

- **Strategy 3.7.** Rationalize federal agencies, their functions, coordination, and connections using ICT.

[Figure 1-6] Comprehensive Plan for the Development of the National Digital Strategy and Harmonization of the Technological Policy



Source: CEDN (2019).

The comprehensive plan for the development of the national digital strategy and harmonization of the technological policy (Esquema de plan integral de desarrollo de la estrategia digital nacional y arminizacion de la politica tecnologica), underpinning Mexico's current National Digitalization Strategy (EDN), established in 2019 by CEDN, highlights the following: Technology policy should be implemented in an approach that harmonizes standards between the national digital strategy and the administrative manual. However, the Administrative Manual, a unified guideline for coordination among organizations applied to the government ministries and affiliated public institutions, is scheduled to be published at the end of 2021, so the detailed technical policies have not been fully implemented.

The national program for the combat of corruption, the abolition of privileges and the improvement of public administration 2019-2024, in Strategies 3.6 and 3.7, require CEDN to receive the technical coordination of national digitization for the electronic procurement. This is in line with the purpose of the comprehensive plan for the development of the national digital strategy and harmonization of the technological policy.

An integrated strategy for a new public procurement system (Estrategia Integral del Nuevo Sistema de Contrataciones Públicas) issued by SHCP Administrative Office in May 2019 sets the implementation goals that embody the above basic plan. Among the seven action goals presented in this strategy, the detailed goals related to e-procurement are two: the use of technical tools for public procurement, and the management of the new technology culture acceptance system. As a result, there is no comprehensive plan and action plan for e-procurement, and the development plan for e-procurement is mentioned as part of the comprehensive plan or action plan for public procurement. There is no plan for performance management other than the development of e-procurement.

According to a Mexican working-level interview survey (June 9, 2021), there is a mid- to long-term development roadmap to improve the current Compranet with PDCP, but there is no plan to accompany administrative, policy, and legal reforms that appear in the development process. However, if the SHCP Administrative Office prepares the strategy and informs it through circulation, based on this, an internal manual is created for each module and distributed to employees. Modules that are currently being promoted have manuals, and modules that have not been promoted do not have manuals.

Based on Articles 40 and 44 in [Standards for establishment, preparation, approval, and follow-up of programs derived from the 2019-2024 National Development Plan], a report containing the progress and achievements of the program is submitted annually. In Chapter 3 of the 2019 Performance Report, the results of each of the priority objectives set in the 2019-2024 National Plan for Corruption, Elimination of Privileges, and the Improvement of Public Administration, and key activities related to the major strategies for improving public administration, is described. As a result, it receives regular evaluation once a year along with other public procurement measures based on the comprehensive plan for public procurement.

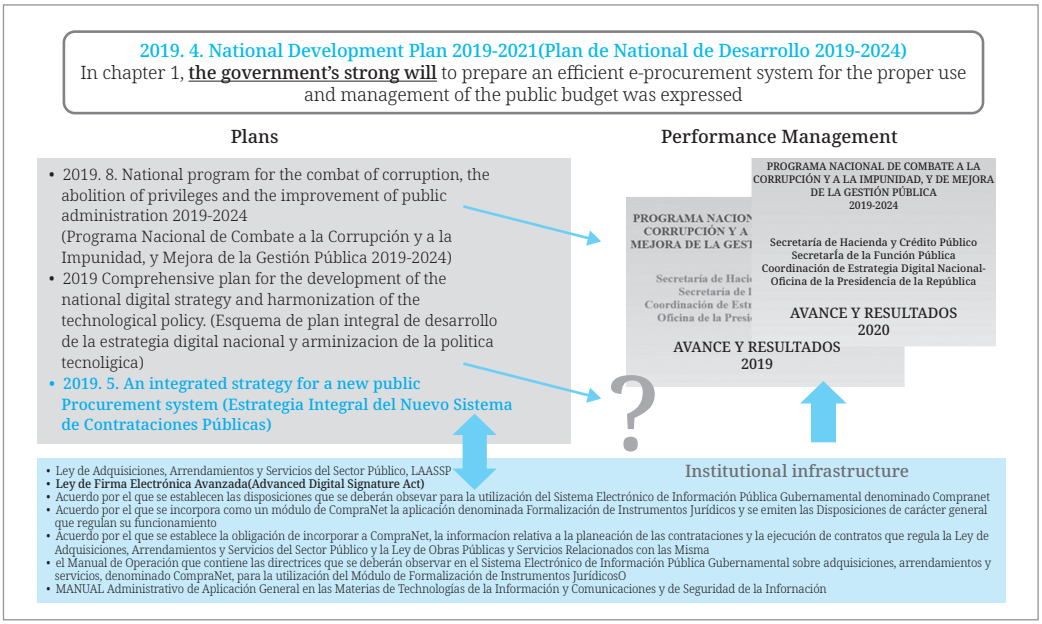
The legal basis for the efficient implementation of e-procurement in Mexico is the Law of Acquisitions, Leases and Services of the Public Services (LAASSP, Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público, enacted in 2000), the LAASSP Regulation, and the Electronic Signature Act (LREA, Ley de Firma Electrónica Avanzada, enacted in 2012).

In Mexico, the e-Government Act is not enacted, so it is supplemented by the CompraNet-related sub-rules or manuals as follows:

- An agreement establishing the provisions that must be observed for the use of the Electronic System of Public Information called CompraNet (Acuerdo por el que se establecen las disposiciones que se deberán observar para la utilización del Sistema Electrónico de Información Pública Gubernamental denominado Compranet).
- The Operation Manual that contains the guidelines that must be observed in the Electronic System of Public Information on acquisitions, leases and services, called CompraNet, for the use of the Legal Instruments Formalization Module (el Manual de Operación que contiene las directrices que se deberán observar en el Sistema Electrónico de Información Pública Gubernamental sobre adquisiciones, arrendamientos y servicios, denominado CompraNet, para la utilización del Módulo de Formalización de Instrumentos Jurídicos).
- An administrative Manual of general application in the matters of information technology & communications and information security (Manual Administrativo de Aplicación General en las Materias de Tecnologías de la Información y Comunicaciones y de Seguridad de la Información).
- An Agreement by which the application called Formalization of Legal Instruments is incorporated as a module of CompraNet and the General Provisions that regulate its operation are issued (Acuerdo por el que se incorpora como un módulo de CompraNet la aplicación denominada Formalización de Instrumentos Jurídicos y se emiten las Disposiciones de carácter general que regulan su funcionamiento).
- An agreement that establishes the obligation to incorporate into CompraNet, the information related to the planning of contracting and the execution of contracts that regulates LAASSP, (the Law of Acquisitions, Leases and Services of the Public Sector), LOPSRM (the Law of Public Works and Related Services) LOPSRM (AGREEMENT that establishes the obligation to incorporate into CompraNet, the information related to the planning of contracting and the execution of contracts that regulates the Law of Acquisitions, Leases and Services of the Public Sector and the Law of Public Works and Related Servicesand the law with the same level (Acuerdo por el que se establece la obligación de incorporar a CompraNet, la información relativa a la planeación de las contrataciones y la ejecución de contratos que regula la Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público y la Ley de Obras Públicas y Servicios Relacionados con las Mismas).

The composition of the Provisional Digital Government Act (Ley de Gobierno Digital) was specified through the 'Guide to the Legal Framework for Digital Government' established by the former administration of Enrique Peña Nieto, but due to the change of government in 2018, no progress was made due to the enactment of the Digital Government Act.

[Figure 1-7] Plans and Performance Management for e-Government and e-Procurement in Mexico



Source: Authors.

Although the above-mentioned laws and regulations specify the roles of relevant institutions in relation to public procurement, the legal roles and authorities of working organizations that manage and operate electronic procurement are not systematically specified in one regulation, but are scattered across several laws. It can be seen that the legal basis for mechanisms promoting e-procurement in Mexico is generally weak.

Looking at the budget allocation for e-procurement as a driving force for the project, CompraNet and PDCP module-related budgets accounted for 0.11% of the total budget for SHCP in 2021. The e-procurement-related budgets such as the next-generation KONEPS system (23 billion won) and digital service-only shopping mall construction project (2.7 billion won) account for 19.2% of Korea's PPS 2021 total budget (133.8 billion won). Considering that the SHCP is at the Ministry level and the Korean PPS is at the Government Agency level, the proportion of SHCP's budget for e-procurement is not small at all. As the total budget information for Mexico's e-government project was not provided, the proportion of the e-procurement project budget to the total e-government project budget cannot be confirmed (see Table 1-7).

<Table 1-7> Mexico CompraNet Budget (2021)

Activities	2021 Year Budget	
	MXN	USD
Technical support and on-site service for CompraNet operations	6,000,000	300,864
On-site technical support service and disaster recovery plan for CompraNet (ESOP & DATAMART)	7,500,000	376,080
Standard maintenance service for perpetual licenses of software of the modules that make up the platform supporting the CompraNet system	3,500,000	175,504
Cloud Service (President's Office)	5,000,000	250,720
CompraNet Budget	**22,000,000 (0.11%)**	**1,103,168 (0.11%)**
SHCP total Budget	**20,228,539,183**	**992,806,588**

Source: SHCP data reorganized by Authors (accessed June 15, 2021).

The evaluation score for each diagnostic item in the vision and policy section was 3.1 points. In Mexico, the e-procurement policy is implemented in the overall basic plan for public procurement, and there is a limitation in that the basic plan and tasks for e-procurement are not specifically linked with performance management. In addition, there is a lack of legal basis to ensure cohesive feedback and driving mechanisms between plans and outcomes for digital government and e-procurement. For example, the absence of the Digital Government Act, the absence of the clear standards for the performance management of the e-procurement, and so on (see Table 1-8).

<Table 1-8> Diagnosis Results for Vision and Policy Sector

Sectors	Items	No.	Index	Score
Vision & Policy (3.1)	Policy/ Strategy (3.6)	1	Does Mexico have a vision and strategy for e-procurement?	5
		2	Is there a link between the e-procurement vision/ strategy and e-government policy tasks?	3
		3	Is there a connection between the e-procurement task and the national digital strategy?	3
	Willingness to push (3.0)	4	Is e-procurement a priority policy in the current government?	5
		5	Are laws and regulations related to e-procurement in the current government?	2
		6	What are regulations of organization related to e-procurement in the current government?	3
		7	What is the proportion of the e-Government budget for e-procurement execution budget?	2

<Table 1-8> Continued

Sectors	Items	No.	Index	Score
Vision & Policy (3.1)	Digital Plan (4.0)	8	Has the e-government basic plan (mid- to long-term) been established within the last 5 years?	4
		9	Has the basic e-procurement plan been linked under the e-government basic plan within the last 5 years?	3
		10	Are detailed goals, strategies, and action plans for e-procurement established?	5
	Performance (1.6)	11	Does an e-government performance management plan exist?	1
		12	Was an e-procurement performance evaluation conducted under the e-government performance management plan?	3
		13	Are performance indicators of e-procurement defined?	1

Source: Authors.

4.3. Sector 2: Governance

Since 2001, Mexico has progressively taken the necessary steps to improve the organisational structures supporting to its public sector digitalisation and modernisation efforts. The Coordination of the National Digital Strategy (CEDN) was established under the Office of the President to oversee and co-ordinate its implementation (see Table 1-9). The partnership between the Coordination of the National Digital Strategy and the Ministry of Public Administration has allowed the government of Mexico to achieve more robust integration of the digital efforts, from connectivity to the digital economy and society as well as the government transformation. It has also secured enough political capital to launch an ambitious, mission-driven initiative to overhaul the government services portal (OECD, 2020).

<Table 1-9> Programs Promoted by CEDN

Program	Descriptions
Coordination of the federal technology policy	All contracts and implementation-related projects for ICT are approved by one Technology Bureau
Encourage the use of the ICT infrastructure and increase its efficiency	The optimization of the federal government resources through an agreement to share an infrastructure with technicians
Encourage the purchase of ICT-related programs and goods	In cooperation with the Ministry of Finance and Public Credit (SHCP), formulate policies and standards for the purchase and use of the goods, programs, and information and communication equipment through the unit price contracts
ICT project technical analysis	Review of linkage with national policy and feasibility through a technical project

<Table 1-9> Continued

Program	Descriptions
E-government	Improving the digital integration environment through the implementation of e-government. Encourage innovation, openness, cooperation and citizen participation
Technological innovation	Expanding access to the government services through ICT - Mexican Social Welfare Bank (Banco del Bienestar)

Source: Authors.

Stronger digital government co-ordination has been favoured by the National Digital Strategy and its Coordination office; an increasingly robust legal and regulatory framework; and a set of standards, guidelines and toolkits that have allowed the public administration to progressively harmonise the processes and procedures in the federal public administration. Furthermore, the Executive Council Inter-ministerial Commission for e-Government Development (Comisión Intersecretarial para el Desarrollo del Gobierno Electrónico, CIDGE) has ensured the technical and operational co-ordination of the implementation of the strategy. The sub-commissions and technical teams of the CIDGE have proved to be critical in the operationalisation of the key components of the National Digital Strategy (OECD, 2020).

However, while these mechanisms have brought Mexico a long way in terms of technical co-ordination, their limitations become evident when it comes to the high-level political co-ordination. The highest ranking co-ordination body for the digital government implementation, the CIDGE, meets only at the level of the heads of the ICT units. While this co-ordination structure has been tremendously important so far, it is unclear whether it will be sufficient going forward to secure the political support required to sustain the horizontal and transversal evolution required by the digital transformation.

The organization in charge of the operation of CompraNet in Mexico was first in charge by the Ministry of Comptroller and Administrative Development (Secretaría de Contraloría y Desarrollo Administrativo, SCDA) through the enactment of the LAASSP and LOPSRM in 2000, and then in SFP as LAASSP and LOPSRM were revised in 2009. In order to provide an efficient process of the public procurement and standardized services, SFP made the mandatory use of CompraNet, enforced electronic reverse auction (OSD), introduced the framework contracts, and prepared Administrative Manuals of General Application in Acquisitions and Public Work (Manuales Administrativos de Aplicación General en Adquisiciones y Obra Pública, MAAGAOP) as basic guideline, in 2010. And in the same year, CompraNet 5.0, a product of Mexico's public procurement innovation, was built. In 2018, when the President López Obrador's administration took office, the department in charge

of CompraNet was changed to SHCP, and SHCP took on an additional role of coordinating between the departments of the administrative agencies to implement the integrated procurement and asset management in public procurement, As the Law of the Federal Public Administration (Ley Orgánica de la Administración Pública Federal, LOAPF) was amended in 2018. As a result, technical coordination in relation to e-procurement is carried out by CEDN, and the coordination for the standardization of public procurement procedures is carried out by SHCP.

SHCP-OM has 5 departments. Among them, the Public Procurement System Unit (Unidad del Sistema de Procura, USP) plays a role in establishing, planning, and implementing the general policies for public procurement, and is in charge of developing, building, and operating the digital systems for public procurement. The General Directorate of Technologies and Information Security (La Dirección General de Tecnologías y Seguridad de la Informació, LDGTSI) within the Administrative Finance Unit (Unidad de Administración y Finanzas, UAF) under the OM, serves as the CIO of SHCP. USP promotes all projects for the e-procurement system through cooperation with LDGTSI. In this case, the regulations established by the CEDN should be complied with. LDGTSI is responsible for defining and managing the information architectures, platforms and tools, and promoting an IT quality, IT security, and information security culture through the oversight of the IT services and portfolios of the projects. It is also responsible for establishing the IT governance model. Since the department in charge of the CIO is not included in USP, which is the general department that manages the e-procurement, there is a limit to exerting the driving force of the e-procurement (see Table 1-10).

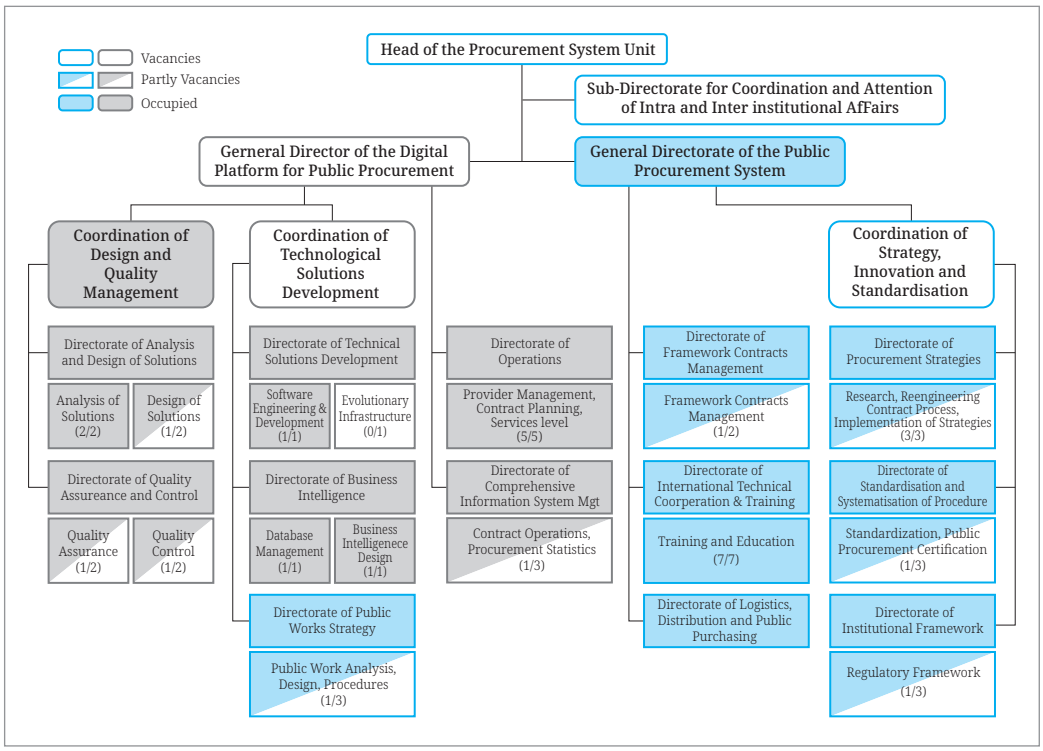
<Table 1-10> Number of Dedicated Staff related to CompraNet in USP

Type	Number of Staff	Number of Vacancies	Number of Staff related to CompraNet	Number of Vacancies related to CompraNet
Unit Holder (Titular de Unidad)	1	1	1	1
General Directorate (Direccion General)	2	1	1	1
Coordination (Coordinacion)	3	2	2	1
Directorate of Sector (Direccion de Area)	13	0	7	0
Sub-directorate of Sector (Subdireccion de Area)	17	3	10	2
Department Head (Jefatura de Departamento)	20	11	11	6
External Cooperation (Enlace)	4	2	2	1
Total	**60**	**20**	**34**	**12**

Source: Authors.

The number of dedicated staff for CEDN in charge of the technical coordination of e-Government projects has not been confirmed. Out of the total number of employees (60 people) of USP in SHCP-OM, the organization responsible for electronic procurement, 34 people are dedicated to CompraNet. Excluding the 12 vacancies as of June 2021, there are only 22 people available as dedicated staff. In the survey of working-level workers in Mexico (June 7, 2021), the CompraNet operation team consists of a total of 24 people, including 10 internal personnel and 14 external experts. Federal Government Digital Store (TDGF)'s[1] operation team consisted of 41 people, all of which were internal, and it was found that some of the CompraNet operation team overlapped. Looking at the dedicated staff allocation chart, it is difficult to guarantee the actual implementation of the project, as there are many cases of vacant positions in high-level positions making major adjustments and decisions (see Figure 1-8).

[Figure 1-8] USP's Dedicated Staff Allocation Chart



Note: The grey line indicates the duties of CompraNet.

Source: Authors.

1 SHCP is in charge of selecting the framework contract targets and reviewing the contract details in TDGF, and the actual contract agreement through the evaluation of suppliers who intend to supply the contract items is in charge of the demanding organization. Then, when the supplier uploads the catalogue, the demanding organization makes an order request and selects the supplier. Since there is a possibility of corruption between the demanding organization and the supplier in this way, in order to minimize the dispute over the fairness of the contract, it is necessary for the SHCP to prepare the evaluation standards for the suppliers and to proceed with the legally stipulated professional evaluation procedures. Increasing the SHCP's authority is a matter related to the administrative authority of public procurement in Mexico, so it should be accompanied by organizational management and institutional innovation.

Although there are many related institutions related to the e-procurement projects in Mexico, there is a lack of a cross-ministerial coordination mechanisms that can oversee the digitalization of the public procurement. In the 2019-2024 National Plan for Corruption, Elimination of Privileges and the Improvement of Public Administration, SHCP plays a role in designing the digital system of public procurement, and SFP is responsible for purchasing compliance monitoring and integrated purchasing issues, and encouraging citizens to monitor the purchasing process in terms of good governance. When these tasks of each institution are converted to digitalization, it is necessary to check whether there is any possibility of conflict and whether there is a discussion to adjust it. As different ministries divide public monitoring and the feedback tasks in the process of digitizing public procurement, there will be limitations in quickly reflecting the feedback issues in e-procurement projects.

In addition, in managing the e-procurement solution, the Brown Solution is managed by SHCP and the cloud service is managed by the CDEN of the President's Office, so there is no automatic linkage between modules for each solution. This gives the user the inconvenience of having to open several windows at the same time. The punishment of public officials who mishandled the procurement corruption and blacklisting is carried out by SFP, and corporate punishment is carried out by SHCP and courts. This may have limitations in systematizing a digital module that registers and manages the suppliers. As of May 2021, there are a total of 467,255 registered suppliers and 23,500 civil servants registered on CompraNet. However, the actual number of valid suppliers that participated in 2020 was 28,952. The faithful vendor registration of CompraNet is not properly managed. In the Mexican working-level interview survey (June 10, 2021), there was an opinion that the time required for business processing was prolonged because the accurate and prompt separation of blacklist was not achieved as the blacklist was manually excluded through a simple search during the actual bidding participation process. This case shows that the automated linkage and integration of the related tasks is highly important.

In general, the e-Government management sector is divided into IT service management, digitalization project management, data management, security, service development and operation, and continuity management, and a manual or guideline for policy management for each management sector must be established. In Mexico, there are internal guidelines, agreements, and manuals for each service module being developed in PDCP, and there are also manuals for IT security management for e-government projects. These manuals and guidelines are available on the CompraNet website. But it was not possible to ascertain whether specific guidance on the planning and operation of the simulation tests for data management or business continuity existed. In a Mexican working-level interview survey

(June 10, 2021), it is revealed that the recently developed TDGF and PDCP platforms are the operating systems using open sources, so quality control is being conducted by regularly reviewing whether there are any changes in the system. It is not known whether this is a regular system evaluation procedure in the prescribed framework.

As a result, we did not find a full evaluation process related to e-government management in Mexico. The e-procurement project is evaluated together during the public procurement work evaluation in Mexico. It is not evaluated by the e-government management policy, and the evaluation process for each management policy is also not regularized.

The evaluation score for each diagnostic item in the Governance section was 3.1 points. In terms of governance, a coordination mechanism for IT exists between e-government systems and e-procurement systems, and a coordination mechanism for business cooperation also exists within the e-procurement projects, so the score was relatively high. However, in detail, the disconnection or lack of connection between modules for e-procurement still remains a challenge. In particular, the evaluation system for the e-procurement projects was very weak. This means a decrease in the policy feedback function for the overall e-procurement, and can be the cause of lowering the possibility of the continuous development of the PDCP, which has to complete 20 modules in a linkage in the long term (see Table 1-11).

<Table 1-11> Diagnosis Results for Governance Sector

Sectors	Items	No	Index	Score
Governance (3.1)	E-government coordination system (4.3)	34	Is there a dedicated agency for e-government coordination?	5
		35	What is the size of the workforce of the agency in charge of e-government coordination?	4
		36	Is there a Chief Information Officer for an e-procurement operating organization?	4
		37	Are there any coordination mechanisms for the digitization of public procurement missions?	4
	E-government management system (3.3)	38	Has the e-government management policy been established?	4
		39	Has the e-government management process manual/guide been established?	3
		40	Is the policy-making process such as the e-government development deliberation operated?	3
		41	Are plans for the e-government business continuity established and operated? (Mock test)	3
	E-government evaluation system (1.3)	42	Has an e-government evaluation policy been established?	1
		43	Has the e-government evaluation process manual/guide been established?	1
		44	Is the e-government evaluation process operating?	2

Source: Authors.

4.4. Sector 3: Service

In Mexico, no e-government standard framework has been developed and utilized. The e-Government standard framework is composed of a common component that has common functions frequently used in the websites of the government ministries, public institutions, and public corporations in advance, and a development environment, execution environment, operation environment, and a management environment to develop them. This is considering the compatibility and standard linkage between the e-government systems. In Korea, the framework has been developed and used in the early stages of the e-government setting-up.

It is mandatory for Mexican federal government agencies to comply with the Administrative Manual of General Application in the Matter of Information Technology and Communications and Information Security (MAAGTICSI, Manual Administrativo de Aplicación General en Materia de Tecnologías de la Información y Comunicaciones y de Seguridad de la Información) to develop government sites or provide digital services. Federal government agencies also strictly audit compliance with this manual. The e-procurement modules such as CompraNet and PDCP are also developing and operating various information services (front office service, intranet service, statistical service, etc.) according to the manual. This manual stipulates the process of regulating the system operation in ICT and information security issues, regardless of the organizational structure and operating methodologies. This manual only provides a guide related to technology and IT security, but does not provide a guide for the system operation and management environment, so it is not easy to ensure compatibility and standardization between the e-government systems.

Looking at the accessibility of CompraNet's website (compranet.hacienda.gob.mx) in Mexico, a warning related to the image label appears, an initial invalid security certificate warning is displayed when browsing through the mobile, and in the case that the user can register as a company, the documents and texts are implemented too small, which makes access inconvenient. In the mobile service of CompaNet, while the general information provision service is smooth, the submission of e-forms or the conclusion of the e-contracts cannot be implemented, because it cannot be linked with the e-signature system. The e-signature is a signature for internal accounting for government agencies, and unlike the digital signature method that can be used by general users, it cannot be used in mobile services. On the other hand, as of June 2021, an e-contract module accompanied by an e-signature system is implemented as a web service, enabling the smooth procurement service.

The Coordination of the National Digital Strategy worked with the British Embassy in Mexico, Oxford Insights and C Minds to develop a roadmap for the effective and ethical AI in the country (Dutton, 2018; Martinho Truswell et al., 2018; Zapata, 22 March 2018). In addition, the government of Mexico has supported the creation of ia2030, a multi-sectoral partnership to set the course for AI development in the country. Mexico has largely succeeded in making the case for the relevance of data-driven approaches going forward.

The initiative Retos Publicos, later renamed Retos MX, responded to the need to foster the capacity of the Mexican public sector to let policy issues and strategic questions drive the efforts aimed at fostering data-driven approaches (Díaz, Rowshankish and Saleh, 2018). Additionally, data analytics have been successfully deployed in the digital service delivery through the Gob.mx portal, but the cases of the successful implementation for policy making are still rare (see Table 1-12). The data governance in the Mexican federal public administration should be reinforced to keep encouraging and expanding the implementation of data-driven techniques in highly strategic ways through the frameworks, incentives, guidance and capacity building (OECD, 2020).

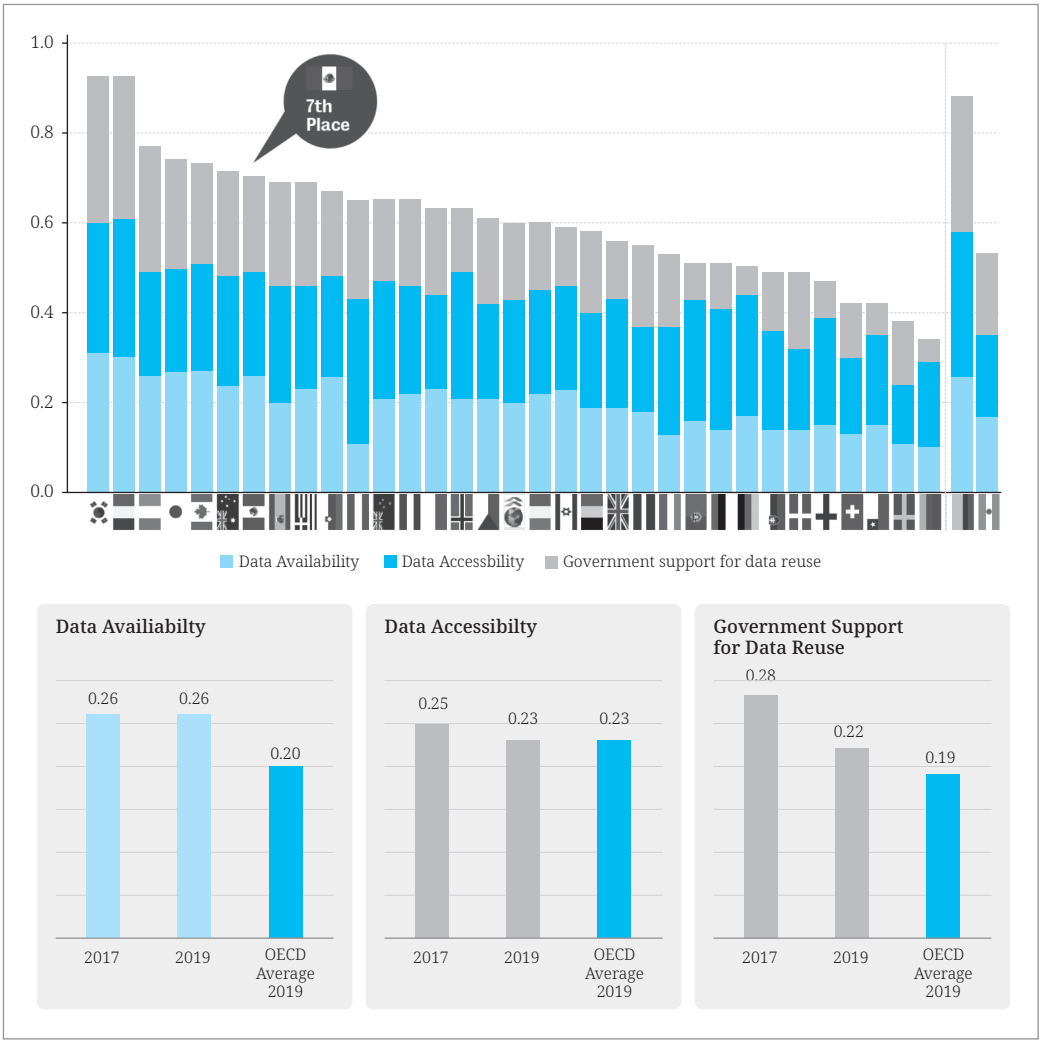
<Table 1-12> Governance for Open Government Data in Mexico

Institutional Governance	Policy Framework	Legal and Regulatory instruments
The Ministry of Public Administration has been in charge of the Mexican open data policy since December 2018.	The 2012-18 National Digital Strategy outlined the priorities for Open Data in Mexico. The Strategy was released as part of the public sector modernization programme Gobierno Cercano y Moderno. The 2015 Open Data Executive Decree introduced the open data policy for the Mexican government.	The General Law of Transparency from 2015 introduced the definition of 'open data' for the first time and reinforced the obligations of the public sector organisations to make open data available in machine-readable formats, in open formats, and free of charge.

Source: OECD OURdata Index (2019).

Datos.gob.mx is the central source for open government data in Mexico. The portal datos.gov.mx features a user-friendly online guide for data publishers that are required to publish open data in compliance with the Open Data Executive Decree. Open contracting data from the federal government are available on the portal via APIs. Data accessibility and utilization in Mexico decreased in 2019 compared to 2017 (see Figure 1-9).

[Figure 1-9] Data Accessibility and Utilization in Mexico (2019)



Source: OECD OURdata Index (2019).

Looking at digitization by process in the public procurement sector, Mexico uses the electronic documents in almost all processes except for providing electronic contracts. This is the same level as Belgium and Canada. As of June 2021, a module for generating legal documents such as electronic contracts have been developed and utilized through the in-sourcing development of SHCP, making it possible to utilize e-documents throughout the public procurement cycle. CompraNet is built as a Brown solution package from the bid announcement to the selection stage of the successful bidder, but the legal document creation module is not added to the package, but individually added. Therefore, automatic continuity between the Braun solution package and the legal document generation module is not guaranteed (see Table 1-13).

<Table 1-13> Availability of Public Procurement E-Documents

	Tender notice		Bidding documents		Evaluation criteria		Award notice		Contract text	
	2016	2018	2016	2018	2016	2018	2016	2018	2016	2018
Australia	●	●	○	○	●	●	●	●	○	○
Austria	●	●	○	●	○	●	●	●	○	○
Belgium	●	●	○	●		●	●	●	○	○
Canada	●	●		●	●	●	●	●	○	○
Chile	●	●	●	●	●	●	●	●	●	●
Denmark	●	●	○	○	●	●	●	●	○	○
Estonia	●	●	●	●	●	●	●	●	●	●
Finland	●	●	●	●	●	●	○	●	●	●
France	..	●	..	●	..	●	..	●	..	○
Germany	●	●	●	●	●	●	○	●	●	○
Greece	●	●	○	○	●	●	●	●	●	●
Hungary	●	●	○	○	●	●	●	●	○	●
Iceland	●	●	●	●	●	●	●	●	●	●
Ireland	●	●	○	●	●	●	●	●	○	○
Israel	●	●	○	○	●	●	●	●	●	●
Italy	●	●	●	●	●	●	●	●	●	●
Japan	●	●	●	●	○	○	●	●	○	○
Korea	●	●	●	●	●	●	●	●	●	●
Latvia	●	●	●	●	●	●	●	●	●	●
Lithuania	..	●	..	●	..	●	..	●	..	●
Mexico	●	●	●	●	●	●	●	●	○	○
Netherlands	●	●	○	○	●	●	●	●	○	○
New Zealand	●	●	●	●	●	●	●	●	○	○
Norway	●	●	●	●	●	●	●	●	●	●
Poland	●	●	●	●	●	●	●	●	●	●
Portugal	○	●	○	●	○	●	○	○	○	●
Slovak Republic	●	●	●	●	●	●	●	●	●	●
Slovenia	●	●	○	●	●	●	●	●	●	●
Spain	●	●	●	●	●	●	●	●	○	○
Sweden	●	●	○	●	○	●	●	●	●	●
Turkey	●	●	●	●	●	●	●	●	●	●
United Kingdom	●	..	●	..	●	..	●	..	●	..
OECD Total										
● Yes	29	31	18	25	26	30	27	30	17	18
○ No	1	0	12	6	4	1	3	1	13	13

Sources: OECD (2016b), OECD (2018b).

When performing intranet work in e-government, connection with the related systems is very important. The e-procurement system in Mexico is not linked with the budget system or accounting system, so there is an inconvenience of having to manually check each intermediate step. The following cases were found in the Mexican work-level survey (June 7~10 2021).

- Mexican officials can retrieve the electronic form by searching for the terms or contract form for the items, but since the valid contract number used in the accounting system is not automatically generated, a window of the accounting system is opened to check the valid number and officials have to fill the number in the formatted form.
- The e-payment is not resolved within CompraNet, but is made through the online accounting system of the contracting institution, so it is impossible to check whether the linkage between each system is secured.
- In TDGF, a digital store based on a framework contract, 210 office supplies are registered, and an e-payment module for this has been developed.
- Even when public officials register the procurement plans in CompraNet, they must check the procurement budget in the budget system and manually enter it in CompraNet.
- Although SHCP has business link agreements with the National Tax Service, a digital signature-related institution, the Ministry of Public Functions (SFP), which monitors the procurement-related corruption, and banks that provide bid guarantees, data sharing is not automated because there is no actual link between the systems.
- Since CompraNet cannot automatically exclude the blacklisted suppliers from participating in the bidding, the procurement officer must manually check the blacklists registered on CompraNet to exclude them. It may not be possible to exclude all blacklists because it can be confirmed only by using an accurate search term.

In addition, as the offline work of the public procurement is digitized, there is a problem that occurs because the work is not properly redesigned.

Regarding the limitation of the file size when submitting a proposal, it is not possible to analyze the items or fields that need to increase the limited capacity through the past data analysis, so the files capacity can be added arbitrarily only when the supplier files a complaint. There is a possibility of undermining the fairness of the bidding participation because the proper work redesign related to the submission of proposals has not been made.

- After the traditional offline bidding is conducted by the demanding institution, the post-registration method in CompraNet is still 37%, and the case where the demanding institution does not register arbitrarily cannot be excluded. This is the result of not complying with the full mandatory use of CompraNet by law, and the task remains to block the offline bidding itself.

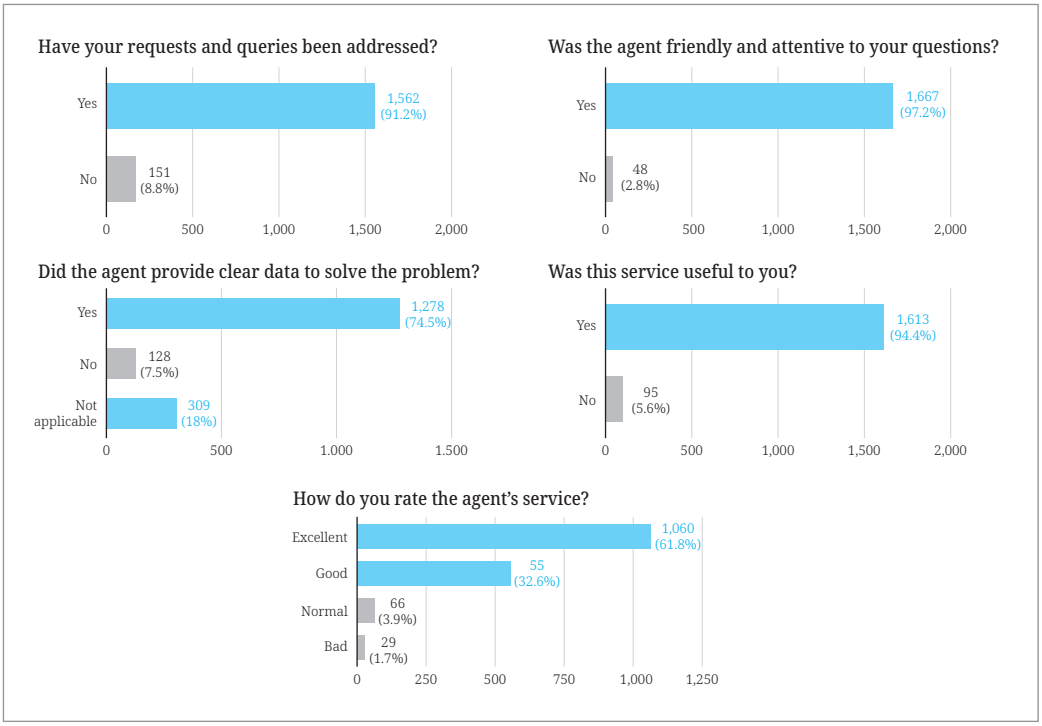
- Based on the framework contract, the purchasing process is being carried out by the demanding institution through the digital store TDGF. However, in the order stage of TDGF, the contract system for selecting a successful bidder through the supplier competition is not defined, so it is concluded in the name of a direct contract. In Korea, such a contract is called a two-stage competitive contract system, and the concept is defined to systematically manage the contract. In Mexico, it is necessary to define a new concept for the competition method caused by the digitalization of the procurement procedures so that it can be managed within the legal framework.
- In the case of the state or local governments, it is mandatory to use CompraNet when instigating procurement from the federal government budget. However, as the audits are conducted independently by the auditors of each state, SHCP do not receive feedback on any problems with the system.

Data should be well defined and standardized in e-Government to provide analysis services to properly analyze the system feedback. In Mexico, CompraNet classifies procured goods and services according to the federal budget accounting classification code, while the recently developed TDGF uses the United Nations Standard Products and Services Code (UNSPSC). This does not provide an accurate analysis service because it cannot uniformly analyze the procurement statistics. As of June 2021, there is no data warehouse, so CompraNet can only aggregate the simple data statistics, and the system feedback function is not working properly due to the analysis using big data and AI.

As a result, the level of the functional utilization of the information service in Mexico's e-procurement is lacking in actual data standardization and sharing, so it is necessary to systematize the overall data management in consideration of the redesign according to the digitalization of the procurement work. In order to build the contract management AI module planned in Mexico in the future, the systematization of data management must be carried out in advance.

In terms of the satisfaction with services to the public, such as civil complaint handling in CompraNet, most of them are handled through chatbots or phone calls, so there were many positive responses to the problem solving, data clarity, service usefulness, and staff friendliness. Since the satisfaction survey is not certain what kind of work it is the civil complaint is about, and it is a survey of general services to the public, it is necessary to strengthen the systematic feedback function by improving the survey as a more user-centered professional evaluation. [Figure 1-10] summarizes the above analysis.

[Figure 1-10] CompraNet Satisfaction Evaluation Result



Source: SHCP data reorganized by Authors (accessed June 15, 2021).

The evaluation score for each diagnostic item in the Service section was 3.1 points. As a result, in Mexico's e-procurement information service development, the pan-government e-government standard framework does not include the operation and management environments other than the technical environment. The standardization for data management in the e-procurement system is poor, or the systematic data linkage and sharing to strengthen the feedback analysis function of the system problems is lacking.

Ironically, the use of the e-government standard framework (No. 17) and the use of open data (No. 22) received a high score of 4 in the diagnostic model, for the following reasons:

- Mexico does not have an e-government standard framework like Korea, but a framework used for the development of the information systems by federal agencies exists and is mostly used. However, there is a need to develop a standard framework that is more specific to the e-government.
- In Mexico, as shown in <Table 1-14>, the use of open data was high, but the close-to-real-time connection between data in e-procurement was weak. Since Mexico's open data environment is good, if the systematic properties of the data management and linkage in Mexico's e-procurement is improved, the integration with other

e-government systems will be accelerated.

- Mexico has long-term plans to build an AI module for PDCP. In order to accelerate the time to realize this, it is necessary to put greater efforts into data linkage and sharing that strengthens the system feedback along with the development of the e-government standard framework.

<Table 1-14> Diagnosis Results for Service Sector

Sectors	Items	No	Index	Score
Services (3.1)	Information Service (3.5)	14	What is the level of web accessibility evaluation?	4
		15	What is the mobile service implementation rate of public service?	3
		16	What is the mobile service quality level of public service?	3
		17	Among e-procurement information services, what proportion of the e-government standard development framework is applied?	4
	Data (1.5)	18	What is the standardization of your data?	2
		19	What is the type of data analysis/utilization among operational analysis services?	1
	Use of Information (3.7)	20	What is the current level of satisfaction with e-procurement service?	5
		21	What is the level of functional utilization of e-procurement information service?	2
		22	What is record of using open data?	4

Source: Authors.

4.5. Sector 4: IT Infrastructure and Technology

Key items in the IT infrastructure and technology sector were investigated using the 2019 ITU and World Bank data. Mexico has relatively low IT access and usability compared to Korea, but it is on the high side in Latin America. In the case of literacy, it is similar to Korea, so it is judged that Mexico has the national competency for an IT infrastructure. While this figure is not an absolute criterion for transitioning to a digital government, it is surveyed to see how far Mexico is laying the groundwork (see Table 1-15).

<Table 1-15> IT Infrastructure and Technology Sector of Mexico and South Korea

Index		Mexico	South Korea
IT Accessibility	Fixed-telephone subscriptions (per 100)	17.81	48.27
	Mobile-Cellular subscriptions (per 100)	95.66	134.49
	International bandwidth	3,000,000	3,387,496
	Percentage of households with computers	44.34	71.74
	Percentage of households with Internet access	56.35	99.69
IT Utilization	Internet users (%)	70.06	96.15
	Fixed (wired)-broadband subscriptions (per 100)	15.17	42.76
	wireless broadband subscriptions (per 100)	76.37	114.90
IT Literacy	School enrollment, lower secondary (%)	92.21	97.25
	School enrollment, upper secondary (%)	73.85	96.01
	Literacy rate (Adult, %)	95.37	99*

Sources: ITU data (2019), World Bank data (2019).

The evaluation score for each diagnostic item in the IT infrastructure and technology section was 3.7 points. The diagnosis was evaluated using Korea as a reference point. According to the evaluation results, since mobile and broadband are sufficiently widespread in Mexico, it is necessary to actively introduce service channels that can utilize them (see Table 1-16).

<Table 1-16> Diagnosis Results for IT Infrastructure and Technology Sector

Sectors	Items	No	Index	Score
IT Infrastructure/ Technology (3.7)	IT Accessibility (3.4)	23	Number of phone subscriptions per 100 people	2
		24	Number of mobile phone subscriptions per 100 people	4
		25	Internet users against the international Internet bandwidth	5
		26	Percentage of households with computers	3
		27	Percentage of households with Internet access	3
	IT Utilization (3.3)	28	Percentage of Internet users	4
		29	Number of wired broadband Internet subscriptions per 100 people	2
		30	Number of wireless broadband internet subscriptions per 100 people	4

<Table 1-16> Continued

Sectors	Items	No	Index	Score
	IT Literacy (4.7)	31	Total enrollment rate for secondary education institutions	5
		32	Total enrollment rate for higher education institutions	4
		33	Adult literacy rate	5

Source: Authors.

4.6. Sector 5: User

The government of Mexico launched its new Digital Academy, a platform providing civil servants access to online courses. It also provides guidance on how to obtain access to the in-person digital government training workshops organised by the Digital Government Unit of the Ministry of Public Administration. While this is an important first step in upskilling civil servants, these activities do not yet have the scope or scale needed to respond to the challenge of the digital transformation.

Through the ICT Policy, its implementation guides and handbooks, the government of Mexico has established a clear process for conducting an ICT commissioning exercise and structuring ICT projects. These include the basic requirements, such as the use of open standards, reusable components, digital identity and meeting the interoperability requirements. In addition, the current policy is sound in identifying the team, establishing ICT project catalogues, performing feasibility studies, structuring a business case and providing the clear definitions of the minimum requirements. These specifications are made more robust by the use of the digital government Seal of Excellence, granted to those services that meet the existing digital government standards and which have gone through a robust process of development (OECD, 2020).

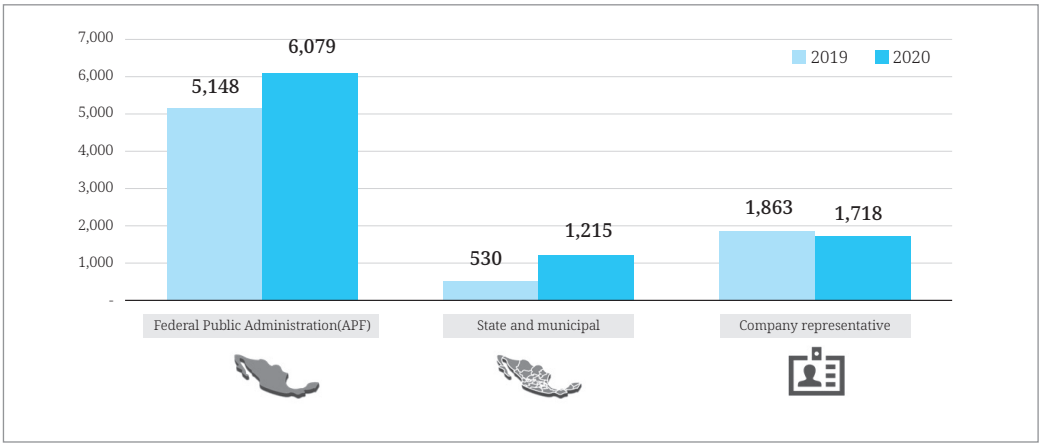
The government of Mexico has set up framework agreements for software licensing with 31 software providers, which has the value of making procurement simpler and more agile. Moreover, the government is currently developing a software framework agreement to efficiently respond to the software needs of the public organisations.

In Mexico, there are 19 training courses as of June 2021 to enhance user competency in relation to e-procurement, 9 of which are geared towards institutional training and 10 for system operation training. The number of education programs targeted at demanding institutions increased from 68.3% in 2019 to 67.5% in 2020 for the federal government, and from 7.0% in 2019 to 13.5% in 2020 for state and local governments. The number of training

for suppliers decreased from 24.7% in 2019 to 19.1% in 2020. In Mexico, education for e-procurement users is mainly conducted, and each government institution determines the schedule and content according to the educational demand, and uses an external instructor with professional requirements for training.

In Mexico, it was not possible to confirm whether an education plan was established with a mid- to long-term goal of professional education for IT personnel or whether an actual professional education program was being implemented. It is judged that the development of a subdivided curriculum for the e-government project is not legally defined, as the role of IT personnel assigned to the planning, development, security, data analysis, and the project management of e-government projects is not defined. However, in Mexico, information sharing between IT personnel mainly uses a knowledge sharing program to solve system security and operation problems, while compensating for each other's insufficient competencies (see Figure 1-11).

[Figure 1-11] Number of CompraNet Training Cases by Training Participant Type



Source: SHCP-OM (2020).

Regarding the status of public procurement education at the policy seminars held in Mexico, online and video-based education gradually increased compared to face-to-face education, a characteristic clearly seen among young users. Ironically, they complained of difficulties in online and video education due to the lack of basic knowledge of informatization. Public officials are motivated to actively participate in education because they require a certificate of participation in education to maintain their position, but suppliers do not have such a drive. For this reason, SHCP evaluates that it is not easy to induce suppliers to participate in training. In a Mexican supplier interview survey (June 10, 2021), even though there were convenient services such as CompraNet's alarm service, they responded that they were not well utilized because such publicity was not provided. As it

seems that education on the use of e-procurement is urgently needed for suppliers, incentive policies such as the private qualification system that can motivate them to participate in education should be considered. The OECD also pointed out the necessity of education following regular system updates, the lack of competency training in e-education, and the provision of competitive career opportunities to public procurement experts.

In the case of an e-procurement project in Mexico, collaboration between the relevant working-level organizations is conducted through directive consultation according to CEDN's technical adjustment, and operation adjustment is made according to the policy priorities set by the SHCP-OM. This has a limit to the realization of active cooperation, which involves mutual cooperation from an organizational infrastructure or the private sector. Mexico has a characteristic of making a new national development plan every time there is a change of government and undergoing major organizational restructuring. Therefore, the gradual acceptance of changes in an administrative culture can occur only when the current government's will for digital transformation can be continuously succeeded to the next administration.

The evaluation score for each diagnostic item in User section was 3.3 points. It is judged that the cultural acceptance following the digital transformation of public procurement has a sufficient foundation, except for the lack of training plans and implementation for IT personnel and the fact that system training for suppliers has not been activated. In order to activate services that apply new technologies such as AI, block chain, and big data related to public procurement, it is necessary to lay the foundation for stable technology acceptance through employment and the professional education of IT personnel. In addition, an institutional and organizational culture environment that supplement and eliminate technological risk factors as much as possible, should be urgently prepared so that users can accept new technologies well. <Table 1-17> summarizes above analysis.

<Table 1-17> Diagnosis Results for User Sector

Sectors	Items	No.	Index	Score
User (3.3)	IT staff competency (3.3)	45	Are the roles of the IT staff defined?	5
		46	Are training courses open/operated to strengthen the competence of IT-oriented personnel?	4
		47	What is the performance ratio of the IT manpower to the education plan?	1
	Culture (3.3)	48	Degree of acceptance of new technology changes	3
		49	Is there a culture of collaboration between organizations within the institution when promoting the informatization project?	4
		50	Is there a culture of information sharing through seminars or presentations within the organization?	3

Source: Authors.

5. Implications and Policy Suggestion

According to the diagnostic model of this study, as a result of diagnosing the level of informatization of public administration in Mexico, it is in the spreading stage with a minimum score of 3.1 and a maximum of 3.7 points by diagnosis area. In the vision and policy sector (3.1 points), the e-government performance evaluation item was the weakest with 1.6 points among the four diagnosis items. In the governance sector (3.1 points), the e-government evaluation system item was the weakest with 1.3 points among the three diagnosis items. In the service sector (3.1 points), the data management item was the weakest with 1.5 points among the three diagnosis items. It was derived that the feedback functions through the performance evaluation system, data standard and analysis management for the digitalization of public procurement in common in these three sectors is not established competitively.

In the IT infrastructure and technology sector (3.7 points), in the three diagnostic categories, the minimum score was 3.3 points and the maximum points were 4.7 points, and it was found that the reinforcement of services using mobile and broadband, which shows rigidity among the technology bases, is required. Utilizing the service using the device most used by the general public will be the most fundamental approach for the activation of the e-procurement system.

In the user sector (3.3 points), it was found that among the two diagnosis items, training plans and performance management for enhancing IT manpower competency were found to be the weakest. Investing in the specialization of IT manpower in the mid- to long-term is very important because it is to nurture the driving force to continuously improve e-procurement.

According to Oliver Wyman (2017), in order to successfully transform digital transformation in the public procurement sector in general, the following must be considered. 1) Develop a digital vision and culture, 2) Articulate the actions of the CPO/CDO/CIO triangle, 3) Develop new capabilities, 4) Rethink supplier relationship management, 5) Bring in big data for supplies analysis and change management, and 6) Designing and implement a systems and data integration roadmap.

When Mexico's diagnosis results are applied to the success factors of Oliver Wyman (2017), Mexico's priority is to develop the capabilities for data analysis and change management. Although Mexico has the sufficient will and coordination mechanism/ propulsion mechanism for the reform of the digitization of public procurement, it is insufficient in

data standardization, connection and sharing, which is the basis for the AI module that it is aiming for in the future. This cannot provide analytical feedback on system problems, and furthermore, it may have limitations in redesigning the roadmap through sufficient performance management.

Therefore, in order to successfully lead the digital transformation of public procurement, Mexico should consider the following improvement directions for each diagnosis sector.

- **Vision and Policy Sector**: Mexican President López Obrador's government is prioritizing the improvement of e-procurement to combat corruption and improve public administration efficiency. However, the Digital Government Act, which is the basis for promoting the digital transformation of public procurement, does not exist, and the e-procurement action plan and performance management are not connected, so it cannot be considered as having a stable and strong driving force. Therefore, it is necessary to prepare the Digital Government Act to prepare a system for e-Government implementation and performance evaluation, and to use this as a milestone to improve the e-procurement system. In addition, in order to realize the technological roadmap for improving the e-procurement system, accompanying governance, operation management, and policy issues should be drawn and reflected in the mid- to long-term basic plan and short-term action plan.

- **Governance sector**: Mexico has a coordination mechanism for business cooperation related to e-procurement, but it was found that there was a lack of linkage between modules being developed sequentially and the feedback function for e-procurement business was weak. Therefore, it is necessary to establish the evaluation standards and indicators for the e-procurement project develop an evaluation methodology according to it and make it a manual, and strengthen the feedback function to solve problems that appeared in the operation process.

- **Service sector**: In Mexico, there is no commonly applied e-government standard framework for the compatibility of e-government projects, and data standardization and linkage are lacking. This has limitations in activating the information service function of the e-procurement. For the transformation of big data and AI-based public procurement digitalization in Mexico, first, the e-government standard framework should be developed and redesigned to automate the data sharing in other public systems related to the e-procurement should be preceded.

- **IT infrastructure and technology sector**: Since the use and usefulness of the mobile and broadband exists in Mexico's IT infrastructure environment, it is necessary to activate the service channels through the mobile and broadband to expand the participation of the e-procurement users.

- **User sector**: In Mexico, although the e-procurement-related education is being conducted for general public officials and suppliers, it was found that the specialized education for IT personnel for specialization of e-procurement system is somewhat lacking. In addition, the number of suppliers participating in the e-procurement training course is small, so the technology acceptance due to the e-procurement upgrade is not achieved quickly. Therefore, Mexico should develop mid-to-long-term education plans and policy programs to enhance IT manpower's competency and activate suppliers' use of e-procurement. It is necessary to have a help desk that can provide professional counseling for the users (public officials and suppliers) to solve problems in real time, so that technology acceptance can be made quickly.

Combining the improvement directions mentioned above, policy suggestions in the aspect of organization, institutional and process, and technology are presented as follows.

1) Organizational aspect:

In the governance sector, we found the lack of linkage between PDCP modules being developed sequentially and the absence of the feedback function for the e-procurement system. To overcome this, SHCP-OM, which is in charge of e-procurement management in Mexico, should develop indicators and methodologies to evaluate the policy performance in addition to technical audits and evaluations, and form a feedback execution department that periodically evaluates the performance. Alternatively, the department in charge of the existing SHCP-OM's public procurement strategy may take the measures to enhance the feedback function and conduct the e-procurement project evaluation. In this case, Mexico will be able to define and implement a policy feedback function related to the e-procurement system within one year. These measures will lead to the expected effect that increasing the efficiency of public administration and strengthening the feedback function to solve problems that appeared in the operation process.

In the user sector, we found that the specialized education for IT personnel for the e-procurement system is lacking and the number of suppliers participating in the e-procurement training course is small, so the technology acceptance due to the of the e-procurement upgrade is not achieved quickly. We suggest making a help desk that can

provide professional counseling for upgrade users (public officials and suppliers) to solve problems for upgrade e-procurement system in real time. We recommend that SHCP-OM organize and operate a formal help desk to enable technical and procurement functional responses to upgrade e-procurement, including those who have previously worked as a help desk. These measures could be realized within one year, and users will be able to receive stable technologies according to the improvement of the e-procurement system using new technologies.

2) Institutional and process aspect:

In the vision and policy sector, we found that the Digital Government Act does not exist, and the e-procurement action plan and performance management are not connected in Mexico. The absence of a digital government law means that performance evaluation from the development plans for all e-government systems, including the e-procurement, is not systematically managed within a strong legal framework. This is also related to the weak feedback function for the e-procurement system in the governance sector. We would like to propose the following in the medium-long term: the establishment of the e-government performance management system including the e-procurement through the enactment of the Digital Government Act (long term task), and developing a performance evaluation methodology for the e-government projects including the e-procurement and making it a manual (medium term task). These measures could have the expected effects in having a stable and strong driving force for the digital transformation of public administration and strengthen the feedback functions for the e-government system including the e-procurement.

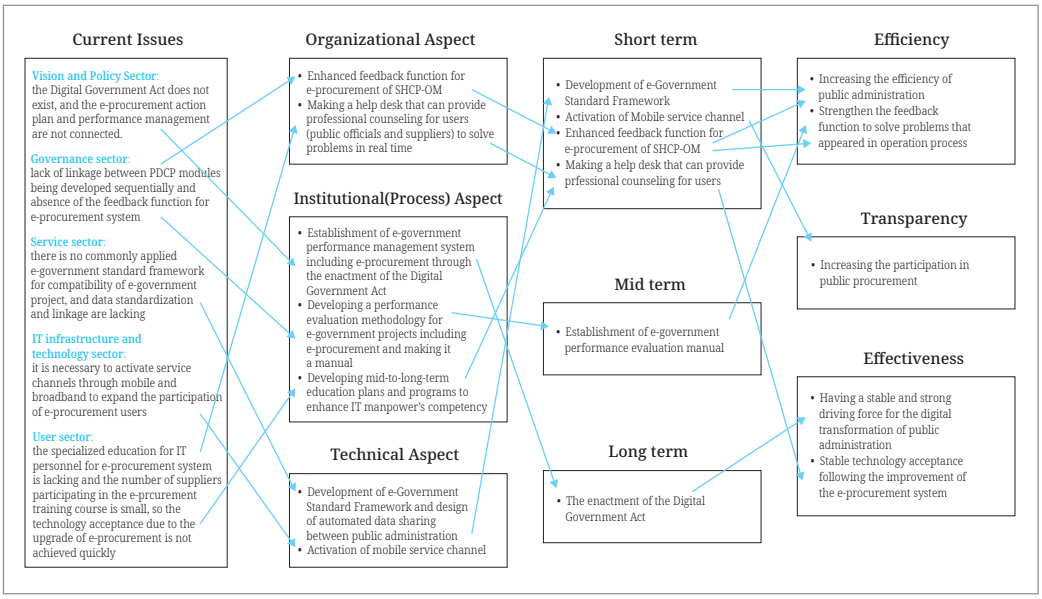
In the user sector, there have derived the needs developing mid-to-long-term education plans and programs to enhance IT manpower's competency for the e-procurement system. Currently, the IT personnel at SHCP-OM have sufficient expertise, but they need to secure the expertise in AI, block chain, and big data, which are the new technologies that will be applied in the future. SHCP-OM is inviting various external experts to participate in the e-procurement improvement project, and it is necessary to actively expand on it. However, policy guidelines are needed for the general users so that they can utilize the help desk according to the technological changes. The expected effects for these measure should have a stable and strong driving force for the digital transformation of the public procurement.

3) Technology aspect:

In the service sector, we found out that there is no commonly applied e-government standard framework for the compatibility of e-government projects, and data standardization and linkage in e-procurement are lacking. To solve these problems, we propose the development of the e-Government Standard Framework and design of the automated data sharing between the public administration information systems. In particular, the e-government standard development framework should be developed within one year and laid down so that it can be designed as an integrated digital government system including the e-procurement. These measures will ultimately have the effect of increasing the efficiency of the public administration.

In the IT infrastructure and technology sector, we found out the needs to activate the service channels through mobile and broadband to expand the participation of the e-procurement users. The reason is that in Mexico, the usage rate for wireless communication is higher than for wired communication. User-friendly services are possible only when digital services using mobile are more usefully developed. Under the premise that Mexico developed an e-government standard development framework, it is expected that more diverse mobile services will be implemented. In the case of e-procurement, this means that the public procurement participants are placed in a user-friendly service environment, and ultimately, it can have the effect of increasing the level of participation in public procurement (see Figure 1-12).

[Figure 1-12] Expected Tasks and Outputs based on Policy Recommendations



Source: Authors.

References

CEDN, Esquema de plan integral de desarrollo de la estrategia digital nacional y arminizacion de la politica tecnologica, 2019.

Gartner, 5 Levels of Digital Government Maturity, 2017.

Government of Mexico, Estrategia Nacional Digital, 2013.

NIA, A Study on Digital Maturity Model for Public Sector, 2020.

OECD, Digital Government in Chile: Strengthening the Institutional and Governance Framework, 2016

OECD, Survey on Public Procurement, 2016.

OECD, Digital Government Review of Brazil: Towards the Digital Transformation of the Public Sector, based on the OECD (forthcoming b), The Digital Government Framework, 2018.

OECD, Survey on the Implementation of the 2015 OECD Recommendations on Public Procurement, 2018.

OECD, Digital Governments in Mexico: Sustainable and Inclusive Transformation, based on OECD (forthcoming a), The digital transformation of the public sector: Helping governments respond to the needs of networked societies, 2020.

SHCP-OM, Informe Anual de Capacitación 2020, 2020.

02

CHAPTER

Comparative Analysis of the Legal and Institutional Arrangements on Digital Public Procurement

Daesik Kim (Korea Institute of Procurement)
Oliver Antonio Mayo Cruz (Legal Procurement Specialist)

Keywords
Procurement Legal System, e-Procurement Legal System, Mexican Procurement, Korean Procurement, Mexican e-Procurement, Korean e-Procurement

Comparative Analysis of the Legal and Institutional Arrangements on Digital Public Procurement

Daesik Kim (Korea Institute of Procurement)
Oliver Antonio Mayo Cruz (Legal Procurement Specialist)

Summary

The Mexican federal government is putting a particular emphasis on improving transparency in public procurement in order to achieve fair competition for the suppliers and "Value for Money" in government operations. According to Article 27 of the "Public Sector Acquisition, Lease and Service Act (Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público)" and "Public Works and Services Law (Ley de Obras Públicas y Servicios)", Federal agencies are obligated to disclose the public procurement information of the federal agencies to CompraNet, and to use CompraNet which is an electronic public information system for the public procurement.

With the reform of the "Organic Law of Federal Public Administration" in 2018, SHCP is responsible for any reference in the procurement regulations and tasks referring to the Ministry of Public Administration (Secretaría de la Función Pública, SFP) instead.

In 2019, SHCP issued an agreement with respect to the application called the "Digital Store of the Federal Government" incorporating a CompraNet Module, through which procurement procedures will be carried out by the use of electronic catalogues containing the goods or services referred to in a framework contract signed by the SHCP. Its users shall use the "Advanced Electronic Signature" issued by the Tax Administration Service. "The Federal Government Digital Store Operation Manual" was published on the CompraNet Platform Internet Portal in 2020. The purpose of the Manual is to establish the technical requirements, access, accreditation and use mechanisms of the app, as well as how the operation of the Federal Government Digital Store will be carried out.

In Korea, the contract to which the state is a party has the nature of a private law contract which is based on the regulations on contracts under the civil law. Separately, the

Act on contracts have been enacted and operated. Most of the main contents of the "Act on Contracts to which The State is a Party" are similarly stipulated with the "Act on Contracts to which a Local Government is a party" and the "Public Enterprise Act (including the implementation regulation on contract for public enterprises and quasi-governmental organizations)."

Regarding executing the public procurement contract for private schools, the provisions on contracts in Section 4 of "the Financial and Accounting Rules for Private Schools" is applied to a substantial part of the "Act on Contracts to which The State is a Party." Practically, the "Act on Contracts to which The State is a Party" can be said to be the basic law on the public procurement contract of the public institutions in Korea.

Since the introduction of the electronic procurement system in 2000, Korea enacted the "Electronic Procurement Utilization and Promotion Act" in 2013, by integrating the electronic procurement related matters scattered in 16 laws and notices. Since then the law has been revised several times as necessary, and its contents includes the designation and operation of the e-procurement support center in 2014, the mandatory use of the subcontract management system under government contracts in 2015.

The "Electronic Procurement Utilization and Promotion Act" was enacted with the aim of securing the safety, reliability and fairness of the procurement business by determining the matters necessary to electronically process the public procurement business of the end-user institution and to promote the smooth execution and promotion of the electronic public procurement business. And then it has evolved into a means of expanding the actual market by activating shopping malls to promote the purchase of the products of SMEs, the products of female owned enterprises, the products of enterprises owned by people with disabilities and technologically innovative products.

The following actions are required for the improvement measures to improve the participation and utilization of CompraNet in the future.

- Reinforcing the utilization of the electronic procurement system by integrating and connecting information such as government finance, procurement demand, and company record management.
- Collecting public procurement data and opening through the Internet to enhance the participation and utilization of market participants.
- Improving the legal system to clarify the roles and responsibilities of stakeholders.
- Legislating dispute settlement procedures for the damage relief and dispute settlement

related to the electronic procurement system.
- Maintaining the related legal basis for the expansion of fields and tasks obligated to use the electronic procurement system.

1. Introduction

This chapter provides the comparative analysis of the legal and institutional instruments on the public procurement of Mexico and Korea, in accordance with the best international practices. Especially, Mexico has been interested in the improvement participation and utilization of CompraNet. Through the Korean experience, reinforcing the utilization of the electronic procurement system by integrating and connecting information such as government finance, procurement demand, and company record management stakeholders is an important factor for the utilization of the e-Procurement System. Also, improving the legal system to clarify the roles and responsibilities of the stakeholders is needed for the utilization of the e-Procurement System.

2. Analysis of the Legal System of Public Procurement and Electronic Public Procurement in Korea and Mexico

2.1. Comparative Analysis of Public Procurement System

2.1.1. The Legal System of Public Procurement System in Mexico

The following are the major laws and regulations related to public procurement in Mexico:

- “Political Constitution of the United Mexican States (CONSTITUCIÓN POLÍTICA DE LOS ESTADOS UNIDOS MEXICANOS)”;
- “Public Sector Acquisition, Lease and Service Act (Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público)” (hereinafter referred to as public procurement law);
- “Rules on Acquisition, Lease and Service in the public sector (Reglamento de la Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público)” ;
- “Standards and policies for Acquisition, Lease, and Service (Políticas, Bases y

Lineamientos en Materia de Adquisiciones, Arrendamientos y Servicios)";

- "General management manual for Acquisition, Lease, and Service in the public sector (Manual Administrativo de Aplicación General en Materia de Adquisiciones, Arrendamientos y Servicios del Sector Público)".

The Political Constitution of the United Mexican States is our maximum order, establishes our system of government, defines the powers and functions of its institutions, provides substantive limits to its operation, and regulates relations between institutions and citizens, contain the principles and objectives of the nation. It establishes the existence of the organs of authority, their powers and limitations, as well as the rights of individuals and the ways to make them effective, contains 136 articles.

In the present case, Article 134 constitutional, establishes what the programming, planning and budgeting of public procurement in Mexico will be like. In accordance with this article, the economic resources available to the State shall be administered under the principles of efficiency, effectiveness, economy, transparency and honesty in order to meet the objectives for which they are intended. Acquisitions, leases and disposals of all types of goods, the provision of services of any nature and the procurement of works made with public resources should be generally awarded through public tendering and must assure the State of the best available conditions in terms of price, quality, financing and opportunity, among other circumstances.

The basic principles of public procurement are clearly stated in the Public Procurement law. It is estimated that the six basic principles of public procurement are used because the expression "standards of economic feasibility, effectiveness, efficiency, fairness, honesty and transparency" is used among the contents of Article 40(Exceptions to open tendering) of the Public Procurement Act.

The main bidding procedure stipulated for government procurement in Mexico is divided into open tendering (Licitación pública), selective tendering (Invitación a cuando menos tres personas) and limited tendering (Adjudicación directa).

In Mexico, open tendering is the principle but in exceptional cases selective tendering (at least 3 companies) or limited tendering are executed.

In addition, for small transactions, up to 30% of the public procurement budget allowed for institutions and organizations in each fiscal year can be implemented through selective tendering or limited tendering pursuant to Article 42 of the Public Procurement Act.

2.1.2. The History of Public Procurement System in Mexico

In 1982, article 134 of the Political Constitution of the United Mexican provided that all procurements to which the State is a party shall be subject to tendering procedures. The tender is defined as a procedure by which the selection of a more advantageous economic tender is awarded, without negotiation, on the basis of objective criteria previously brought to the knowledge of the tenderers. In order to ensure the state interest, the best available conditions in terms of price, quality, financing, opportunity and other relevant circumstances and that, by way of exception, where tendering is not appropriate, regulatory laws shall lay down the basis, procedures, rules, requirements and other elements used to establish the economy, efficiency, effectiveness, impartiality and honesty that ensure the best conditions of contract for the State.

Article 134 applies not only at the federal level, but also in states, as it lays down the principles to be observed in the acquisitions, leases and disposals of all kinds of goods, the provision of services of any kind and the procurement of works, in favor of the Federation, The States, the Municipalities, Mexico City and the political-administrative bodies of their territorial demarcation, when using resources from the federal budget. To regulate the government procurement, there are other laws that somehow influence this topic:

I. Revenue Act, regulates the calculation of annual state revenue, is issued annually in the last quarter of the previous year.

II. Fiscal Coordination Law aims to coordinate the Federation's tax system with federal entities, as well as with municipalities and territorial demarcations. It was published on December 27, 1978.

III. Planning Law aims to establish the basic rules and principles under which National Development Planning will be carried out. It was published on January 5, 1983.

IV. The Procurement, Leases and Public Sector Services Act (LAASSP)is the main legal order. It was released on January 4, 2000.

V. Federal Law on the Budget and Responsibility, regulates the programming, budgeting, approval, exercise, control and the evaluation of federal public income and egresses. It was released on March 30, 2006.

VI. The Federal Law on Economic Competition aims to promote, protect and guarantee free competition and economic competition, as well as to prevent, investigate, combat, pursue effectively, severely punish and eliminate monopolies, monopoly practices, illicit concentrations, barriers to free competition and economic competition,

and other restrictions on the efficient functioning of markets. It was released on May 24, 2014.

VII. Federal Law on Transparency and Access to Public Information Gubernamental, regulates what is necessary at the federal level to guarantee the right of access to Public Information in possession of any authority, entity, body and body of the Leguslative, Executive and Judicial powers, was published on May 9, 2016.

VIII. The Purpose of the Republican Austerity Act is to regulate and regulate austerity measures that must be observed by the exercise of federal public spending and to help ensure that available economic resources are effectively, efficiently, economically, transparencyly and honestly managed. It was released on November 19, 2019.

IX. Quality Infrastructure Act aims to establish and develop the foundations of industrial policy through standardization, accreditation, conformity assessment and metrology activities. It was published on July 1, 2020.

LAASSP is the main legal order for regulating the application of constitutional Article 134 in procurement, leasing of movable property and the provision of services of any kind. In its history since its expedition on January 4, 2000, it has had 15 modifications in total, the last of these on august 11, 2020. LAASSP also has a Regulation, which was originally published on 28 July 2010 and has had several reforms, the last of which was published on 13 November 2020.

In addition, the following Manuals have been published from LASSP and its Regulations:

I. The Administrative Manual of the General Application on Procurement, Leases and Public Sector Services aims to establish the processes and guidelines that the units and entities of the Federal Public Administration must observe in order to reduce and simplify the administrative regulation in this area, in order to efficiently take advantage and apply the resources available to those institutions. It was released on August 9, 2010.

II. The administrative Manual of the General Insight in Information and Communications Technologies and Information Security aims to issue the policies and provisions for the implementation of the National Digital Strategy, in the field of Information and Communications Technologies. It was released on May 8, 2014.

III. The Administrative Manual of General Application on Financial Resources, aims to establish general processes to guide the activities carried out in accordance with the

budget cycle and in the exercise of their powers carried out by the Management and Finance Units or their chemvalents in the units and entities of the Federal Public Administration. It was released on July 15, 2011.

IV. The Administrative Manual of the General Application on Material Resources and General Services. It was released on July 16, 2010.

In addition to the above, a number of Mandatory Enforcement Agreements and Guidelines have been published, including:

- An AGREEMENT issuing various guidelines on acquisitions, leases and services and public works and related services (DOF 09/09/2010).
- From the General Guidelines for the Issuance of Policies, Bases and Guidelines (Chapter First).
- Of the Guidelines for the Application of the Proposal Assessment Criterion through the Point or Percentage Mechanism in Procurement Procedures (Second Chapter).
- From the Guidelines for the Reduction of Compliance Amounts to Be Constituted by Suppliers and Contractors (Third Party Chapter).
- Of the Guidelines for the Use of the Modality of the Subsequent Offers of Discounts on Electronic Public Tenders (Chapter Four).
- From the Guidelines to Promote the Speeding up of Payment to the Suppliers (Chapter Five).
- Of the Guidelines for the Determination of the Prices of Services that are intended to Develop or Conclude the studies, plans and programs for the Procurement of Public Works Associated with Infrastructure Projects (Chapter Six).
- An AGREEMENT establishing the provisions to be observed for the use of the Electronic Government Public Information System called CompraNet (DOF 28/06/2011).
- An AGREEMENT issuing the protocol of action on public procurement, granting and issuing of licenses, permits, authorizations and concessions (DOF 20/08/2015).
- An AGREEMENT establishing the obligation to incorporate to CompraNet, the information regarding the planning of contracts and the performance of contracts regulated by the Law on Acquisitions, Leases and Services of Sector Público and the Law on Public Works and Related Services (DOF 05/01/2017).
- A Code of Ethics of Public Servants of the Federal Government 2019.AGREEMENT delegated to the Senior Officer the power to promote, design, develop, conclude, sign and administer framework contracts (DOF 08/07/2019).
- An AGREEMENT incorporating as a CompraNet module the application called the Digital Store of the Federal Government and issuing the general provisions governing

its operation (DOF 31/07/2019).

- An Agreement laying down various powers to the holder of the Senior Officer of the Ministry of Finance and Public Credit, in matters of consolidated purchases (DOF 11/10/2019).
- An AGREEMENT incorporating as a Purchase Module CompraNet application called Formalization of Legal Instruments and issuing the General Provisions governing their operation (DOF 18/09/2020).
- An AGREEMENT suspending the operation of the Electronic System of Government Information on Procurement, Leases, Services, Works and Related Services, called CompraNET (DOF 18/09/2020).
- GUIDELINES on the Republican Austerity of the Federal Public Administration (DOF 18/09/2020).
- GUIDELINES to coordinate and carry out consolidated procurement procedures for the acquisition or leasing of movable property or the provision of services of any nature (DOF 12/03/2020).

2.1.3. The Legal System of Public Procurement System in Korea

The following are the major laws and regulations related to public procurement in Mexico:

- “Act on Contracts to which the State is a Party”;
- “Act on Contracts to which a Local Government is a Party”;
- “Decrees on Special Cases Concerning Enforcing the Act on Contracts to which the State is a Party in Specific Procurement”;
- “Decrees on Special Cases Concerning Enforcing the Act on Contracts to which a Local Government is a Party in Specific Procurement”;
- “Established Rule, Public Notice, etc. Publicly Notified by the Minister of Economy and Finance.”

In Korea, the contract to which the state is a party has the nature of a private law contract which is based on the regulations on contracts under the civil law. Separately, the Act on contracts have been enacted and operated. Most of the main contents of the “Act on Contracts to which The State is a Party” are similarly stipulated with the “Act on Contracts to which a Local Government is a party” and the “Public Enterprise Act (including the implementation regulation on contract for public enterprises and quasi-governmental organizations)”.

After the “Act on Contracts to which The State is a Party” was enacted, the scale of government contracts has also been greatly expanded. The government contract system also frequently has been revised to respond actively and proactively to changes in the public procurement environment. In the future, the demand for greater transparency in national finances, the revision of the WTO government procurement agreement, and expansion of FTA agreements will lead to an increased demand for the improvement of the government contract system. Accordingly, it is expected that the interest and weight in the “Act on Contracts to which The State is a Party” will increase.

In addition, most of the main contents of the “Act on Contracts to which The State is a Party” are similarly stipulated with the “Act on Contracts to which a Local Government is a party” and the “Public Enterprise Act (including the implementation regulations on contract for the public enterprises and quasi-governmental organizations)” by public institutions such as public enterprises and quasi-governmental organizations. Regarding executing the public procurement contract for private schools, a substantial part of the provisions on contracts in Section 4 of the “Financial and Accounting Rules for Private Schools” (§35~§40) applies to the “Act on Contracts to which The State is a Party”. Practically, the “Act on Contracts to which The State is a Party” can be said to be the basic law on the public procurement contract of the public institutions in Korea.

Article 2(Scope of Application) of the “Act on Contracts to which The State is a Party” This Act shall apply to contracts to which the State is a party, including the government procurement contracts awarded through international tendering procedures and contracts to which a national of the Republic of Korea is the counterparty (including contracts that become sources of revenue)” is applied to both national and international tendering by stipulating.

However, the Presidential Decree and the Ministry of Strategy and Finance ordinance have enacted the application of national and international tendering separately. In other words, the Presidential Decree is a special provision of the Enforcement decree of the “Act on Contracts to which The State is a Party” and the enforcement decree of the same Act, the Ministry of Strategy and Finance ordinance is divided into the enforcement regulations of the same Act and the special enforcement regulations of the same Act. For national tendering, the enforcement decree and enforcement regulations are applied. In international tendering, the enforcement decree and enforcement regulations are basically applied, but the matters to be applied differently are stipulated in the special regulations and special rules and applied first. Special regulations and special rules were enacted based on Article 3 (2) of the Enforcement Decree of the Act on Contracts to which The State is a Party.

In order to supplement the "Act on Contracts to which The State is a Party", the Minister of Strategy and Finance establishes and operates the contract established rules, directives, and public notices (administrative rule). The contract established rules, directives, and public notices are limited to the functions of supplementing the Act on the Contracts to which The State is a Party and should not be stipulated in violation of the provisions of the same laws and regulations. If it is stipulated in violation of the provisions of the same laws and regulations, it will not be effective.

One of the systems for settling disputes against ordering institutions related to government contracts is the System for Filing Petitions. A person whose interest is prejudiced by an act conducted by the head or contracting officer of a central administrative agency in the course of handling a government procurement contract for an amount equivalent to or greater than a certain amount may file a petition for objection, seeking the revocation or rectification of such an act. Acts subject to such petitions for objection include 1) a matter regarding the scope of a government procurement contract for which international tendering is called; 2) a matter regarding qualification for participation in tendering procedures; 3) a matter regarding the public tender notice, etc.; 4) a matter regarding the determination of a successful tenderer; 5) a matter regarding the adjustment of contract prices and; 6) a matter concerning penalty for delay and the scope of the inclusion of the days delayed. A petition for objection must be filed to the head of the competent central government agency within fifteen days from the date on which the act constituting the cause of the petition was conducted or within ten days from the date on which the petitioner becomes aware that such an act was conducted (Kim, 2021).

A person who has an objection against a measure taken under a petition for objection may file a petition for review, seeking conciliation by the State Contract Disputes Conciliation Committee. The Committee may issue an order to defer the relevant tendering procedure or suspend the execution of the relevant contract until conciliation proceedings are closed if it deems it is necessary to do so, considering the opinions from the head of the competent central government agency (Kim, 2021).

<Box 2-1> Contract Established Rule

- Government Tendering and Contract execution standards
- Criteria for Safekeeping of Budget Price
- Pre-qualification for Participation in Tendering
- Evaluation and Qualification Criteria
- Criteria for determining a successful tenderer by turnkey tendering procedure
- Criteria for Execution of Contract through Negotiations
- Joint Contract operation method
- General Conditions of Contract in Construction Works
- Instructions on the Bidding for the Construction Works

Source: Authors.

2.1.4. The Comparison of Public Procurement Award System in Mexico and Korea

In Mexico, there are three types of procurement procedures agencies can use: public tender, restricted invitation, and the direct award. A public tender is the preferred method; however, there are twenty exceptions that allow for an agency to by-pass public tenders. A restricted tender is invitation-only but must include at least three bidders. A direct award is a sole-source procurement and requires the approval of a specific justification such as national security. When a single supplier does not exist that can fulfill the required needs, the procuring agency can offer a joint bid and/or split award. An agency seeking to procure a product or service will evaluate the bid on a point-based, cost-benefit, or binary criteria. Through a point-based process, every component of a bid is weighted differently (50 points in total), and the experience of a supplier is 10 percent to 15 percent of the final score. The cost-benefit evaluation monetizes the benefit of each component of the bid to enable cost-benefit scoring. The binary process is typically used for commodity purchases in which the procuring agency first determines the bids that meet all technical requirements and then automatically awards the purchase to the lowest price bid.

In Korea, public procurement contracts should be awarded based on the general competition of the bidders, regardless of the kind of goods, services, etc. which are to be procured. However, when deemed necessary in light of the purpose, nature and size of a contract, the contract may be awarded by other methods such as a competition among the bidders designated by the contracting authorities or the execution of the contract with a person designated by the contracting authorities without competition procedures. For example, when the goods to be procured are military goods manufactured or sold by a defense contractor, the relevant procurement contract may be awarded without going through the general competition procedures. Again, the detailed procedures for a specific

bidding/procurement contract are specified in the public notice for the bidding/procurement contract.

The relevant laws of Korea provide that, in order to receive the award of a contract, the bidder should satisfy one of the following criteria: 1) the bidder has the sufficient ability to perform its obligations under the contract and has offered the lowest price among bidders; 2) the bidder's tender is found to be most favorable to the contracting authority based on the selection criteria specified in the public notice for the bidding; or 3) the bidder is selected by the contracting authority based on the review of the bidders' ability to perform its obligations under contract in the order of prices offered by bidders (from low price to high price) among those bidders who submitted prices lower than the estimated price. The contracting authorities may establish additional selection criteria, which are typically specified in the public notice for the bidding.

2.2. Comparative Analysis of Electronic Public Procurement System

2.2.1. The Legal System of Electronic Public Procurement System in Mexico

The Mexican federal government is putting particular emphasis on improving transparency in public procurement in order to achieve fair competition for suppliers and "Value for Money" in government operations. Accordingly, it is mandatory to disclose the public procurement information of federal agencies to CompraNet ("Public Sector Acquisition, Lease and Service Acts" Article 27).

- Article 27 provides that public tenders may be carried out by electronic means, in accordance with the administrative provisions issued by Secretaría de Hacienda y Crédito Público (SHCP).
- SHCP, in which case the administrative unit authorized by it, shall be required to carry out all their tendering procedures by such means, except in justified cases authorized by the SHCP.
- The SHCP will operate and be responsible for the certification system of the electronic means of identification used by the units, entities or tenderers and will be responsible for exercising the control of these means, safeguarding the confidentiality of the information sent in this way.
- The SHCP may accept certification or electronic identification granted by the units and entities, federal entities, municipalities and other public sectors, as well as third parties

empowered, where the certification systems used are in line with the provisions issued by the SHCP.

- The proposals submitted must be signed autographed by the bidders or their representatives, if they are sent through the remote means of electronic communication, the means of electronic identification will be used, which will produce the same effects that the laws confer on the corresponding documents, with the same probative value.

- CompraNet is an electronic public information system for public procurement. Federal agencies specified in Article 1 of the" Public Sector Acquisition, Lease and Service Act (Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público)" (hereinafter referred to as public procurement law) and "Public Works and Services Law(Ley de Obras Públicas y Servicios)" are obligated to use CompraNet (see Table 2-1).

<Table 2-1> Government Agencies using CompraNet

Public Sector Acquisition, Lease and Service Act (Ley de Adquisiciones, Arrendamientos y Servicios del Sector Público)	Public Works and Services Law (Ley de Obras Públicas y Servicios)
Administrative agency directly under the Presidential Office	
Federal government departments and legal advisory bodies	
Federal Attorney's Office	
Affiliated institutions	
Companies and government trust companies with the government participating as major shareholders	
Federal organizations and public institutions where the federal government's finances make up all or part of the institution's budget	

Note: In Article 1 of each Act, the following organizations are specified in common.
Source: Authors.

According to the Presidential Report of Mexico for the second round of state administration (2019.9-2020.9), The Ministry of Finance implemented a system improvement project to enhance the efficiency of public procurement procedures through the use of CompraNet such as: 1) Adding an online shopping mall (Tienda Digital) module in the CompraNet system; 2) Promoting the digitalization of public procurement-related documents; and 3) Preparation of new guidelines for public officials on the use of CompraNet, etc. It was mentioned that a policy of continuous improvement will be prepared in the future.

The main changes that have been in the last 10 years to the recruitment processes are:

1. In 2010, the issuance of the Administrative Manuals of General Application, which simplified administrative regulation, homologating processes, criteria and deadlines throughout the Federal Public Administration.

2. In 2010, the publication of various criteria such as:
   a. Application of the Point and Percentage Proposal Assessment Criteria in Procurement Procedures.
   b. Reduction of Compliance Guarantee Amounts.
   c. Use of the form of the subsequent offers discounted on electronic public tenders.
   d. Streamlining payment to the suppliers.

3. In 2011, various criteria were established for the use of the CompraNet:
   a. The obligation to use in contracting processes through invitations to at least three people.
   b. Minimum technical requirements.
   c. Registration mechanisms, accreditation of buyer units, operators and administrators.
   d. Registration of the Annual Procurement Programs.
   e. Requirements for accessing suppliers and contractors.
   f. Formation of the Single Register of Suppliers.
   g. CompraNet operation.
   h. Use of Subsequent Discount Offers.

4. In 2015, a protocol of action was established in the field of public procurement and the granting of licenses, permits, authorizations and concessions, which is updated in March 2020, which aims to:
   a. Formulate a manifest of links or the relationships of business, labor, professional, personal or kinship in public procurement procedures, granting and extending licenses, permits, authorizations and concessions.
   b. Provide for the mechanisms through which individuals may make a declaration of integrity in the procedures for granting and extending.
   c. Disseminate the best practices that guide public servants on how to prevent, detect and manage the conflict of interest situations that may arise in public procurement procedures.

5. In 2017, an obligation was established to incorporate to CompraNet, information on procurement planning, and contract execution.

6. In 2018, the Organic Law of the Federal Public Administration was amended, anticipating that the functions related to the Government Procurement would move from the Secretariat of the Civil Service, to the Senior Officer of the Ministry of Finance and Public Credit.

7. In 2019, the Code of Ethics of Public Servants of the Federal Government was published.

8. In July 2019, an Agreement is issued laying down the various powers to the holder of the SHCP Senior Officer's Officer on consolidated purchases.

9. In September 2019, an Agreement incorporating a CompraNet Module, the application called the Formalization of Legal Instruments, is published, through which contracts are signed to suppliers and contractors, through the advanced electronic signature issued by the SAT.

10. In September 2019, an Agreement is published incorporating as a CompraNet module the application called the Digital Store of the Federal Government and issuing the general provisions governing its operation.
    a. This system provides for the procurement procedure using electronic catalogues containing the goods or services subject to a framework contract concluded with the SHCP, is generally enforceable.

11. In September 2019, the SHCP Senior Officer issued Guidelines for the Administration of the Framework Contracts.

12. In February 2021, the SHCP Senior Officer issued a Guide to the Development of Market Research that would prove better conditions to those agreed in the framework contracts.

13. In March 2021, guidelines are published to coordinate and carry out the consolidated procurement procedures for the acquisition or leasing of movable property or the provision of services of any kind, are intended to establish the guidelines to be observed for carrying out consolidated procurement procedures for the acquisition or lease of goods and services of widespread or sectorized use in the Federal Public

Administration, in order to obtain the best conditions in terms of price, quality and opportunity.

In 2018, the Organic Law of the Federal Public Administration was reformed, anticipating new powers for the Ministry of Finance and Public Credit (SHCP) in the field of public procurement:

- Plan, establish and conduct the general policy on government procurement regulated by the Procurement, Leases and Services Act of the Public Sector and the Law on Public Works and Related Services, promoting the best conditions of contracting in accordance with the principles of efficiency, efficiency, economy, transparency, impartiality and honesty; issue and interpret the standards, guidelines, manuals, procedures and other similar instruments required in such matters; promote the approval of public procurement policies, standards and criteria;
- To serve as a consolidating area of the procedures for the purchase of goods and procurement of services determined by the Secretariat itself;
- Establish rules and guidelines on budgetary control; as well as exercising the budgetary control of consolidated public procurement through the Senior Officer's Officer;
- Participate in international trade negotiations related to the public sector procurement chapters and coordinate the strategic procurement of the public sector that generate benefits to the country; develop provisions that promote the participation of the national supply in purchases in this sector, as well as advise the units and entities of the Federal Public Administration on compliance with the regulations in this area.

In accordance with SHCP new powers as of November 2018, and in accordance with article 56 of the Procurement, Leasing and Public Sector Services Act, it is responsible for the administration of the electronic system of government public information on procurement, leases and services. This system will have the following purposes:

1. Contribute to the generation of a general policy in the Federal Public Administration on procurement;
2. Promote the transparency and monitoring of the public sector procurement, leases and services; and
3. Generate the necessary information that allows the proper planning, programming and budgeting of public procurement, as well as its comprehensive evaluation.

This system shall contain at least the following information, which must be verified to be up-to-date at least every three months:

a) Annual procurement, leasing and services programs of the units and entities;
b) The single registration of suppliers;
c) Information derived from the procurement procedures, in the terms of this Law;
d) Notifications and notices relating to procurement procedures and the instance of non-conformities;
e) The data and contracts signed, referred to in Article 7(XIII) of the Federal Law on Transparency and Access to Government Public Information;
f) The registration of sanctioned suppliers, and
g) The resolutions of the nonconformance instance that have caused a state.

The units and entities shall keep in an orderly and systematic manner all documentation and electronic information verifying the facts and contracts of that order for at least a period of three years, contracted from the date of its receipt; except accounting documentation, in which case it will be provided for by the applicable provisions.

With respect to the Digital Store of the Federal Government, the SHCP issued an Agreement on 18 July 2019, incorporating a CompraNet Module, the application called the "Digital Store of the Federal Government", through which procurement procedures will be carried out through the use of electronic catalogues containing the goods or services referred to in a framework contract signed by the SHCP.

This Agreement is the mandatory enforcement for the units and entities of the Federal Public Administration, who must carry out through the "Digital Store of the Federal Government" their procurement procedures and the conclusion of the specific contracts resulting thereof, using section 41 fraction XX of the Law on Procurement, Leases and Services of the Public Sector , as indicated in the framework contracts concluded by the SHCP, as well as for domestic or foreign physical or moral persons interested in the concluded framework contracts.

The SHCP may determine cases in which it is not feasible to use the Federal Government Digital Store in the procurement procedures under a framework contract, for which it will be associated in the relevant framework contract, the form and means through which the respective procedures will be carried out.

Public servants, national physical or moral persons interested in forming part of a framework contract, as well as the possible national suppliers who have concluded a framework contract, shall use as an electronic means of identification the "Advanced Electronic Signature" issued by the Tax Administration Service, in terms of the Advanced Electronic Signature Act.

The "Federal Government Digital Store" must be compatible with the other modules that make up CompraNet, in order for the procurement procedures to be carried out through this application. For this purpose, the SHCP Senior Officer will be empowered to conclude the collaboration agreements required for the interoperability and exchange of information with the electronic systems of other units and entities of the Federal Public Administration or public bodies from other areas of government. The Senior Officer will issue the Operation Manual of the Federal Government's Digital Store, which requires technical requirements; the mechanisms of access, accreditation and the use of the application, as well as the way in which the operation of the application will be carried out, ensuring the inalterability and conservation of the information.

The Senior Officer of the SHCP through the Public Procurement Standards Unit is the empowered instance to interpret the Agreement administratively, as well as resolve the issues not provided for therein, for which it may rely on the other administrative units of the SHCP.

The Federal Government's Digital Store Operation Manual was published on the CompraNet Platform Internet Portal from July 31, 2019, the purpose of the Manual is to establish the technical requirements, access, accreditation and use mechanisms of the app, as well as how the operation of the Federal Government Digital Store will be carried out, therefore, the unalterability and retention of the information contained therein will be guaranteed.

Through the above-mentioned Operation Manual, you are granted attribution to the SHCP Senior Officer's Officer to:

1. Assignment within the Digital Store.
2. Designate a public server for the administration of the Framework Agreement.
   a. You must generate the Framework Contract Data Sheet, discharge potential suppliers and requesting Units that intended to make use of the Framework Agreement.
3. Designate a public server for system administration.

4. Designate a public server for planning with the minimum level of the Director, in charge of conducting market research and evaluating the framework contracts.
   a. You must generate and manage a Classifier of goods or services
5. Provide training in the Electronic Government Public Information System training module.

2.2.2. Early The Legal System of Electronic Public Procurement System in Korea

In the process of developing the electronic tendering system, the newly institutionalized regulations are the terms and conditions for electronic tendering bidders (2000.9.19.), the terms and conditions for electronic tendering bid execution officials (November 13, 2000), the Special instructions on the electronic tendering for the Construction Works, and the Special instructions on the electronic tendering for the goods purchasing (October 10, 2000), etc (Public Procurement Service, 2008).

The terms and conditions for electronic tendering bidders are intended to solidify the rights and obligations relationship between the Public Procurement Service and the participants in tendering(supplier) for the participation and use of electronic tendering prior to the commencement of registration. The terms and conditions for the use of the bidding execution officials confirm the rights and obligations relations and usage guidelines between the public institutions that use the electronic tendering system publicly and the Public Procurement Service, which is the system operator. In addition, an agreement process is taken in the process of registering as a bidding execution officials by the public institution's officer.

The registration of public institutions began after November 2000 when the system was opened. The Special instructions on the electronic tendering for the construction works and the goods purchasing was established prior to the official mock tendering and contain the contents peculiar to the electronic tendering among the tendering related regulations.

All of the above regulations are intertwined with the system development process and are complementary. In other words, it was completed by reflecting the problems derived in the process of the regulation to the system and reflecting the results of the system development to the regulations.

3. Introduction of Electronic Public Procurement Law in Korea

3.1. History of Electronic Public Procurement Legal System in Korea

Although the contract affairs for public institutions were converted from written contracts to electronic contracts, matters related to electronic procurement were scattered in 16 law and regulations and public notices including the Act on Contracts to which The State is a Party and the Government Procurement Act, etc. Accordingly, the enactment of the "Electronic Procurement Utilization and Promotion Act" was promoted from the end of 2010 in order to enhance the reliability of the electronic procurement.

The Electronic Procurement Utilization and Promotion Act specifically stipulates when the electronic documents are transmitted and received through the Korea On-line E-Procurement System(KONEPS) and when the electronic contracts become effective. Hereby, the safety and reliability of the electronic procurement system has been reinforced and the punishment regulations for the obstruction of work have been established. This was to prevent illegal electronic tendering. In addition, the Electronic Procurement Utilization and Promotion Act laid the institutional foundation for promoting international cooperation in e-procurement affairs and the export of KONEPS abroad and the legal basis for the private use of KONEPS.

In 2012, a bill was submitted to the National Assembly and the "Electronic Procurement Utilization and Promotion Act" was enacted on March 22, 2013. Since then, the enactment and revision of the "Enforcement Decrees, Enforcement Rules, and KONEPS" related the directives and public notices have also been made. As a follow-up measure following the enactment of the "Electronic Procurement Utilization and Promotion Act", regulations related to the "designation and operation of electronic procurement support centers" have been prepared to designate the reliable professional organizations that enable the stable operation and technical support of KONEPS.

In 2015, a partial amendment was made to include an electronic procurement system or a system operated by the head of end-user institution electronically for subcontract management in case of the electronic processing of matters related to subcontracting (Law No. 13626).

The revision was made once in 2018. And the contents are as follows.

<Box 2-2> Reasons for Revision and Main Contents in 2018

The government has established and operated KONEPS, which can be used jointly by state agencies, local governments, and public institutions in order to digitize public procurement work. As of 2016, 23 public institutions are building and operating their own electronic procurement system separate from KONEPS.

However, despite having similar characteristics to KONEPS in public terms, its own electronic procurement system is individually managed, resulting in inefficiency due to the overlapping expenditure of the system maintenance and management costs. Accordingly, there is an inconvenience of having to register and bid duplicated in each institutional electronic procurement system except for KONEPS in the case of the suppliers in order to tendering and being awarded in the public sector.

Accordingly, new electronic procurement systems can be established and operated only when the requirements prescribed by the Presidential Decree are met. For institutions that have already established their own electronic procurement system, they tried to secure the efficiency of the procurement work by preparing a legal basis for conversion to KONEPS.

Source: PPS (2018).

The revision was made once in 2019. And the contents are as follows.

<Box 2-3> Reasons for Revision and Main Contents in 2019

It is compulsory to use an electronic procurement system that the head of end-user institution establishes or operates for electronic subcontract management for matters concerning the request and payment of contract payments prescribed by Presidential Decree in order to prevent the problems such as a delay in the payment of wages or the non-payment of subcontracting payments.

Source: PPS (2018).

3.2. Electronic Public Procurement Law in Korea

The Electronic Procurement Utilization and Promotion Act was enacted with the aim of securing the safety, reliability and fairness of the procurement business by determining the matters necessary to electronically process the public procurement business of the end-user institution and to promote the smooth execution and promotion of the electronic public procurement business. It is composed of a total of 7 chapters.

The “Electronic Procurement Utilization and Promotion Act” is interesting that Article 1 of the Act mentions only the three objectives of e-procurement: i) security, ii) reliability, and iii) fairness, although there are many other objectives of public procurement, such as value

for money, competition, customer satisfaction, transparency, efficiency, to name a few. This article clearly shows the focus of this Act. There were vendors who illegally borrowed other vendor's PKI certification, and the hacking of KONEPS was also a problem. In this context, enhancing the security, reliability, and fairness of the e-procurement were priorities of this Act. Furthermore, the facilitation of e- procurement is also another important purpose (Kim, 2019).

Chapter 1 is a general provision that stipulates the purpose of the Act, the definition of terms, the scope of the Act and the relationship with other Acts, etc.

Chapter 2 stipulates the electronic processing of public procurement work. Therefore, the entire process of public procurement such as bidding notice, executing contract, and subcontract management was stipulated to be processed electronically. In addition, since the arrival of electronic documents and the time of entry into force are explicitly stipulated, it is intended to prevent the possible disputes and to secure the stability and reliability of transactions.

Chapter 3 stipulates the operation and management of the electronic public procurement system. For the electronic processing of public procurement work, an electronic public procurement system is established and operated. New electronic public procurement systems can be established and operated only when the requirements prescribed by the Presidential Decree are met (Article 14). In addition, besides demanding institutions, the private sector is also making it possible to procure goods through the electronic public procurement system (Article 15).

Chapter 4 stipulates the management of the contract-related information, protection of the personal information of electronic public procurement users, and business secrets, etc. It stipulates the prohibition of interfering with the electronic public procurement business through fraudulent methods such as the forgery of information related to the electronic public procurement system or the transfer or rental of identity verification certificates.

Chapter 5 stipulates the designation of the electronic public procurement support centers and international cooperation through education and training on electronic public procurement, the overseas export of electronic public procurement systems, etc.

Chapter 6 stipulates the usage fee of the electronic public procurement system and the payment of rewards for reporting illegal electronic public procurement activities. Chapter 7 stipulates the penalties for the violations of matters stipulated in the Electronic Procurement Utilization and Promotion Act.

3.3. Contents of Electronic Public Procurement Law in Korea

The timing of the transmission and reception of KONEPS of the electronic document is legally important as the criterion for the validity or invalidity of the bidding when the bidding process is processed by electronic documents and a specific Bid deadline is generally set.

Article 11 (2) of the Korean Electronic Procurement Utilization and Promotion Act stipulates “An electronic document shall be deemed to be transmitted or received at the time it is entered into the Electronic Procurement System: Provided, that a bidding document submitted by an electronic procurement user may be deemed to be received when it is presented to the licensed certification authority in accordance with Article 18 of the Digital Signature Act, if it is impossible to ascertain the time when the document is entered into the Electronic Procurement System”, in the event of a dispute regarding the timing of transmission and receipt application for bid participation, the criteria for judgment are presented.

According to the Electronic Procurement Utilization and Promotion Act, electronic documents entered into computer equipment other than the electronic procurement system are deemed to have not been received regardless of whether they were printed or not. It is stipulated that the electronic documents entered into the electronic procurement system are regarded as being transmitted regardless of the intention of the sender. Unless otherwise determined by the head of the end-user institution or the contract officer, related disputes are prevented by requesting the notification of receipt of the electronic documents or placing conditions on the effect.

In relation to KONEPS, Korea is strengthening the personal information protection and information security management system. Since 2011, KONEPS has been reinforcing the efforts to prevent the leakage or infringement of personal information such as employee information of the participants in bidding managed by KONEPS by applying a certified electronic signature and a nationally certified encryption algorithm.

In other words, KONEPS which handles tendering and contract work through an electronic system has contributed to dramatically improving the convenience and efficiency of the public procurement administration. However, countermeasures were required as cases of illegal electronic tendering through the public certificate rental occurred by exploiting the merits of non-face-to-face online electronic tendering through the certificate login method.

Illegal electronic tendering can harm the public tendering order, lowering the credibility of KONEPS and resulting in the waste of the national budget. For this reason, the introduction of the "fingerprint recognition electronic tendering system" was promoted as a measure to fundamentally block illegal electronic tendering through the rental of certified certificates and establish a fair tendering order.

The purpose of the fingerprint recognition system was to fundamentally block illegal tendering through certificate rental by verifying the identity of the bidder using personal biometric information. Since July 2010, an authentication system through fingerprint recognition has been applied to all bids executed by KONEPS.

In particular, important tendering activities (the Bid, Safekeeping of Budget Price, etc.) were not handled by the user PC vulnerable to hacking from October 2013. Instead, a system that handles the important tendering activities was built in a virtualized server, a security safe zone built by the Public Procurement Service. Hereby, overall operation and management of security and the computing equipment were carried out. On the other hand, a constant information monitoring system through an integrated log analysis system was implemented such as managing all the history of the actions such as DB access for internal employees and consignment companies. On the other hand, through the integrated log analysis system, a constant information monitoring system was implemented to manage all the history of actions such as DB access for internal employees and consignment companies.

In February 2018, a tendering support service company was investigated by the police on charges of hacking the PC of individual users who use KONEPS to secretly collect and sell the bidding participant information and earn billions of unfair profits by selling it. The illegal offenders sold and distributed the 'bidding evaluation and qualification automatic calculation program' with malicious codes embedded in local governments nationwide. Through the program, a number of related information such as the management status and credit rating of the construction companies participating in the tendering were illegally collected and used for tendering.

Key information about the possibility of the infringement of various personal information on KONEPS was encrypted. In addition, KONEPS controls mass inquiries and the downloads of personal information by internal and external system operators and responds by introducing a function to prevent the automatic extraction of personal information.

3.4. Implication of Electronic Public Procurement Legal System Development in Korea

One of the characteristics of Korea's electronic tendering system development process was that it promoted not only the system development but also the improvement of the related laws and systems. Although the development of the electronic tendering system was basically done in the direction of the 100% acceptance of the current business processing procedures and systems, the partial system was required to be created newly so what it was necessary in two aspects.

One was the case that there was no existing system, so it was necessary to newly define it. And the other was the regulations as a safety device to prevent disputes in advance and to secure legal stability due to the nature of the tendering business.

In the former case, it includes stipulating the procedures for the confirmation and timing of the transmission and reception of the electronic documents and clarifying the validity and limits of the liability of the electronic document in accordance with the Framework Act on Electronic Documents and Transactions and the Digital Signature Act. And in the latter case, the regulations related to the handling of system failures and the regulations on how to declare the being awarded for electronic tendering are representative examples.

All of the above regulations in KOREA are intertwined with the system development process and are complementary. In other words, it was completed by reflecting the problems derived in the process of the regulation to the system and reflecting the results of the system development to the regulations for KONEPS.

One of the characteristics of the laws and regulations is that they must constantly be revised to reflect the changes in a nation's economic, social, cultural and political situation. As such, there are significant limitations related to establishing the laws and regulations in all areas. It is important to establish the goals and directions within a practicable range.

One characteristic of the establishment of laws and regulations related to the e-procurement is that they can be changed according to the implementation phase of the e-procurement. Therefore, the laws and regulations must be established within the range of e-procurement to be performed.

When the laws and regulations are revised, they should include the general rules, the digitalization of the procurement tasks, the management and objectives of the e-procurement, security and protection, promotion and penalties regarding user information.

4. The Role of Electronic Public Procurement System in Centralized Procurement and Decentralized Procurement

4.1. Advantages and Disadvantages of Centralized Procurement and Decentralized Procurement

Public procurement systems can be largely divided into the centralized procurement and decentralized procurement systems. The centralized procurement system has the following advantages.

First, if the purchase quantity is concentrated and lump-sum purchasing are made, price discounts due to competition are possible. In addition, since it is possible to purchase when the price is relatively low by using the periodic fluctuations in the market, the cost paid per product can be reduced.

Second, the efficiency of the public procurement administration can be improved through the standardization for goods mainly used by public institutions. In addition, it is possible to reduce the risk of corruption by facilitating control over purchasing operations that are highly probable for irregularities caused by a moral hazard.

Third, it is possible to efficiently collect and manage the product market information and related market information and specialize in purchasing an administration such as developing contract techniques and resolving claims.

Fourth, it can be used as a means of supporting government policies such as the supply and demand control of the goods and price stabilization through the concentrated government purchasing rights.

Fifth, research and development on procurement techniques and contract systems can be encouraged while protecting and fostering SMEs and domestic industries through centralized procurement. In addition, it is possible to establish production plans by companies by presenting the preliminary examples of contract processing standards and consistent purchasing standards by establishing and promulgating short and long-term public procurement plans. And it can directly or indirectly support job stabilization and productivity improvement. Accordingly, SMEs can participate in the public procurement market even if they do not have a nationwide sales network. In addition, items with frequent demands are contracted lump-sum by a centralized procurement agency and supplied

immediately whenever necessary. This is regarded as a great advantage of centralized procurement as it can reduce the waste of manpower by avoiding the duplication of work for each end-user institution.

However, the centralized procurement system has not only these advantages and pure functions but also disadvantages.

First, it may lead to the bureaucratization of public procurement administration, resulting in a lack of elasticity due to formalism and there is a possibility of deteriorating the diversity and quality of products due to standardization.

Second, it is difficult to meet the time of purchase because it has to go through a certain purchasing stage according to the public procurement regulations which can lead to disruptions to public projects.

Third, if the end-user institutions want to purchase at a low price by purchasing a large amount at a time, there is a possibility that it is concentrated on large companies.

The reason why the centralized procurement system is difficult to satisfy the end-user institutions is that government procurement differs from private sector purchases. In other words, according to the “Act on Contracts to which The State is a Party” and “Government Procurement Agreements”, the general competitive bidding method has to be adopted in principle so that anyone with qualifications and competence can access the government procurement market easily. In addition, since the basic spirit of centralized procurement aims at low cost and high efficiency for “improving the efficiency of budget execution”, there is an inherent limitation in that it is not possible to purchase and supply only high-priced and specific products favored by the end-user institutions. In addition, there is a limitation in that it is difficult to meet the needs of the end-user institutions that prefer the products of large companies because it is necessary to support the specific execution of government policies such as the preferential purchase of SME products.

In the case of a decentralized procurement system, these are the following advantages (see Table 2-2).

First, it has the advantage that it is possible to purchase independently according to the purpose of demand and in case of urgent demand, it is advantageous for timely public procurement and it is possible to expedite the purchase procedures. Second, it has the advantage that it is possible to purchase goods according to the special specifications and

that the local industry-oriented purchases are possible. Third, the low possibility of the expansion of formalism is also considered an advantage of the decentralized procurement.

However, the decentralized procurement system has not only these advantages and pure functions but also disadvantages. First, there may be problems such as an excessive cost compared to a lump-sum purchase. Second, there is a possibility that the standardization of the specification or quality assurance may be difficult. Third, there is a possibility that the public procurement contracts will be allocated according to political preferences. Fourth, administrative control over a moral hazard is not easy.

<Table 2-2> Comparison of the Characteristics of Centralized Procurement and Decentralized Procurement

Part	Centralized Procurement	Decentralized Procurement
Significance	The centralized procurement organization collectively purchases goods and services necessary for the performance of public institutions' work and supplies them to end-user institutions.	Individual and direct purchase of resources required by each public institution.
Country	Korea, USA, Canada, UK, etc.	Australia, New Zealand, Japan, etc.
Advantages	• Increased purchasing bargaining power and price discounts by inducing competition among suppliers. • Reduced indirect costs by reducing the number of purchases and achieving the economies of scale. • It is possible to reduce payment costs per product by stockpiling and supplying in consideration of the fluctuations in supply and demand in the market. • To improve the efficiency of public procurement administration through standardization. • Easy to control purchasing work, minimizing the possibility of illegal activities. • Reduce market research and management costs through the efficient collection and management of market information. • Easy to specialize in purchasing administration such as the R&D of the contract system and the settlement of claims.	• Easy to execute flexible and immediate public procurement. • Ease of the practical purchase administration • Easy to carry out public procurement in accordance with the characteristics of the end-user institution. • Promote product diversity. • Advantageous for small purchases and easy to achieve inventory reduction. • Easy to simplify the steps and the procedures of public procurement. • Advantageous for fostering local industries and local SMEs.

<Table 2-2> Continued

Part	Centralized Procurement	Decentralized Procurement
Advantages	• Facilitating government policy support through functions such as controlling the supply and demand of goods, stabilizing prices and controlling liquidity in the market. • Advantageous policy protection and the fostering of SMEs and domestic industries. • Aggregate demand plan establishment enables companies to plan production and inventory.	
Disadvantages	• Complicated purchase process: Legislation of all processes hinders business flexibility due to complex procedures. • Bureaucratization of public procurement work: Proliferation of formalism due to business standards, decrease in product diversity. • Difficulty of special purchase: Difficulty purchasing flexibly for special specifications. • Inadequate time to purchase: There is a high possibility of delay in the purchase timing because it has to go through the purchasing stage determined by complex public procurement regulations. • Concentrating on large companies: Advantageous for mass production and for large companies that can compete in price.	• Low benefits of economies of scale and price discounts. • Competitiveness is weakened due to excessive protection of local companies. • High possibility of corruption due to the links with specific companies. • Duplicate purchase work occurs for each institution. • Lack of purchasing works expertise.

Source: Lew (2005).

In reality, each country operates a government procurement system in the form that suits each characteristic due to the diversity of history, culture and legal systems rather than choosing either the system based on the advantages and disadvantages of the system. In other words, centralized countries that emphasize the efficient execution of budgets generally adopt a centralized procurement system and the decentralized countries generally adopt a decentralized procurement system.

Ultimately, the public procurement system of the public institutions is based on the principle of a market economy that seeks to obtain the best value with the smallest amount of money. Rather than choosing either system, it is necessary to maximize the merits by properly combining the two systems.

Therefore, even major advanced countries with centralized procurement agencies are operating government procurement systems in such a way to maximize the merits of centralized procurement and decentralized procurement.

4.2. Current Status of Central/Decentral Mixed Procurement in Korea

Korea has basically operated a centralized procurement system. However, centralized procurement and decentralized procurement are simultaneously operated as the local autonomy requires the decentralization of procurement administration.

In other words, the centralized procurement is requested by the Public Procurement Service for more than a certain amount in the case of state agencies and public procurement can be requested by self-procurement or the centralized procurement in the case of local governments or public enterprises.

Korea's centralized procurement system has a relatively wide range of handling and a fairly direct level of involvement compared to other centralized countries. However, the centralize procurement method in Korea has been relatively relaxed in the quality management sector.

It cannot be determined which of the centralized procurement method or the decentralized procurement method is better. The reason is that it has been institutionalized for a long time according to the territory, climate, political and socio-cultural environment and the economic structure of the country. When considering public procurement reform, some necessary factors are benchmarked and the system is accepted according to the national and international situation and the environment of the country. A few countries have only one element of a public procurement system.

The implementation of decentralization, customer-centered demand for innovation in public procurement services, a national IT policy, the opening of the government procurement market by joining the WTO GPA in 1993 and the emergence of e-government were the backgrounds for the promotion of informatization that changed the offline procurement administration to an online procurement administration. In particular, the decentralization of the local governments strengthened the autonomy of local governments, leading to an increase in decentralized purchasing.

Accordingly, even local governments which had a somewhat insufficient procurement capability were able to proceed with the decentralized procurement while securing public procurement information transparency and accessibility by implementing a public procurement information system. It is intended to strengthen the efficiency and accountability of public procurement by having local governments in charge of contract affairs according to the regional characteristics.

However, this expansion of decentralized procurement is also a part of the concern about another side effect due to the immature public procurement capacity and conditions of the end-user institution. <Table 2-3> summarizes comparison of procurement system between Korea and Mexico.

<Table 2-3> Comparison of Procurement System in Korea and Mexico

Country	Procurement System	Special E-Procurement Law	Independent Public Procurement Agency
Korea	Centralized Procurement	O	O
Mexico	Decentralized Procurement	X	X

Source: Authors.

4.3. Experience of Expanding the Mandatory Use of Electronic Public Procurement Systems in Korea

In the case of Korea, it is based on Article 44 of the "Act on the Management of Public Institution" in relation to the mandatory purchase consignment of the Public Procurement Service. Public enterprises and quasi-governmental organizations are responsible for purchasing competing products among SMEs pursuant to Article 6 of the "Act on the Facilitation of the Purchase of Small and Medium Enterprise-Manufactured Products and Support for the Development of their Markets" in Article 4 Paragraph 1 of the "Act on Contracts to which The State". Pursuant to the above, it stipulates that the purchase must be entrusted to the Public Procurement Service or purchased according to the contract method pursuant to Article 5 of the "Government Procurement Act" in the case of purchasing more than the amount notified by the Minister of Strategy and Finance.

The designation system for the competing products among SMEs means that the Minister of SMEs and Startups designates the product in order to expand the market for products directly produced and provided by SMEs and requires public procurement contracts through 'limited competition between the SMEs'. As described above, it is obligatory to make a consignment purchase through the Public Procurement Service when the competing products among SMEs is purchased more than the amount notified by the Minister of Strategy and Finance except in exceptional cases.

However, the direct purchase is possible in the following cases pursuant to Article 7-2 of "the Implementation Regulation on the Contract for Public Enterprises and Quasi-Governmental Organizations":

1) urgent purchase to achieve the purpose of the contract;
2) when it is necessary to select and purchase products in advance by reflecting the design contests and preference survey results, etc; and
3) when it is appropriate to purchase directly to support the unique business of each institution as a product related to the service business such as software development.

In particular, direct purchase is possible even in the following cases:

When the Administrator of the Public Procurement Service acknowledges that it is necessary to purchase directly from the relevant institution to secure purchasing expertise and quality as core equipment or it is possible to purchase directly even if the Administrator of the Public Procurement Service acknowledges that it is appropriate to purchase directly from a public enterprises or quasi-governmental agency in consideration of the specificity, expertise, safety and purchase timing of the product. In this case, the head of the agency or contract officer shall submit an application stating the product name, specification, quantity, estimated price, time of demand, and necessity for the direct purchase of the product to the Public Procurement Service in advance.

As follows, the matters related to the mandatory purchase through the Public Procurement Service in the Government Procurement Act and the Enforcement Decree of the Government Procurement Act are indicated.

Article 11(Request for Entering into Contract) ① Where the value of money requested for a contract, the nature of a contract, and any other matters comply with the standards prescribed by Presidential Decree, in entering into a contract pertaining to commodities in demand or construction, the head of each end-user institution shall request for entering into a contract to the Administrator of the Public Procurement Service: Provided, that the foregoing shall not apply to cases specified by Presidential Decree for which it is impracticable to request to execute a contract due to a natural disaster or other force majeure event or cases for which it is inappropriate to request to execute a contract for national defense or the protection of State secrets or due to a disaster, emergency relief, or the special features of technology.

② The head of each end-user institution may request, to the Administrator of the Public Procurement Service, for entering into a contract for the purchase of commodities in demand and construction even in cases not falling under paragraph (1).

③ Where the Administrator of the Public Procurement Service is requested to enter into a contract under paragraphs (1) and (2), he/she shall determine a contracting method and others in consultation with the end-user institution, according to the statutes that the end-user institution shall apply with respect to the conclusion of a contact: Provided, that consultation may be omitted if deemed unnecessary for the purpose or nature of the contract.

④ The Administrator of the Public Procurement Service may direct the end-user institution to enter into a contract if consultations under the main sentence of paragraph (3) are not reached.

Below are related provisions in the Enforcement Decree of the Government Procurement Act:

Article 11(Request, etc., for Entering into a Contract) ① "Standards prescribed by Presidential Decree" in the main sentence of Article 11 (1) of the Act means any of the following:

1. In cases of a contract by which a State agency purchases commodities in demand, the estimated amount referred to in subparagraph 1 of Article 2 of the Enforcement Decree of the Act on Contracts to which The State is a Party, shall exceed 100 million won (in cases of foreign made commodities, 200 thousand US dollars);

2. Commodities in demand that a State agency or a local government intends to purchase, shall be commodities in demand, for which the Administer of the Public Procurement Service has entered into any of the following contracts:

a. A unit price contract for a third party;
b. A contract with multiple suppliers;
c. A unit price contract pursuant to Article 22 of the Act on Contracts to which The State is a Party;

3. In cases of a contract for the construction works of a State agency, the estimated price referred to in subparagraph 1 of Article 2 of the Enforcement Decree of the Act on Contracts to which The State is a Party, shall exceed three billion won (in cases of specialized works, electrical works, information and communications works, and fire-fighting system installation works, 300 million won);

4. The second contract and subsequent contracts in cases of a long-term continuing contract made by the Administrator of the Public Procurement Service for commodities in demand or a construction project according to the request from the head of the end-user institution;

5. Commodities, the purchase of which shall be requested to the Administrator of the Public Procurement Service or construction projects on which the conclusion of a contract shall be entrusted to the Administrator of the Public Procurement Service, under any other statute.

② "Cases prescribed by Presidential Decree" in the proviso to Article 11 (1) of the Act mean any of the following cases:

1. A natural disaster, urgent event, or other cases where there are reasons corresponding thereto;

2. Cases related to national defense or cases where any acts of a State agency shall be done secretly;

3. Cases where the emergency restoration works are carried out due to a disaster or accident;

4. Cases where the head of an end-user institution has consulted with the Administrator of the Public Procurement Service in advance, as special works deemed that the head of an end-user institution is required to enter into a contract for works directly, when considering the special characteristics of technology required for construction, supervision, the repair of defects, etc.;

5. Cases where the Administrator of the Public Procurement Service delegates the purchase of commodities in demand to an end-user institution, as prescribed by the Ordinance of the Ministry of Strategy and Finance;

③ The head of an end-user institution shall submit a plan for the execution of works he/she is to request the Administrator of the Public Procurement Service to enter into a contract in the relevant fiscal year among works under his/her jurisdiction to the Administrator of the Public Procurement Service by January 20 each year, as prescribed by Ordinance of the Ministry of Strategy and Finance: Provided, that with regard to a project for which he/she shall formulate a plan for execution for each project separately,

because the budget is compiled in full, he/she shall submit a plan for execution within 20 days after determining a plan of execution of each project.

④ If deemed necessary, the Administrator of the Public Procurement Service may determine and execute the detailed standards for procedures and the post-management of contracts related to commodities in demand and construction works.

An example of the experience of expanding the mandatory use of the Korean electronic procurement system is the national subsidy system. Based on the "Subsidy Management ACT", the national subsidy is a system in which the state creates and distributes financial aid to provide financial assistance for work or projects conducted by persons other than the state.

According to the "Guidelines for the Operation and Management of National Subsidies" announced in July 2016, It is stipulated that a private subsidy program operator must entrust a contract with the Administrator of the Public Procurement Service or a local government to sign a contract or use the KONEPS to sign a contract when a contract to purchase goods and services exceeding 50 million won or the construction works contract exceeding 200 million won is signed.

In addition, the government contract subcontract management system is an additional example of the experience of expanding the mandatory use of the Korean electronic procurement system.

Laws such as the "Fair Transaction in the Subcontracting Act", "Framework Act on the Construction Industry and Software Development Promotion Act" stipulate the obligations of the subcontracting management of the ordering institution. However, there were difficulties in the systematic management of subcontracts within government contracts. In the case of unilateral contract cancellation and reduction after verbal contract, it was difficult to prove the illegal act. In addition, it was difficult to secure adequate profits due to low-cost subcontracting. In addition, unfair subcontracting transaction practices were rampant in the market such as delays in the settlement of the original operator who received the advance payment and contract payment.

As the subcontract management of the ordering institution (public institution) was not systematic, the verification of the original operator's performance was delayed. And it was difficult to confirm the performance of the subcontractor when the original operator went bankrupt. In addition, it was possible for the original operator to issue arbitrarily

a subcontract performance certificate. Accordingly, a government contract subcontract management system construction project was promoted to process electronically the government contract "subcontract contract signing-performance management-payment-issuance of the performance certificate" at KONEPS of the Public Procurement Service.

The government contract subcontract management system electronically handles contracts and payments (subcontracting costs, materials and equipment costs and labor costs) between the original operator and subcontractors. It is a system that dramatically improves the rights and interests of subcontractors by allowing the ordering institution to check the above matters online in real time. The Public Procurement Service expanded the use of the government contract subcontract management system through the voluntary participation of the stakeholders in accordance with the principle of a private autonomy.

The Electronic Procurement Utilization and Promotion Act was revised and implemented to prepare the legal basis for the use of the government contract subcontract management system. In addition, the enforcement decree was revised and implemented to prepare the contents and procedures of the electronic subcontract management. In addition, the use of the ordering institution was encouraged by signing MOUs with 16 public institutions regarding the use of the government contract subcontract management system.

A user manual was provided to enable education in a 'Step by Step' method. In addition, education opportunities were expanded by conducting regional education and institutional visit education throughout the year. In particular, measures were taken to prevent users from entering duplicate information on original and subcontracting contracts, billing and payment information, etc. by linking the government contract subcontract management system with Kiscon, the construction works contract management system and D-Brain, the financial system.

In accordance with such efforts to revitalize various fields, the performance of subcontracting contracts registered in the government contract subcontract management system has increased significantly.

[Figure 2-1] Government Contract/Subcontract Management System Homepage

Source: Government Contract Subcontract Management System (http://g2b.go.kr:8105/sc/portal/main.do) (accessed June 2, 2021).

On the other hand, Article 30 of the Enforcement Decree of the Act on contracts to which the State is a Party in Korea requires that where the head or a contracting officer of a central government agency intends to make a negotiated contract, he/she shall therefore obtain quotations from at least two persons. And for the negotiated contracts of more than 20 million Korean won, in principle, quotations therefore from at least two persons are submitted through the E-Procurement System to improve contract transparency.

Article 30 (Determination of Price with Quotations, etc.) ① Where the head or a contracting officer of a central government agency intends to make a negotiated contract, he/she shall therefore obtain quotations from at least two persons: Provided, that a quotation from one person may suffice in any of the following cases:

1. Where it makes a contract under Articles 26 (1) 2, 26 (1) 5 (e), 27, or 28;

2. Where the estimated price is not more than 20 million won: Provided, that the estimated price is not more than 50 million won, in cases of executing a contract with any of the persons in Article 26 (1) 5 (a) (v) a) through c);

3. Where there is only one person that has submitted a quotation, although the E-Procurement System has been used for receiving quotations pursuant to the main sentence of paragraph (2), and it is apparently foreseen that only one person will submit a quotation, even if the quotations are invited again.

② Where the head or a contracting officer of a central government agency intends to make a negotiated contract for the estimated price exceeding 20 million under Article 26 (1) 5 (a) and Article 26 (6) (50 million won, in cases of executing a contract with any of the persons falling under Article 26 (1) 5 (a) (v) a) through d) or Article 26 (6) 4), he/she shall require contractors to submit a quotation through the E-Procurement System: Provided, that the foregoing shall not apply to cases specified by the Ordinance of the Ministry of Economy and Finance as cases where it is impracticable to submit a quotation through the E-Procurement System in the light of the purpose or nature of the contract concerned.

③ Where the head or any contracting officer of a central government agency intends to require contractors to submit a quotation through the E-Procurement System pursuant to paragraph (2), he/she shall publish information about the submission of such quotation through the E-Procurement System.

④ Where the head or any contracting officer of a central government agency intends to make a negotiated contract under paragraph (2), he/she may place limitations on persons eligible for submitting a quotation, based on the location of the head office in the corporate register, as prescribed by the Ordinance of the Ministry of Economy and Finance, where it is deemed necessary in the light of the easiness and efficiency in the performance of the contract. In such cases, such limitations and the criteria for the limitations shall be clearly stated in the information published under paragraph (3).

⑤ The Minister of Economy and Finance may determine the criteria and detailed procedures for the submission of quotations through the E-Procurement System under paragraph (2) and the necessary matters concerning the timing and period of the publication of information under paragraph (3).

⑥ Where it is impossible to determine a contractor because the price quoted in quotations submitted pursuant to paragraph (1) or (2) does not fall into the range of the budget price (referring to the estimated price, inclusive of the value added tax, if the determination of a budget price is omitted under Article 7-2 (2)), quotations shall be requested again to determine the contract price.

⑦ Notwithstanding paragraphs (1), (2), and (6), in the cases prescribed by the Ordinance of the Ministry of Economy and Finance, the head or a contracting officer of a central government agency may allow the bidders not to submit a quotation.

5. Policy Recommendations for Raising the Use of Electronic Public Procurement System

5.1. Institutional Strategy for Expanding the Use of the Electronic Procurement System

In the case of Korea, it can be said that various policy objectives have been achieved through the e-procurement system. Looking at this historically, the role of the e-procurement system started from 1) the aspect of the procedural means of utilizing a non-face-to-face procurement system to enhance the efficiency, fairness and transparency of public procurement work. And it can be said that the role of the e-procurement system has been developed as 2) a means of expanding the actual market by activating shopping malls to promote the purchase of the products of SMEs, the products of female owned enterprises, products of enterprises owned by people with disabilities and technologically innovative products. In other words, the role of the e-procurement system has changed in line with the changes in procurement policy.

In particular, in addition to the decentralized procurement system, unlike the Korean Public Procurement Service, which directly acts as an agency for procurement contracts by government agencies, the SHCP in Mexico should consider the following to improve the utilization of CompraNet.

<Box 2-4> Korea's Bid-Rigging Indicator Analysis System (BRIAS)

The Fair Trade Commission (FTC) in Korea works with public buying entities to identify the cartel activity and the potential cases of bid rigging in public procurement. This work is particularly relevant today, since a number of potential cases related to increased spending in response to the 2009 economic crisis have been identified. In 2009 and 2010, Korea launched a number of large public works projects in a limited period, and there are now claims that the contractors colluded to divide up this work.

To identify the cases of collusion, the FTC traditionally relied on voluntary reporting by the cartel members seeking leniency, and on reports by the competing suppliers. These remain the most reliable sources for identifying the potential collusion. In 2006, the FTC developed the Bid-Rigging Indicator Analysis System (BRIAS) to supplement these methods of identification.

Drawing information directly from the Korean e-procurement system KONEPS, BRIAS analyses the data elements including the bidding price (as a ratio compared to the reference price), the number of participants, and the competition method, and applies a formula that generates a

<Box 2-4> Continued

potential bid-rigging score. If it is above a certain threshold, it suggests the need to collect more information on the contract action. Based on this information, an investigation is opened in cases where it is warranted.

BRIAS collects information from KONEPS on a daily basis, and each month, the system is run on data collected in the previous months. For goods and services, BRIAS is run on tenders above USD 423 800. For public works, the threshold is USD 4.2 million. As of 2012, BRIAS was run on 20 000 to 30 000 bids per year; of approximately 20 000 runs in 2012, the system generated 200 hits that warranted an additional look. This kind of automated system for detecting red flags in public procurement is a good practice that has been implemented successfully in other countries, such as Brazil.

Source: OECD (2018).

5.1.1. Reinforcement of the Integration and Connectivity of the Electronic Procurement System

The e-procurement system should not simply perform the role of the announcement of bids and contract procedures. In addition, integration and linkage with information such as a government budget and finance, special procurement demand from various demand agencies and the history management of companies sanctioned as ineligible companies such as the non-fulfillment of contracts will greatly contribute to enhancing the utilization of the system.

In particular, Korea's KONEPS provides the budget information of the demand agencies for payment, the details of sanctions by ineligible companies due to collusion and the non-fulfillment of contracts, and the evaluation information of contract performance through shopping malls. In addition, in the future system advancement plan, the system of about 26 public institutions operating their own e-procurement system is being promoted to unify the system into KONEPS.

5.1.2. Collection and Open-door of Public Procurement Data

Bidding and contract information related to the e-procurement system, which is the window of the public procurement market can be very useful base information or marketing information for public procurement policy makers or participants in the public procurement market. In particular, Korea's KONEPS is trying to enhance the participation of public market participants in the e-procurement system by providing an open source-based public procurement statistics information provision system called "Ontongjodal".

5.2. Legal System Development Strategy for Expanding the Use of Electronic Public Procurement System

Through the various discussions described above, measures to improve the legal system to improve the utilization of CompraNet in the future have been summarized. 1) First, since CompraNet is a system in which various stakeholders such as procurement managing institutions, demand agencies, suppliers and users in the demand agency are connected, it is necessary to improve the legal system to clarify the roles and responsibilities of the stakeholders. 2) Second, it is necessary to improve the legal system for dispute settlement procedures related to the e-procurement system. 3) Third, it can be summarized as the improvements in the legal system using CompraNet as a single window in carrying out support for SMEs, unfair correction such as subcontracting, support for eco-friendly green products and the submission of quotations for a negotiated contract.

5.2.1. Clarification of Role and Responsibility of Stakeholders in the Electronic Procurement System

As shown in <Table 2-4>, the comprehensive e-procurement system operated by the state is a system in which the various stakeholders such as procurement managing institutions, demand agencies, suppliers and users in the demand agency are connected. Therefore, it is necessary to improve the legal system to clarify the role and responsibility of the stakeholders.

<Table 2-4> Role and Responsibility of Stakeholders

Category	Description
Role and Responsibility of the Procurement Managing Institution	Defines the role and responsibility of the procurement managing institution or an institution in charge of procurement work. Examples are as follows: - Uses system to reflect the equipment to be convenient to execute the procurement works - Collects information required for executing an e-procurement system or procurement work.
Role and Responsibility of Demand Agency	Defines the role and responsibility of the institutions registered at an e-procurement system to execute procurement works. Examples are as follows: - Registers users in charge of managing the work - Manages users and registered authentications - Installs vaccine program, responsible for security, etc.

<Table 2-4> Continued

Category	Description
Role and Responsibility of Users in Demand Agency	Defines the role and responsibility of the managers and users in demand agency. Examples are as follows: - Responsible for managing e-signatures - Take actions to the loss of e-signature - Confirm the information registered at an e-procurement system - Understands and complies with various regulations regarding procurement works.
Role and Responsibility of the Supplier	Defines the role and responsibility of the business operators registered at an e-procurement system. Examples are as follows: - Responsible for managing e-signatures - Take actions to the loss of an e-signature - Understands and complies with various regulations regarding procurement works.

Source: Authors.

5.2.2. Clarification of Dispute Settlement Procedures Related to the Electronic Procurement System

In order to resolve damage relief and dispute settlement related to the use of the e-procurement system such as the effect of sending and receiving electronic documents, it is necessary to enact a dispute settlement system. Through this, it is necessary to strengthen the responsibilities of the administrative entity, which is the system operator or to improve the people's rights remedy. In addition, it can reduce the dispute settlement cost of companies and contribute to the realization of a fair e-Procurement administration.

5.2.3. Expansion of Fields and Tasks Obligated to Use the Electronic Procurement System

As seen in the case of KONEPS in Korea, the method of unifying the purchase of SME products, socially disadvantaged products, technological innovation products and eco-friendly green products through the e-procurement system will play an important role in enhancing the use of the e-procurement system. In particular, in order to enhance transparency of the negotiated contract, the e-procurement system can be used as a single window for receiving quotations or paying subcontracts. In this way, the e-procurement system can be effectively utilized in social policy activities, Obviously, in the case of a single window of the e-procurement system, the relevant legal basis needs to be clearly established.

References

Dae-in Kim, Legal Issues in Facilitation & Fair-Use of E-Procurement System - Lessons from Korean Experience, KLRI Journal of Law and Legislation Vol.9 No.1, 2019.

Dae-in Kim, Korean Public Procurement Law, K-law Academy, 2021.1.

Jae-ik Lew, Improving the Central Public Procurement Service with the G2B System, Kyungpook National Univ., 2005.

Mexico - Selling to the Public Sector, https://www.trade.gov/ (accessed date June 2, 2021).

Ministry of Strategy and Finance, PPS, The Law, Enforcement Decree, and Enforcement Rule on Contracts to Which the Government is a Party, Ministry of Government Legislation, 2017.

OECD, Digital Governments in Mexico: Sustainable and Inclusive Transformation, based on OECD (forthcoming a), The digital transformation of the public sector: Helping governments respond to the needs of networked societies, 2020.

OECD, Mexico's e-Procurement System, OECD Public Governance Reviews, 2018.

Public Procurement Service, e-Procurement White Book, 2008.

Public Procurement Service, Introduction of KONEPS, 2020.

03

CHAPTER

Technical Support in Developing Digital Public Procurement

Kyuhyeog Chae (Korea IT Consulting)
Fabio Camilo Betancourth Rincon (Independent Consultant)

Keywords
Public Digital Procurement Platform, CompraNet, Plataforma Digital de Contrataciones Publicas (PDCP), Open Source Software, Business Process Reengineering (BPR), Information Strategy Planning (ISP), Standard Framework

Technical Support in Developing Digital Public Procurement

Kyuhyeog Chae (Korea IT Consulting)
Fabio Camilo Betancourth Rincon (Independent Consultant)

Summary

The Mexican federal government started operating CompraNet, a digital public procurement system in 1996, and is operating an advanced version of Version 5.0 as of 2015 through continuous improvement. However, the current CompraNet is required to be upgraded due to computerization that is limited to some of the public procurement processes, a lack of professional manpower, the payment of an overseas procurement system license fees, the insufficient competition for recruitment in general by government departments, and low participation by SMEs.

The Ministry of Finance, Public Credit (SHCP), a central government agency in charge of public procurement, reexamines the development and operation status of the PDCP (CompraNet) and solves problems by deriving step-by-step development plans, through utilizing the experience of KONEPS (Korea ONline E-Procurement System), Korea's electronic(digital) public procurement system.

The Korean Public Procurement Service (PPS) has continuously developed since the opening of the modernized electronic public procurement system, KONEPS, in 2002, and had already been evaluated as a level that no longer needs improvement by the OECD in 2004. However, according to the continuous increase in system users and the recent changes in the ICT technology environment, improvement consulting started in 2018 and the 'next-generation KONEPS construction project' is underway with the goal of opening in 2023, which is a great help in the technological improvement directions of PDCP(CompraNet).

Mexico's PDCP project for new CompraNet currently uses the same open source software set for all modules. Django Rest Framework is used on the backend, Angular 7 on the frontend, and PrimeNG for the user interface (UI) to keep the overall look and feel

consistent. Currently, TDGF uses PostgreSQL as the database. And, the currently developed TDGF and new modules are being operated in the cloud center under the responsibility of CEDN (Coordinación de Estrategia Digital Nacional) in the presidential office, which is being used as Platform as a Service (PaaS) for public services and Infrastructure as a Service (IaaS) for development.

However, the TDGF and new modules developed in this way are not technically fully integrated with the currently operating CompraNet at all, which is inevitable because the current CompraNet is developed based on a specific company's solution. In addition, the operating infrastructure is completely separated, and the data required for the new module as well as the basic user DB are manually transferred from CompraNet by the PDCP team.

This situation occurred because there is no comprehensive blueprint, which is understandable by stakeholders in public procurement, for what CompraNet should look like in a few years, considering the design and development period, and it lacked a comprehensive consultation, such as an ISP (Information Strategy Planning), to draw a target model.

Meanwhile, with respect to the module development, all modules currently use the same technology set, but the standardization strategy of the development framework has not been confirmed. In the case of the current PDCP project, the SHCP's public procurement organization employs Mexican engineers on individual contracts for development, so it may be decided that there will be no problem for the time being. However, when the size of the development project expands, and the development is carried out simultaneously and through outsourcing via international/domestic bidding, a mid- to long-term strategy to standardize the development performance of TDGF for both maintenance and development efficiency needs to be established. And, the continuous development of the digital public procurement system, even if it is an open source, a more standardized framework must be determined and software engineers must be continuously trained to ensure stable development and operation, and thus it needs to be treated with importance.

Assuming that the starting point of KONEPS was the year 2002, the continued service expansion and functionality of Korea's national digital procurement system has been enabled by consultations called the ISP. And for the goal model, implementation strategy, and implementation plan for the next-generation KONEPS, establishing strategies and implementation plans for the next-generation national digital procurement system in 2020 have played key roles. In addition, the joint foundation for e-government services called the eGovFramework played a crucial part in the successful development and operation

of KONEPS. This has to do with the fact that for the successful system development and operation, domestic software engineers who participate in the system must have the foundation for continuous training and employment.

When considering the various functions that national public procurement has to provide, such as the efficient execution of the national budget, the monitoring of contract management, and the expansion of the accessibility for the participating companies by providing convenience for digital procurement, the current solutions on the market cannot sufficiently satisfy these requirements. In addition, in order for public procurement to be used as a policy, such as contributing to industrial development and job creation by enhancing the competitiveness of domestic SMEs, general package software cannot be used.

Therefore, these policy recommendations are presented on the premise that the public digital procurement system is not based on a package solution, but is redeveloped as a system integration (SI) project concept using open source according to the Mexican e-government strategy.

In order to develop the next-generation CompraNet as a Mexican public digital procurement platform, the following policy recommendations are presented in three categories (knowledge base, organizational foundation, and vision establishment):

- The first policy recommendation is that, most urgently, a target model should be established through a comprehensive IT strategy consulting such as BPR/ISP.
- The second policy recommendation for building knowledge bases is to develop a development standard framework.
- The policy recommendation for building organizational foundations is to organize public digital procurement planning unit and technical analysis unit.
- The policy recommendation for vision establishment is to aim the standardization of the public digital procurement system and the leading service of the digital government.

These policy recommendations are based on the basic premise that in order to rebuild the public digital procurement platform in the direction that Mexico wants, a new perspective should be approached. And in order to implement these recommendations as a rough guideline, a more detailed and detailed action plan may be needed.

1. Introduction

The Mexican federal government started operating CompraNet, a digital public procurement system in 1996, and is operating an advanced version of Version 5.0 that applied a web-based platform as of 2015 through continuous improvements.

However, the current CompraNet is required to be upgraded due to computerization that is limited to some of the public procurement processes, a lack of professional manpower, the payment of overseas procurement system license fees, the insufficient competition for recruitment in general by government departments, and low participation by SMEs.

Mexico received consultations on CompraNet in February 2017 with the help of the OECD. However, Mexico determined that CompraNet was not able to trace the entire public procurement cycle with just that improvement, and in March 2019, in partnership with the Inter-American Development Bank (IDB) and the Methodology for Assessing Procurement Systems (MAPS), it launched Procura Mexico, a comprehensive improvement project that evaluates procurement and purchasing systems.

In addition, the Ministry of Finance, Public Credit (Secretaría de Hacienda y Crédito Público, SHCP), a central government agency in charge of public procurement, reexamines the development and operation status of PDCP (CompraNet) and solves problems by deriving step-by-step development plans, through utilizing the experience of KONEPS (Korea ONline E-Procurement System), Korea's electronic (digital) public procurement system.

The Korean Public Procurement Service (PPS) has continuously developed since the opening of the modernized electronic public procurement system, KONEPS, in 2002, and was already evaluated as a level that no longer needs improvement by the OECD in 2004. However, according to the continuous increase in system users and the recent changes in the ICT technology environment, improvement consulting started in 2018 and the 'next-generation KONEPS construction project' is underway with the goal of opening in 2023, which is a great help in the technological improvement direction of PDCP (CompraNet).

This study analyzes the current status of Mexico for improving the technology of Mexico's digital public procurement platform PDCP (CompraNet) to support the efficient operation of the government budget and the eradication of corruption through transparency and the efficiency of public procurement. In addition, policy measures including the technological improvement measures for PDCP (CompraNet) will be presented from a mid and short-term perspective in consideration of Korea's experience.

In particular, policy recommendations will consider the fact that Mexico has been using a solution-based digital procurement system (CompraNet) for a long time and lacks experience in conducting large-scale digital public procurement development projects.

2. Status of the Digital Public Procurement System in Mexico

CompraNet was born in 1996 as part of the North American Free Trade Agreement (NAFTA 1.0) initiatives agreed between Canada, the United States of America and México. Since 1996, CompraNet has been improved from being a tool that publicized federal government procurement notices and the contracting decisions to a transactional portal where public entities are able to carry out the entire procurement process online.

The Mexican federal government started operating CompraNet (version 1.0), a digital public procurement system in 1996, and is operating an advanced version of Version 5.0 that applied a web-based platform as of 2015 through continuous improvement. This version was developed based on an Italian company's electronic procurement solution called BravoSolution, and an American company called Jaggaer took over the company in 2017.

CompraNet 5.0 went to live in 2010 based on the Commercial-off-The-Shelf (COTS) platform developed by the BravoSolution that allows the registration of demanding entities and suppliers, the creation of the annual procurement plan and contracting procedures (including auctions) while maintaining the traceability of the user activities and offers procurement data for decision-making. This product is characterized by being based on the "right of use" which means the Government of Mexico have to pay for a perpetual license agreement, annual support and maintenance fees. The vendor does not provide a license to get access to the source code to change it and keeps the copyright protecting the exclusive rights for use and the distribution of the software as a product. <Table 3-1> summarizes the history of Mexico's public procurement system.

<Table 3-1> History of CompraNet

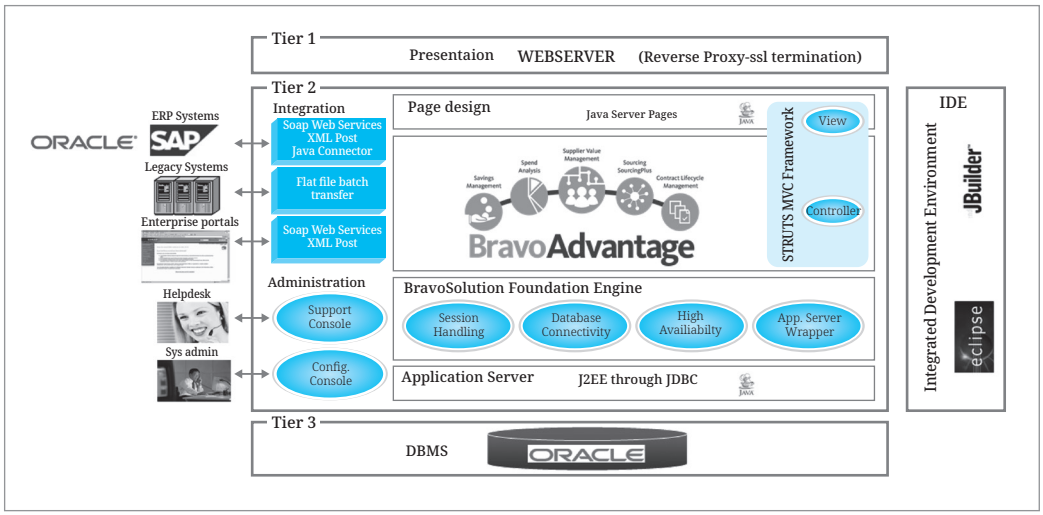
System Name	Year	Version	Main Features	Regulations
CompraNet	1996	1.0	Module to publicize tender opportunities and disclose contract award decisions	
CompraNet	1997	2.0	Access to bidding opportunity documents, upon receipt of a bank slip to prove the payment of fees related to federal legal rights	
CompraNet	2000	3.0	A transaction module to allow for e-tendering (Electronic submission of bid documents and contract award notices)	
CompraNet Plus	2007	4.0	The pilot implementation project was canceled due to performance issues. But, several users indicated that this version was the most user-friendly to date.	
CompraNet	2010	5.0	<Web-based platform developed by Bravo Solutions> 1. Buyers, private business and interested stakeholders to register, even remotely to gain access to government tender documents 2. Uploading of documentation related to non-open tender activity, such as closed tenders (invitations to three business) and direct awards, both permissible by law under certain circumstances 3. Loading and sharing of the annual procurement plans developed by government agencies 4. Execution of various forms of an e-auction, including English/ reverse and Dutch auctions 5. Traceability of user activities, such as loading and accessing of documentation 6. Online training for buyers 7. Extraction and analysis of data from the Data Mart database 8. Development of a supplier registry, against which government buyers can provide ratings (on a 0-100 scale) to record contract compliance 9. Execution of tender activities, including the dissemination of documentation such as the minutes of clarification meetings, testimonies of social witnesses executed contracts and any variations or modifications	LA ASSP/ LOP SRM
CompraNet	2015	Enhanced	1. Availability for CompraNet users: 99.5% 2. Additional security for the Data Mart 3. *Clave Cartera* was added to procurement activities (investment programs and projects, Ministry of Finance's information on public grants and funding	

Source: OECD (2018).

Many of the federal government procurement system requirements are covered by BravoSolution, however, adding a new feature or software module can be difficult due to the low flexibility to make timely adjustments. This software has been developed as a monolithic solution, which means that is self-contained, has one central database and lacks modularity features. Modularity is important in information systems because it supports the reuse of

parts of the application logic and facilitates maintenance by allowing repairs or replacing the components of the system without requiring a complete compilation (see Figure 3-1).

[Figure 3-1] Architecture of BravoSolution



Source: Authors.

Additionally, the implementation of COTS solutions always demands some level of adaptation by the institutions (procedures) and end users (look and feel) so the adjustments are always needed. Both, the more changes (customizations) required in BravoSolution platform the costlier and more unsustainable the solution becomes (see Table 3-2).

<Table 3-2> Technology Stacks of BravoSolution

Application Servers	• JBoss	• 7.1	
Web Servers	• Apache	• 2.2	
Hardware Platform	• Industry Standard Servers	• Xeon Multicore CPUs	
Web Architecture and Scalability	• Horizontal (application server cluster, multiple web server, RAC nodes) • Vertical (1-tier → 3-tier)	• *NA*	
Operating Systems	• Oracle Enterprise Linux	• OEL 7.x 64bit	
Database	• Oracle	• 11g	
Programming Languages & Development Environment	• J2EE, JSE, SQL • Eclipse, InterlliJ • Java Server Faces	• *NA*	

Source: Authors.

As of May 2021, more than 467,255 companies, 23,542 operators of 5,624 publics, state and municipal entities in charge of public purchases have been registered in the system, an average of 40,000 daily visits are received to the CompraNet portal, through which they flow an average of 3,000 contracting procedures in force daily, having published to date more than 1.9 million contracting procedures since the start of the operation of version 5.0 of CompraNet in July 2010.

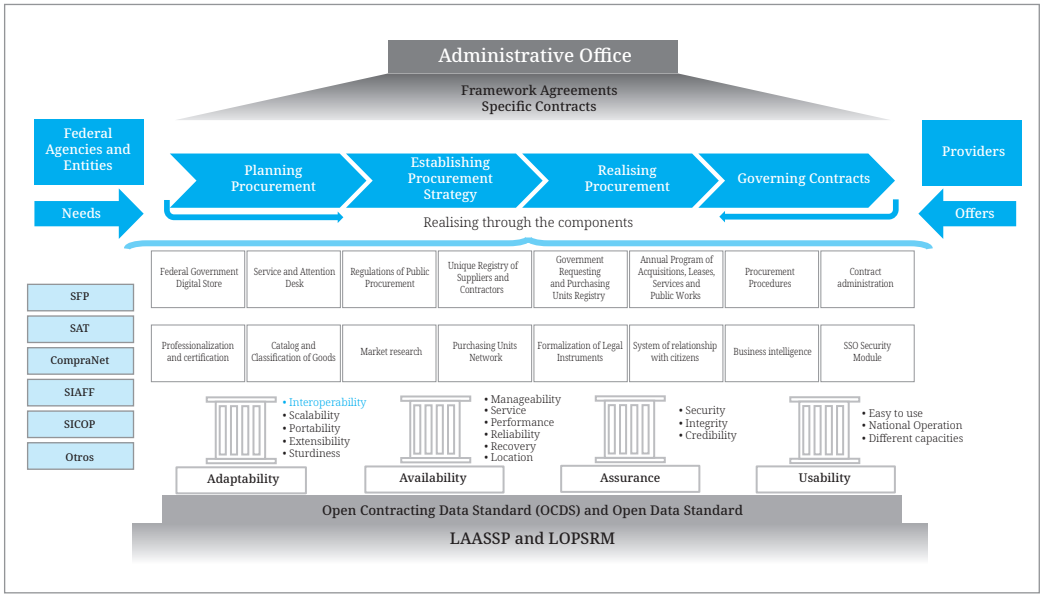
However, the current CompraNet is required to be upgraded due to, among other reasons, the computerization is limited to some of the public procurement processes, lack of professional manpower, the payment of overseas procurement system license fees as mentioned before, the insufficient competition for recruitment in general by government departments, and low participation by SMEs.

Furthermore, Mexico received consultations on CompraNet in February 2017 with the help of the OECD, and 34 improvement tasks for digital public procurement in Mexico were presented in a report delivered in January 2018. In addition, the OECD submitted an improvement progress report in January 2019.

However, Mexico determined that the current CompraNet was not able to trace the entire public procurement cycle with simply that improvement, and in March 2019, in partnership with the Inter-American Development Bank (IDB) and the Methodology for Assessing Procurement Systems (MAPS), it launched Procura Mexico (aka Plataforma Digital de Contrataciones Publicas; PDCP), a comprehensive improvement project that evaluates the procurement and purchasing systems.

Mexico is currently developing Procura Mexico in accordance with the direction and supervision of the Coordination of the Digital Strategy of the Presidency (‘Coordinación de Estrategia Digital de Presidencia’). Each of the target functions will be distributed and used in an evolutionary and incremental manner. Procura Mexico aims for the complete traceability of the public procurement life cycle through more than 20 modules, including the Tienda Digital del Gobierno Federal (TDGF). [Figure 3-2] shows the relationship between the main modules in PDCP and external systems.

[Figure 3-2] PDCP Modules

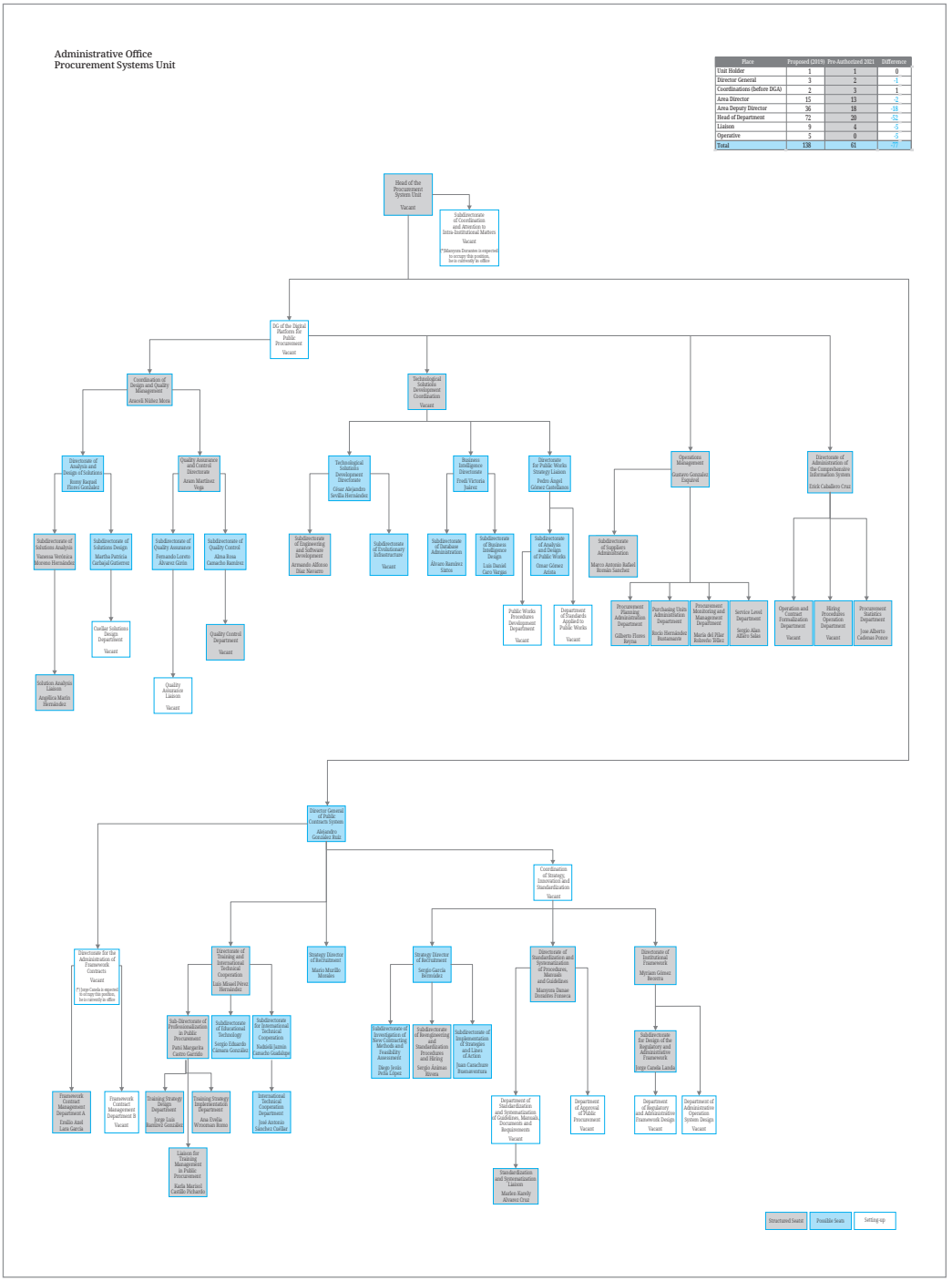


Source: SHCP (2021).

PDCP is a project and platform to digitize Mexico's public procurement delivery cycle. It includes not only the ICT system but also the improvement of public procurement procedures, guidelines, and laws and systems. Meanwhile, CompraNet is an official name registered by LAASSP (Law of Acquisitions of the Public Sector), LOPSRM (Law of Public Works), and LAPP (Law of Public-Private Associations). Therefore, TDGF, which was developed in 2019 as one of the PDCP modules, is now being operated as one of CompraNet's modules. Other modules to be developed in the future are also expected to operate as CompraNet modules. In fact, PDCP and CompraNet are organized under the Procurement System Unit within SHCP, which is in charge of public procurement in Mexico, and the Director General who leads the PDCP and CompraNet is in charge of the project (or program) and the organization that operates the current system.

In addition, the PDCP organization is further divided into two teams: the Coordination of the Design and Quality Management team is responsible for the design and quality management of the modules developed by PDCP while the Coordination of the Technological Solutions Development team develops technical solutions (see Figure 3-3).

[Figure 3-3] Procurement System Bureau



Source: SHCP (2021).

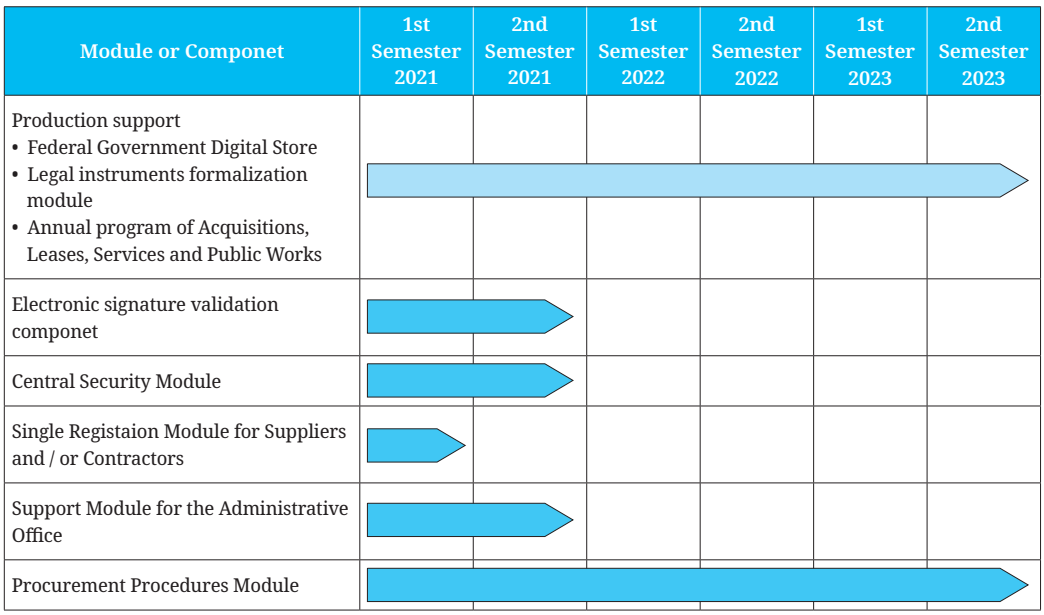
3. Status and Challenges of PDCP and CompraNet

3.1. PDCP Project Status

PDCP is a comprehensive digital transformation program that includes the total cycle of public procurement, procurement processes, legal and regulatory improvements that aim to allocate resources more efficiently, monitor procurement contracts in a timely manner, and streamline federal government operations through interoperability with various agencies (see Figure 3-4).

The new PDCP capabilities will be developed incrementally. The SHCP plan is to first develop the complementary functionalities to the current CompraNet (BravoSolution) and then develop the modules to replace CompraNet functionalities, including procurement procedures, auctions and other functionalities and improvements. The above means that for some time the federal government procurement system will operate on different platforms.

[Figure 3-4] Medium-Term Execution Path



Source: SHCP (2021).

There are more than 20 modules planned by PDCP, however, so far three modules are in production:

3.1.1. Federal Government Digital Store (Tienda Federal del Gobierno Digital: TDGF).

It is a module of CompraNet through which the agencies and entities of the Federal Public Administration carry out acquisitions using electronic catalogs which contain the goods that are the object of a framework contract.

- Possibilities: It enables the administration, control and transparency of acquisitions from requisition, contracting, contract signing, contract administration, reception of goods, invoicing and making of payments in interoperability with the Accounting and Budget System (SICOP) and the Comprehensive Federal Financial Administration System (SIAFF) platforms. It allows agencies and entities to make their purchases electronically, with minimal contact with suppliers and through competitive prices.
- Versions: Module for the execution of purchases connected with the budget system of the Federal Government, SICOP. Module for the execution of purchases with management of own resources of the agencies and entities, as well as their own financial management systems.
- Scope: The dependencies and entities of the Federal Public Administration are obliged to carry out, through the Digital Store of the Federal Government, their contracting procedures, as well as the execution of the specific contracts that result from them, based on article 41 , section XX, of the Law of Acquisitions, Leases and Services of the Public Sector, in the terms indicated in the framework contracts executed by the Ministry of Finance and Public Credit, as well as for interested national or foreign individuals and legal entities in entering into framework contracts (Third Article of the AGREEMENT).
- Architecture: Built from free software. It uses the electronic signature component to formalize documents. It has communication with other systems and services such as SAT, SICOP, SIAAF and BANXICO.

With the implementation of the Digital Store, a paradigm shift was generated in public procurement due to the use of information technologies. The Digital Store allows the generation of information in real time about the status of the acquisitions made by agencies and entities, which allows their timely monitoring. Different roles participate, from the Master Contract Administrator through the Purchasing Unit, Requiring Unit, Purchasing Unit Operator, Contract Administrator, Reception Manager, Payment Request Typist and Budget. All processes in the Store are traceable and also have the support of the Electronic Signature in each of the actions carried out by users.

The federal government digital store allows to acquire goods and services for the Federal Public Administration (Administración Pública Federal; APF) through framework agreements, for example, office supplies, cafeteria service, computer accessories, etc. SHCP is currently making adjustments for new framework agreements and to permit the participation of international contractors. Highlighting that one of the virtues it grants is to guarantee that all roles, both internal and external, carry out the procedures through its Advanced Electronic Signature, which ensures traceability and transparency in contracting procedures. Currently, 31 suppliers and 6,503 active users are registered, and 204 goods are available for purchase.

Monitoring on the proceedings, which is 100% electronic, is carried out through:

- Requisitions which allows the selection of goods and delivery conditions;
- Confirmation of the quotation or price improvement by suppliers (in the case of a supplier of goods, it is called a supplier, and in the case of a construction or service related company, it is called a contractor);
- Awarding of goods and their formalization through the electronic signature in the specific contract;
- User administration;
- Electronic notifications;
- Consultation and selection of budget sufficiency; and
- Interoperability with other systems.

3.1.2. Legal Instruments Formalization Module (Módulo de Formalización de Instrumentos JurídicoCs: MFIJ).

The Legal Instruments Formalization Module (MFIJ) of CompraNet, is the module through which the agencies and entities generate, validate and electronically formalize the legal instruments * that are derived from the various contracting procedures provided for in the LAASSP and in the LOPSRM. This allows streamlining the processes for the validation and formalization of legal instruments, as well as having consistent, accurate and timely information in CompraNet for decision-making.

- Profits: Avoiding direct contact between suppliers and public servants, deterring acts of corruption. Standardization of formats for contracts and modifying agreements. Use of electronic signature issued by the Tax Administration Service (SAT) as certifying authority. Reduction of the time to formalize and send contracts to competent public servants for review and validation. Online process available 24 hours a day. Digital

contracts available online, avoiding the excessive use of paper in the Federal Public Administration.

- Components: Configuration: general data, participants, suppliers, prices, guarantees, templates. Validation and signature through the e. Signature issued by the SAT. Consultation of formalized legal instruments.
- Scope: The dependencies and entities of the Federal Public Administration, as well as the state and municipal administrations that use federal resources, are obliged to formalize their legal instruments derived from the contracting procedures established in the LAASSP and the LOPSRM through the MFIJ. The foregoing, based on the Agreement published in the DOF on September 18, 2020.
- Roles: The roles that participate are: Contract administrator, Reviewing legal area, Signatory Operator, Purchasing unit, Purchasing unit Provider or Contractor
- Architecture: Built from free software. It uses the electronic signature component to formalize documents. It has communication with SAT services and other CompraNet modules.6503 active users.

This module allows:

- Saving templates of legal instruments;
- Review, correction and validation of legal instruments by public servants empowered in the application;
- Sign electronically and safeguard said instruments;
- Standardization of the models of legal instruments under which the agencies will be working with their suppliers;
- Simplify documents throughout the Federal Government, facilitating interaction with suppliers and streamlining contracting processes; and
- By electronically signing legal instruments, the risk index is inhibited and the procedure is made transparent.

3.1.3. Annual Program Module for Acquisitions, Leases, Services and Public Works (Programa Anual de Adquisiciones, Arrendamientos, Servicios y Obra Pública: PAAASOP).

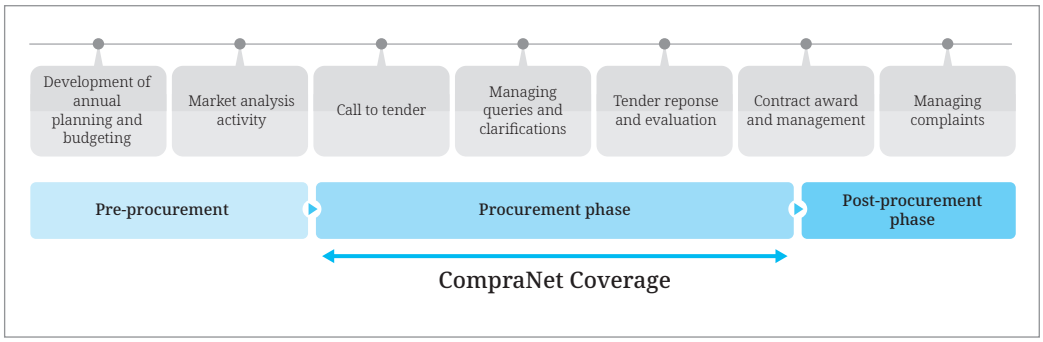
The Module of the Public Procurement Digital Platform, which registers the Annual Programs of Acquisitions, Leases, Services, Public Works and Services related to them.

- Benefits: This module makes available to the citizens the contracts that are planned during the current year. It seeks to awaken interest among the suppliers, fostering greater competition and at the same time making the upcoming contracts transparent.
- Components: A site of Self-registration of the Heads of the Finance areas. A module for capturing and updating the annual programs of the Entities and Agencies. A website to share information with citizens.
- Scope: Registering the PAAASOP is mandatory for Public Administration Entities and Dependencies that use federal resources in their acquisitions. The roles that participate are Heads of Administration and Finance Units and Data entry Typists
- Architecture: Built from free software. It uses the electronic signature component for the publication of the programs of the entities and agencies.

These three new modules are already in service as the modules of the current CompraNet. However, the currently developed modules and the modules to be developed according to the mid-term action plan seem to be based on needs among functions that the current CompraNet (BravoSolutions) does not currently provide rather than being established according to a systematic implementation plan based on the overall target model.

For example, in the case of TDGF, it was developed as the first module according to political or administrative judgment, and the contract management module (MFJI) is considered to be developed to supplement the contract management function that BravoSolution cannot provide (see Figure 3-5).

[Figure 3-5] The Procurement Business Coverage of CompraNet (BravoSolution)



Source: Authors.

According to PDCP plan, the components of the current CompraNet (BravoSolution), including procurement procedures, the auctions and other functionalities are in the analysis and design stage and will be developed in the medium and long term to replace the current system (see Box 3-1).

<Box 3-1> The Scope of PDCP

- Maintain traceability from planning to the completion of the Contract.
- Make processes transparent
- Generate a new Regulatory Framework
- Integrity of the Public Procurement System
- Generate transparent and accessible participation for all
- Homologate, standardize, and automate the entire public procurement cycle
- Professionalize all Public Servants as well as the Suppliers and / or Contractors and Citizens through the use of online learning
- Mechanisms for evaluating the purchasing system for its continuous improvement, accountability and risk detection
- Integrate the execution of public procurement expenses with the management of Finance, Budgeting, Treasury, Inspection and Sanctions.

Source: SHCP (2021).

However, it is not enough for the public digital procurement system to implement its own procurement process such as bid announcement, bid submission, evaluation, and the announcement of the preferred bidders supported by the general e-procurement system. This is because the public digital procurement system must provide functions to ensure transparency and the efficiency of public procurement, from the process of establishing a procurement plan to contract management and payment after the selection of a preferred bidder.

In particular, in order for the public digital procurement system to operate efficiently, it is very important to link with the systems operated by external organizations such as the National Tax Service, banks, pension institutions, and the chambers of commerce as well as the national financial system. It should be built and operated according to the systematic implementation plan, but it is judged that the current PDCP does not have such a comprehensive blueprint and implementation plan.

3.2. General Technical Architecture of PDCP

The PDCP architecture is component-based, micro-services-oriented and uses the full power of the cloud to provide security, scalability, and flexibility while facilitating the work of the development teams to meet the demands of the federal government procurement system.

A component-based architecture allows for the logical groupings of the functional capabilities (components) that can be implemented independently using different technologies, as long as they are open source programming languages and databases because it is a SHCP requirement. The team develops the component once and then reuse it as many times as possible. In order to communicate the different modules, the architecture uses standard Jason-based interfaces that are complex object structures that allows data interchange between the different modules.

In this new microservice-oriented architecture is possible to split the scope of CompraNet in many services on the basis of the business needs. Services can be implemented using different technologies and components can logically share the services. SHCP technical teams also can be arranged around the features/components of the application depending on the domain expertise so the software maintenance and support will be more effective. Microservices communication is primarily synchronously using Jason requests. There are also asynchronous communications, in this case they use a message broker that allows a publish-subscribe message pattern. Each microservice has its own database and each team can choose freely the technology as long as they are open source databases.

Cloud computing offers many advantages to the PDCP. The new platform can allocate resources for each functional module when needed and the operation and management is easier and less expensive because the infrastructure and platform services on the cloud provider's network.

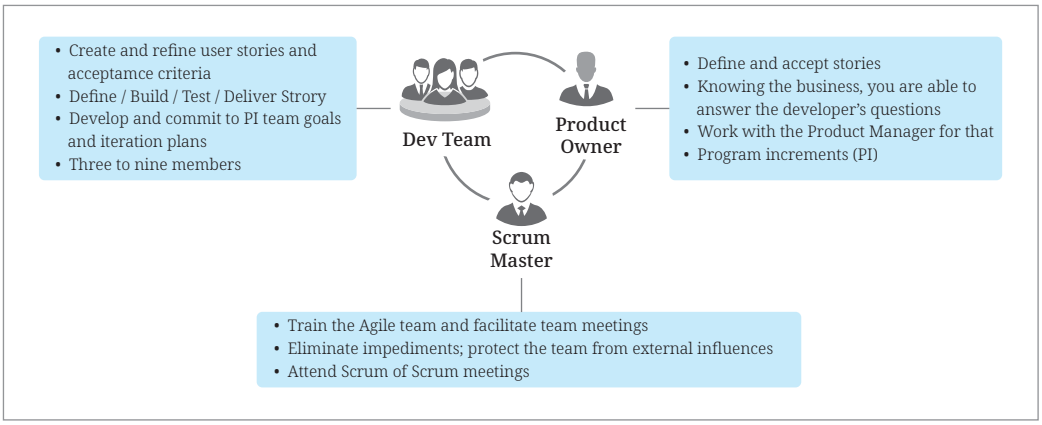
Unlike the methodology of the past (typically a traditional waterfall model) that was led through planning, the Agile methodology does not predict the future and develop, but constantly creates prototypes within a certain period of time, adding and modifying the necessary demands over time. Mexico has adopted Scrum, which is one of the most representative Agile methodologies, however, they combine agile techniques with traditional waterfall methodologies when necessary to interact with different areas, follow specific process and comply with the regulations on government procurement.

The development team is arranged in the following sub-areas:

- Business Analysis: Focused on the business areas and the corresponding microservice domains. Each microservice has a product backlog, which is the complete requirements list that the microservice must enable. They run 3 weeks sprints to work with developing and quality sub-areas for building the service.
- Development: SHCP technical team uses a source code repository where each developer updates the changes to the development project. Then the leader verifies that everything works well with the new functionality.
- Quality: Run the software tests. When the certification is completed, the code is passed through to the production environment.

The technical team must be conformed with full-stack developers that being able to work with databases, servers, systems engineering, and the languages of the new PDCP architecture (see Figure 3-6).

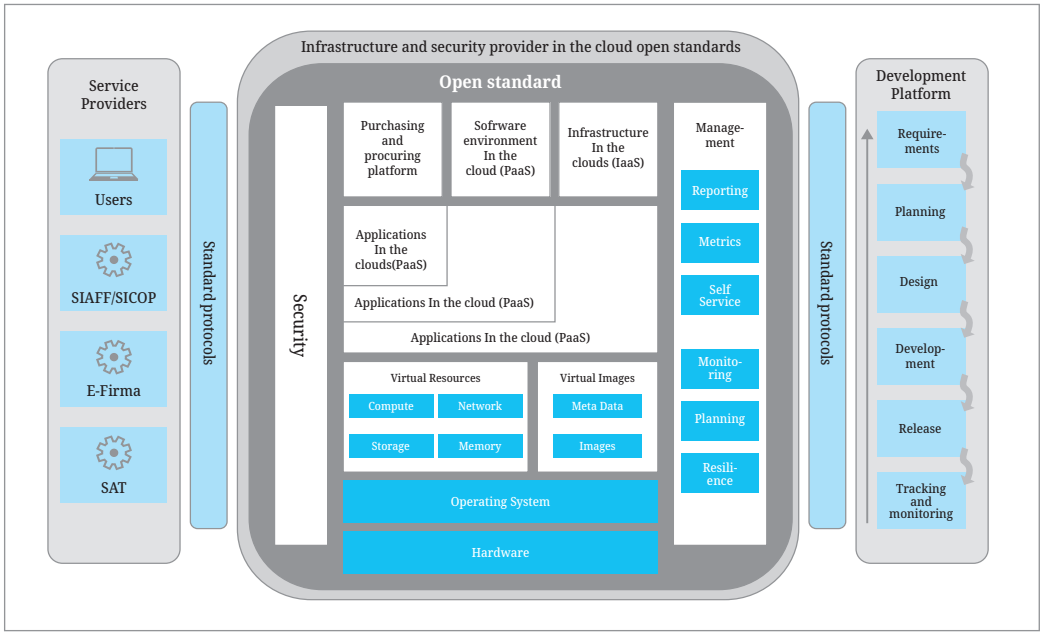
[Figure 3-6] Scrum Team Composition



Source: SHCP (2019).

In terms of technical architecture, international standards and open source technologies are used, new components are gradually integrated, and a highly flexible architecture is selected for continuous quality assurance, adaptation to changes, and interoperation with other systems. In addition, in order to increase the scalability and availability of resources, a cloud is being considered, and the development and operation of the DevOps method has been adopted (see Figure 3-7).

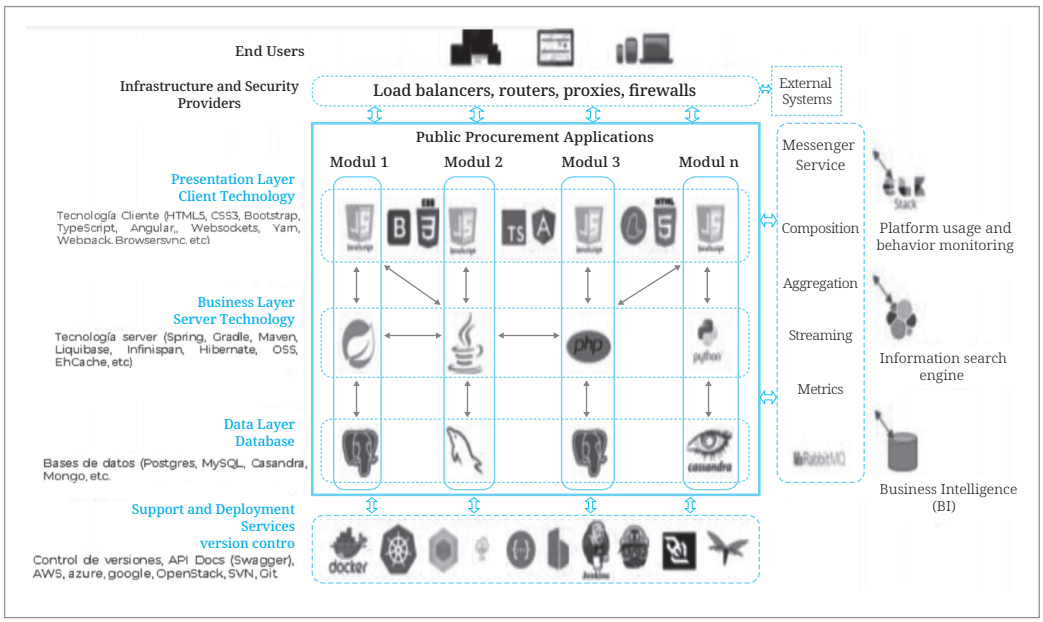
[Figure 3-7] Technology Architecture of PDCP



Source: SHCP (2019).

Mexico defines the technical architecture for PDCP very openly, allowing various DBMSs and development frameworks (languages) to be used in the data layer or business layer without limiting a specific development framework or development language (see Figure 3-8).

[Figure 3-8] PDCP's Open Technology Architecture



Source: SHCP (2019).

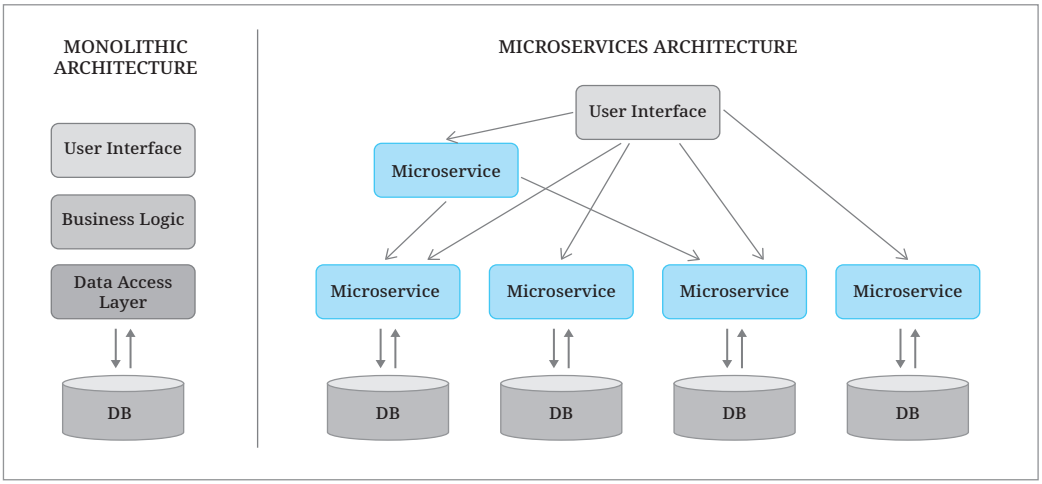
Mexico seems to have decided to use a framework composed of open sources such as Agile as a methodology for developing PDCP modules and Django/Python as a technical architecture for development. For relational databases they use PostgresSQL and MySQL and for non-relational databases they use MongoDB and ElasticSearch. The type of persistence depends on the type of component.

For the frontend (user interface) the IT development team uses Angular. They also have some html portals when the business requirement is not for dynamic information. For modules that process information and are more dynamic, they always use the Angular programming framework.

For information security, they use a single-sing-on system to access to the all platform with the same user/password. Platform communications include tokens that carry out the user's information, the modules the user can access and the additional information. They use the OAuth2 and JWD standards.

Finally, Micro Service Architecture (MSA) has been adopted as a software development technique, which is different from the Monolithic Architecture method in which all components of the software are integrated into one project for development. MSA is a method where one large application is decomposed into several small applications for changes and different combinations (see Figure 3-9).

[Figure 3-9] Comparison between MSA and Monolithic



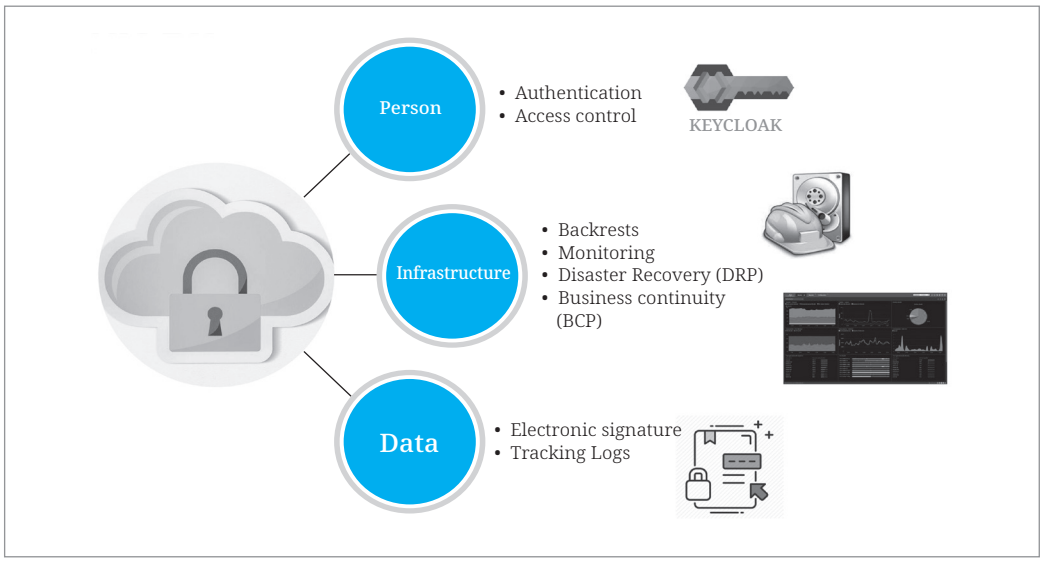
Source: https://dzone.com/articles/what-are-microservices-actually (accessed July 15, 2021).

In the case of developing multiple modules that are gradual but with rapid responses to the requirements of the field and interoperability in mind, it is important to select

MSA rather than Monolithic Architecture. The MSA is an architecture that has ideological similarity to SOA (service-oriented architecture), and is a very important choice for flexibility that the ADB (Asian Development Bank) claims in its technical considerations of the e-procurement. According to them, "By applying a service-oriented architecture (SOA) paradigm to the design of the core components, e-GP system implementers can ensure a significant improvement in system flexibility, while leveraging the benefits of reuse at the same time. Online help can be offered, providing assistance at any time to users performing activities in the system through means such as in-context sensitive help, user manuals, wizards, walkthroughs, and online demonstrations."

Finally, when it comes to security, PDCP approaches it from the perspective of people, infrastructure, and data. This can be said to be a very reasonable approach, but in terms of software development and operation, it can be said that security management from the perspective of 'software development security' is required before the developed software goes to the operation stage. To do this, a 'Development Security (or Secure Coding) Guide' that developers must follow must be prepared. This refers to a series of security activities that must be followed in the software development process, such as removing potential security vulnerabilities that may exist in the source code, etc., and designing and implementing functions in consideration of security for safe software development. This is because it is necessary to remove the vulnerability in advance in the development stage because a larger cost is incurred to remove the security vulnerability after development (see Figure 3-10).

[Figure 3-10] Security Perspective of PDCP



Source: SHCP (2021).

Currently, CompraNet uses the electronic signature (e-firma) issued by the Tax Administration Service (Servicio de Administración Tributaria; SAT) to implement the authentication and non-repudiation function, an essential function in digital procurement. The electronic signature is valid for two years and can be issued by companies and individuals, and is provided via a mobile device free of charge (see Figure 3-11).

[Figure 3-11] Registration Electronic Signature in CompraNet

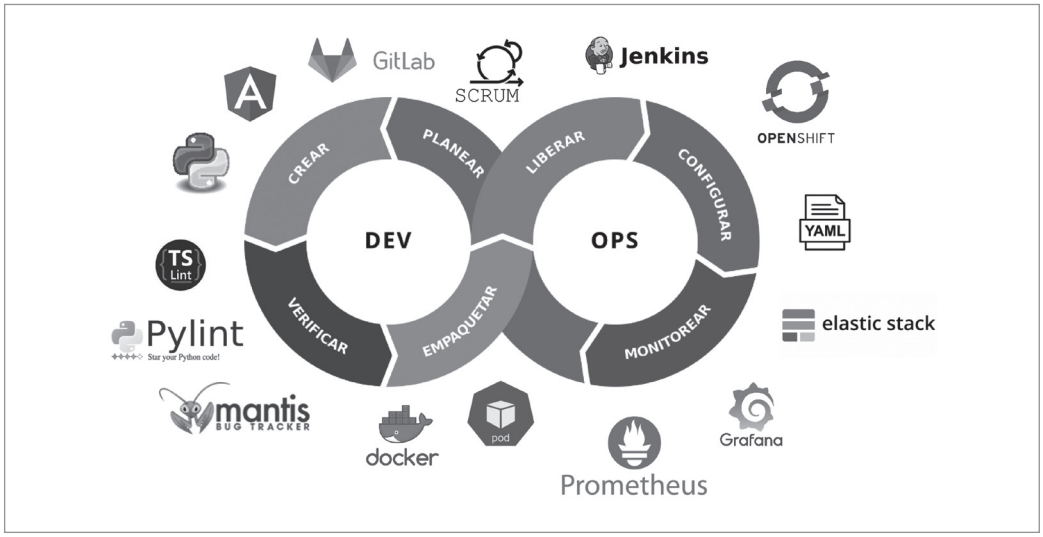
Source: https://cnet.hacienda.gob.mx/servicios/solicitud.jsf. (accessed June 21, 2021).

3.3. Technological Architecture of TDGF and New Modules

TDGF, developed in 2019 and operated as a module of CompraNet, is a public digital shopping platform similar to “Amazon” or “Mercado Libre.” As it is integrated with a budget and accounting system, SICOP (Sistema de Contabilidad y Presupuesto), and an integrated system for federal budget management, SIAFF (Sistema Integral de Administración Financiera Federal), the payment process is easy and fast, showing some achievements. And MFIJ and PAAASOP modules, developed in 2020, are being operated by the PDCP team to supplement the functions of the current CompraNet.

Mexico’s PDCP project currently uses the same open source software set for all modules. Django Rest Framework is used on the backend, Angular 7 on the frontend, and PrimeNG for the user interface (UI) to keep the overall look and feel consistent. Currently, TDGF uses PostgreSQL as the database. [Figure 3-12] shows the PDCP’s DevOps using open source software.

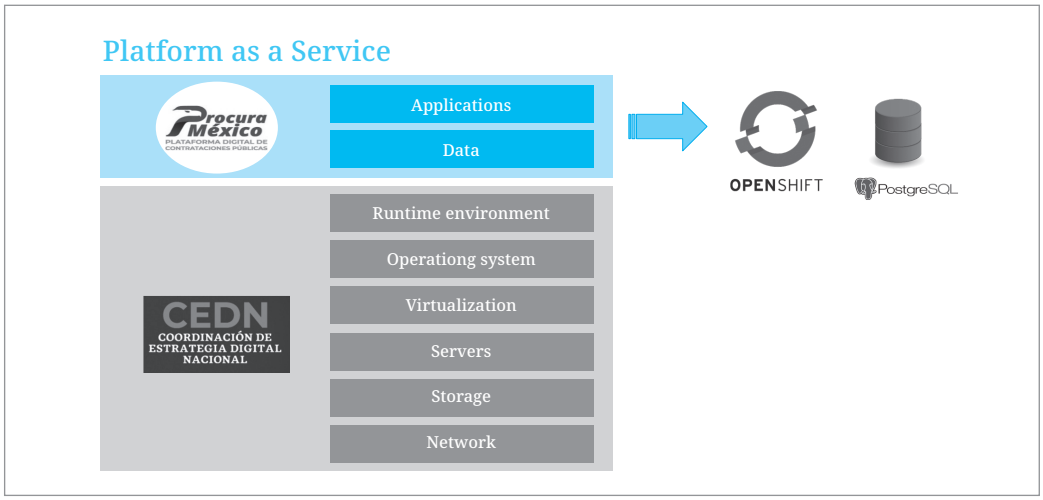
[Figure 3-12] PDCP's DevOps



Source: SHCP (2021).

Meanwhile, the currently developed TDGF and new modules are being operated in the cloud center under the responsibility of CEDN (Coordinación de Estrategia Digital Nacional) in the presidential office, which is being used as Platform as a Service (PaaS) for public services and Infrastructure as a Service (IaaS) for development. CEDN is a technical support unit of the presidency within the organic structure of the federal administration and is led by Carlos Emiliano Calderón Mercado now (see Figure 3-13).

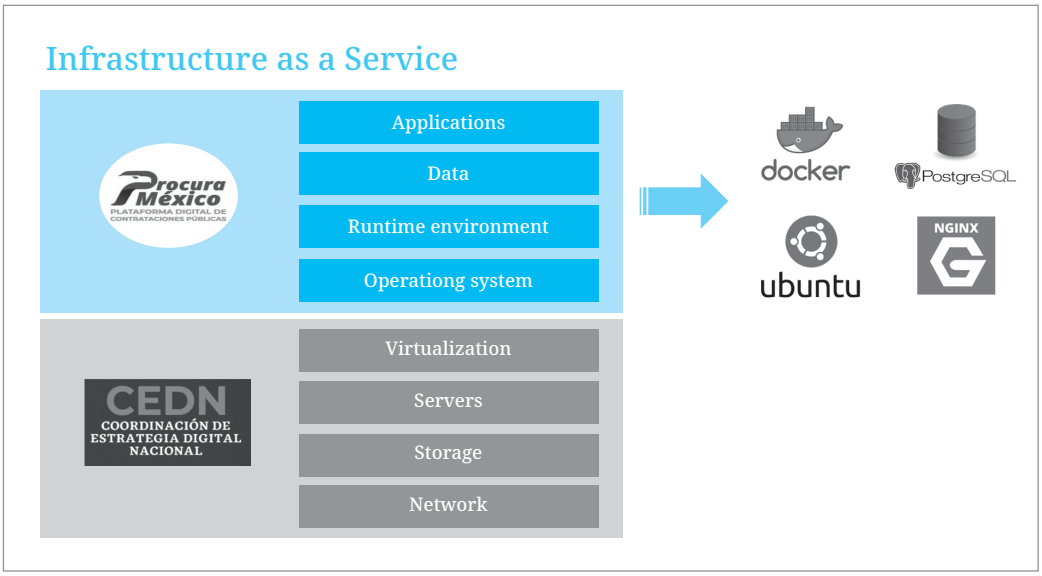
[Figure 3-13] PaaS for TDGF and New Modules



Source: SHCP (2021).

In the case of PaaS, using CEDN's environment from network and storage to the execution environment, the PDCP team deals only with application software and databases, and OpenShift as an application platform and PostgreSQL as a database are being used. As with various development cases today, the PDCP team is leveraging OpenShift, an operating environment that supports Docker containers and Kubernetes using DevOps tools to enable rapid application development.

[Figure 3-14] IaaS for TDGF and New Modules

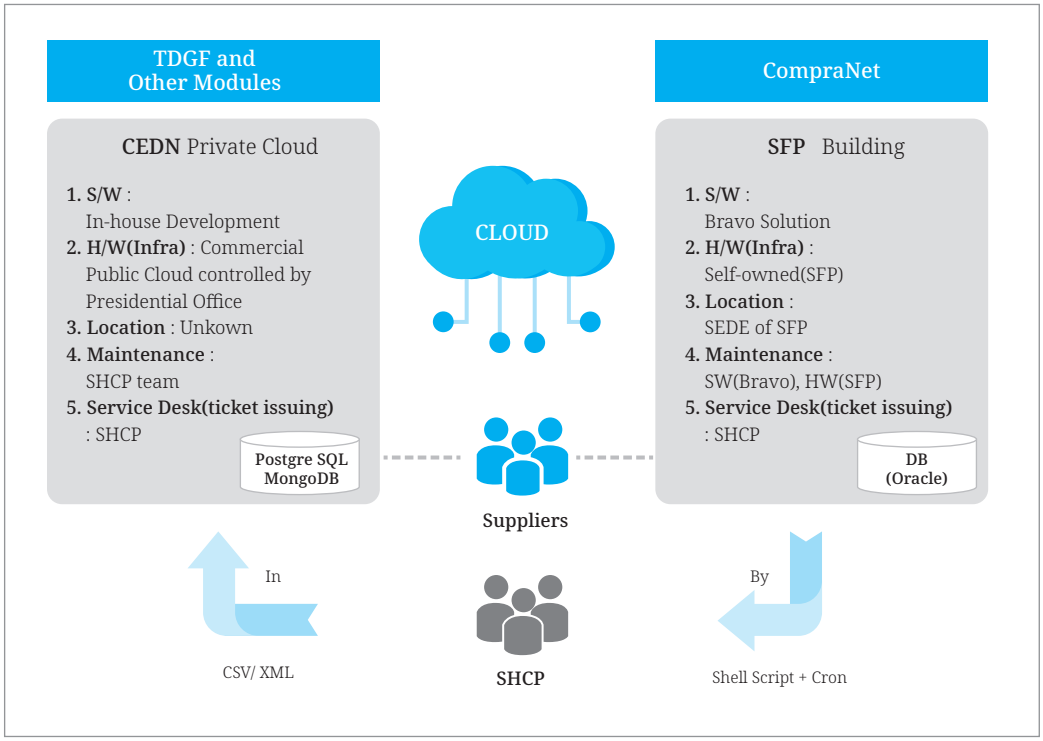


Source: SHCP (2021).

Meanwhile, in the case of development, based on CEDN's IaaS, self-configured Ubuntu as a OS, NGINX as an execution environment (web server), and PostgreSQL as a database are configured to develop applications.

The TDGF and new modules developed in this way are not technically integrated with the currently operating CompraNet at all, which is inevitable because the current CompraNet is developed based on a specific company's solution. In addition, the operating infrastructure is completely separated, and the data required for the new module as well as the basic user DB are manually transferred from CompraNet by the PDCP team. Accordingly, the user is eventually connected to the existing CompraNet or to the service of the TDGF and the new module according to the required service.

[Figure 3-15] Relationship between TDGF and the Current CompraNet



Source: Authors.

3.4. Challenges with PDCP

Currently, Mexico has a grand goal of digitizing the public procurement delivery cycle, and the PDCP project is underway with a schedule of completing the roadmap in about three and a half years, which was projected to take ten years by OECD. In this regard, the program is focusing on 3 modules including TDGF, and the technical architecture for PDCP is also very openly proposed based on open sources.

However, it is not possible to confirm the development priorities of more than 20 modules included in the current PDCP, and a clear target model of what CompraNet will eventually look like when all 20 modules are developed has not been clarified.

This situation occurred because there is no comprehensive blueprint for what CompraNet should look like in a few years, considering the design and development period, and it lacked a comprehensive consultation, such as an ISP (Information Strategy Planning), to draw a target model.

Having a long-term project to replace the current CompraNet implies that there will be multiple systems operating at the same time. System with different data sources and different information technologies can lead the SHCP to have fragmented information and multiple accesses to public procurement information system. This not only makes it difficult to access and use the platforms but also generates a high operational load and inefficiency in the procurement process for both buyers (demanding entities) and suppliers. Multiple systems and data sources without proper management generate information asymmetries, redundant data and inefficiency.

In addition, the strategy or roadmap for introducing new technologies such as Big Data/ Artificial Intelligence (AI) and Blockchain, which have been rapidly developing over the past five years, has not been confirmed. One of the most important aspects of the success or failure of digital public procurement is a user-friendly environment and services provided for system users (user organizations and procurement vendors), which can be solved by the introduction of new technologies in many areas.

In this regard, the OECD recommends the following. “Pursue state-of-the-art e-procurement tools that are modular, flexible, scalable and secure in order to assure business continuity, privacy and integrity, provide fair treatment and protect sensitive data, while supplying the core capabilities and functions that allow business innovation. E-procurement tools should be simple to use and appropriate to their purpose, and consistent across procurement agencies, to the extent possible; excessively complicated systems could create implementation risks and challenges for new entrants or small and medium enterprises”

Therefore, Mexico’s PDCP must also include a new technology introduction strategy, which can be carried out as one of the tasks of comprehensive consulting, or by setting up a new technology adoption committee.

The issue of introducing these new technologies is also very important in relation to contact-less public procurement work, which is being emphasized in the context of infectious diseases such as COVID-19. In order to enable the immediate systematization of possible tasks by using new IT for immediate problems, it is crucial to have a system that enables the rapid configuration of a dedicated organization or setting up a system through outsourcing.

Meanwhile, with respect to module development, including TDGF and new modules, all modules currently use the same technology set, but the standardization strategy of the development framework has not been confirmed. Of course, in the case of the current

PDCP project, the SHCP's public procurement organization employs Mexican engineers on individual contracts for development, so it may be decided that there will be no problem for the time being.

However, when the size of the development project expands, and the development is carried out simultaneously and through outsourcing via international/domestic bidding, a mid- to long-term strategy to standardize the development performance of TDGF for both maintenance and development efficiency needs to be established. For the continuous development of the digital public procurement system, even if it is an open source, a more standardized framework must be determined and software engineers must be continuously trained to ensure stable development and operation, and thus it needs to be treated with importance.

In addition, there should also be a defined data standard strategy for the entire new PDCP platform so the vendors, buyers, processes, contracts and other entities information can be store in the platform in the same format and without duplicating data.

The modernization of a public procurement system must necessarily include an integration strategy that allows the exchange of data between internal and external systems that has not be confirmed by SHCP. It is one of the biggest implementation challenges since, in general, the systems the PDCP must be integrated with can be in different stages in its life cycle (design, construction, production, operation, maintenance, etc.), with different technologies and maturity levels.

Meanwhile, the data migration strategy to the new PDCP platform has not yet been decided by SHCP. This process could have a high impact in the project as well as open a big opportunity to evaluate and improve the data quality available in the current systems. Regardless of the implementation strategy, it is essential that, from the users' point of view, the CompraNet services remain complete and unchanged. In other words, for a citizen, company or any other actor, the transition must be as transparent and smooth as possible.

It is important also to keep in mind that the large-scale COTS solutions usually invest important resources in information security. It is the value added which is included in the 'support and maintenance of licensing' annual fee. The Mexican government decision was to develop a new PDCP from scratch, then cybersecurity has to be one of the priorities to take into account in this project.

Finally, in the current PDCP, the relevance of the digital electronic procurement system of state and local governments other than the federal government and the role of the federal government cannot be confirmed. Of course, federal agencies or state government agencies (including local governments) may operate different digital procurement systems according to the different regulations and circumstances on the consumer side.

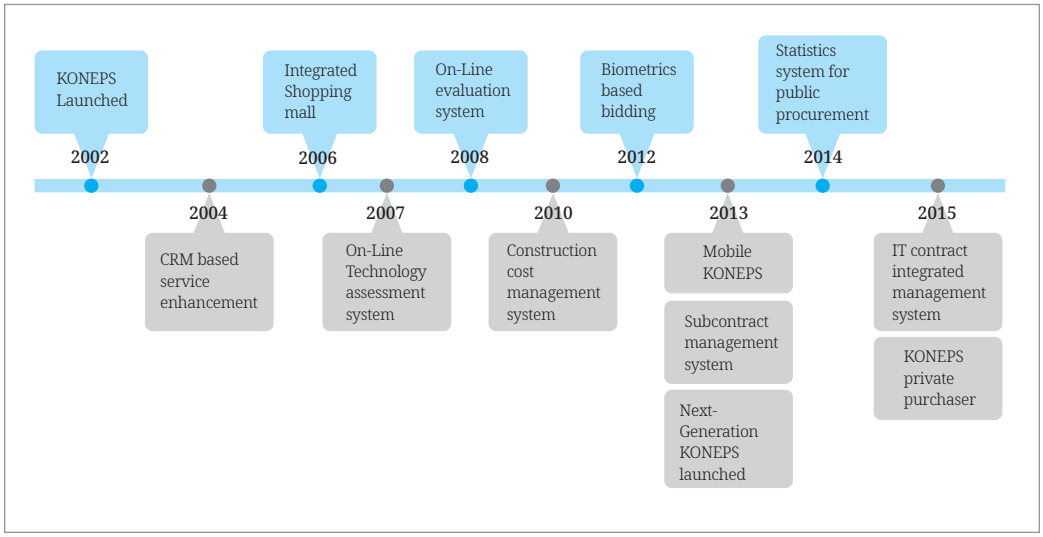
However, from the perspective of the supplier, it will be recognized as the same public procurement, and accordingly, in order to activate the digital procurement system by active participation of the SMEs, it is necessary to consider the role of the leader of the federal government's public digital procurement system and the initiative in standardization.

4. Status of KONEPS in Korea

4.1. Overview of KONEPS

The current Korean public procurement system, named KONEPS (Korea ON-line E-procurement System) which is a comprehensive national digital procurement system, started as part of the Uruguay Round in 1993. Korea participated in the WTO agreement on government procurement in 1994, and opened its government procurement market in 1997. From this point, Korea gradually digitized the public procurement sector and by 1994, e-Bidding based on PC and OMR cards was applied to all bids, and procurement EDI, in which the major procurement documents were distributed via an e-Document format, was conducted from 1996 to 2001. In 2002, KONEPS, a comprehensive national digital procurement system, was launched that allowed not only PPS (Public Procurement Service) but also all government agencies to conduct public procurement online. And in 2006, the MAS (Multiple Award Schedule) framework contract was introduced, and an online shopping mall opened (see Figure 3-16).

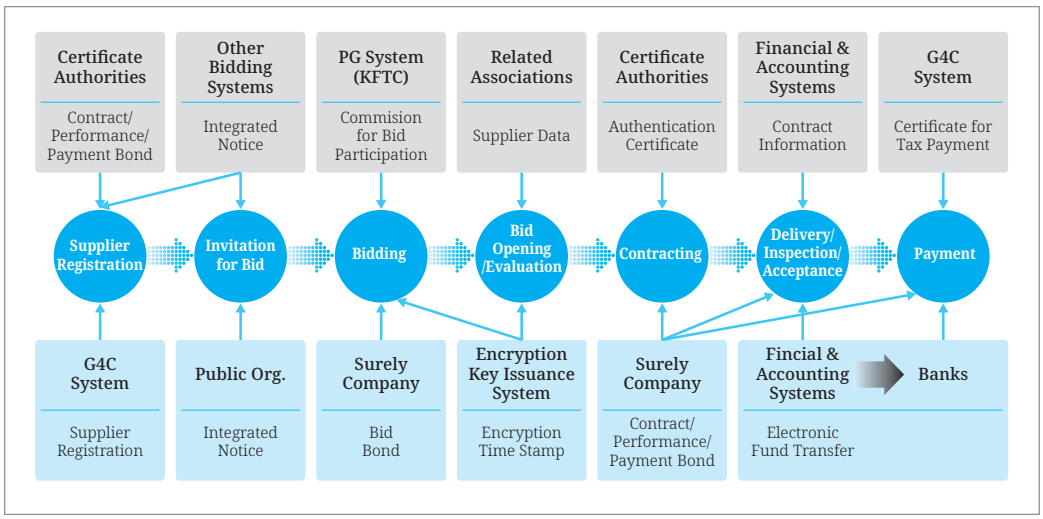
[Figure 3-16] Main Features and Expansion Progress of KONEPS



Source: PPS (2016).

Since then, KONEPS has continued to adopt an online evaluation system (2008), a construction cost management system (2010), a mobile function, and a subcontract management system (2013). In 2015, the digital public procurement system became available to private institutions, such as for joint housing management, named 'Nurijangteo' (see Figure 3-17).

[Figure 3-17] Main Process of Procurement in KONEPS



Source: PPS (2020).

All processes from user registration to payment are digitalized, and a one-stop service is available, through compatibility with 156 external systems including the national budget and accounting system (d-Brain).

4.2. KONEPS and Information Strategy Consulting

The government's digital public procurement system, the predecessor of KONEPS, started from a consulting plan called the Innovation Plan for G2B Activation. As can be seen from the fact that the consulting of the innovation plan at that time was carried out for about 6 months from July to December 2001, and for about 6 months from March to August 2002, KONEPS was built on the basis of long-term and comprehensive consulting results, it can be said that it has a tradition of faithfully accepting the user requirements and technological development directions.

The Ministry of Planning and Budget (currently the Ministry of Strategy and Finance) established a procurement redesign (BPR) and informatization strategic plan (ISP) as strategies for promoting the government's digital procurement business, and in 2002, in order to establish a digital procurement system according to the results in January, the Innovation Plan for Activating G2B (BPR/ISP) was established and promoted.

In the past, the Business Process Reengineering (BPR) system improved the procurement process by 80% by removing over 150 out of over 550 unnecessary redesign target processes, while changing 300 through digitization and integration. This allowed the procurement process to be simplified through the Internet and digital documents.

The main contents of the Information Strategy Planning (ISP) established according to BPR included 1) S/W system construction design necessary for a G2B service, 2) H/W system structure design, such as computer equipment and communication networks, 3) When considering compatibility with other systems, it included the derivation of transmission/reception information items and exchange methods.

Since then, the Public Procurement Service has carried out information conversion consulting at for every important occasion to improve and expand the function of the digital procurement system, and this has been reflected in improving the system. A few are listed in <Box 3-2>:

<Box 3-2> ISP Progress for Establishment and Continuous Improvement of KONEPS

2002: Innovation Plan for Activating G2B (BPR/ISP)
2006: ISP for the advancement of RFID-based national goods management service
2008: ISP for the establishment of a product registration office (product information integration system)
2009: Consultation on the advancement of the internal information system's foreign investment sector
2012: Research on establishing the mid- to long-term development strategy for procurement digitalization
2013: Informatization strategy plan to establish the public procurement data system
2016: ISP for rebuilding product information systems
2018: Korea ON-line E-procurement System (KONEPS) overhaul ISP
2019: ISP for rebuilding the integrated cost management system
2020: Expanded the subcontract guarding service ISP, ISP to build a shopping mall dedicated to the digital service products
2020: Establishment of the next-generation national digital procurement system (KONEPS) establishment strategy and implementation plan

Source: Reorganized by Authors.

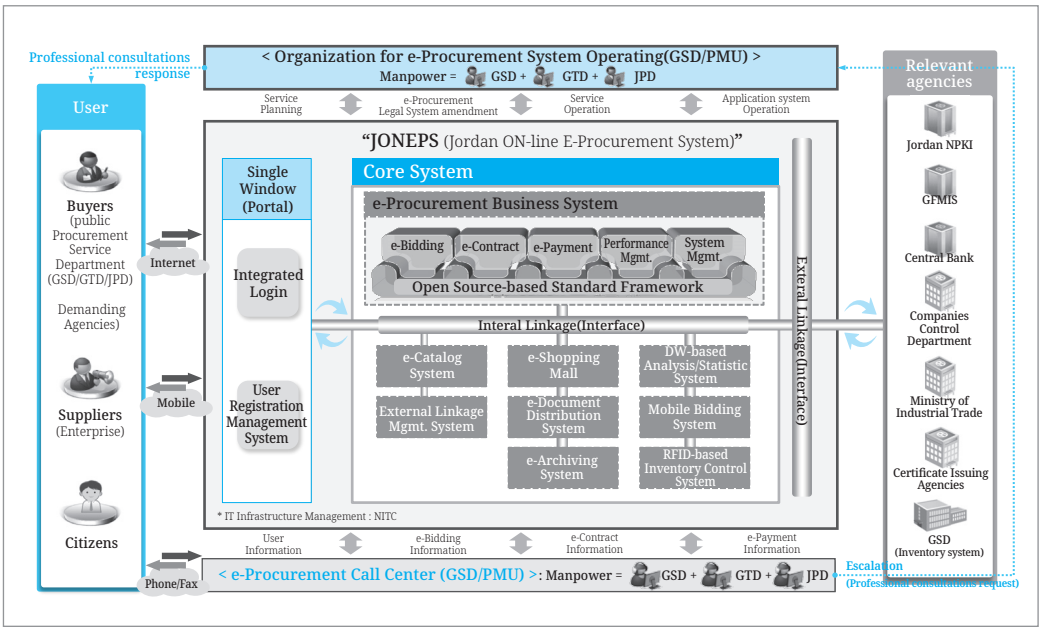
In 2020, it was found that the state contract system centered on ownership forms has difficulty in accommodating new types of digital services, such as cloud services. Accordingly, it is necessary to establish a system suitable for new institutions so that contracts with companies in the form of product information (catalog) and ordering agencies can quickly introduce and use the best digital service, which has been optimized for the characteristics of the business through negotiations with a contractor. Thus, a "complementary strategy plan for the establishment of a shopping mall dedicated to digital service products" has been established.

The 'digital service professional contract institution' as mentioned above is an institution that has been in effect since October 2020, and refers to a system that allows the public to purchase cloud services without going through the bidding process, for example. The government and national institutions can voluntarily contract digital services registered in the 'digital service use support system'. As a result, the existing complicated procedures were eliminated and the services registered through prior deliberation were able to be used as much as necessary when needed by public institutions. For this purpose, the Enforcement Decree of the Cloud Computing Act, the Enforcement Decree of the National Contract Act, and the Enforcement Decree of the Procurement Business Act have been revised. The procedure of the procurement request → pre-disclosure of the purchase specifications → bid notice → bid → selection of successful bidders → contract conclusion and delivery' has

been simplified to the 'digital service search → suitable service selection/consultation of the contract conditions → contract and delivery. It could be the best practice of BPR.

Meanwhile, KONEPS's achievements led to the exports to several countries such as Tunisia, Costa Rica, and Jordan. In the process, BPR/ISP consulting played an important role in presenting a blueprint for establishing the public digital procurement system in the country. [Figure 3-18] was the blueprint for the establishment of a public e-procurement system for Jordan.

[Figure 3-18] Target Model of Jordan e-Procurement System (JONEPS)



Source: KOICA (2017).

4.3. KONEPS and Development Framework

KONEPS, which started its service in 2002, began to service the next-generation version of KONEPS that applied the new IT in 2013, about 10 years later. This was done in order to increase the access speed and reinforce the search functionality, data analysis, security and web accessibility.

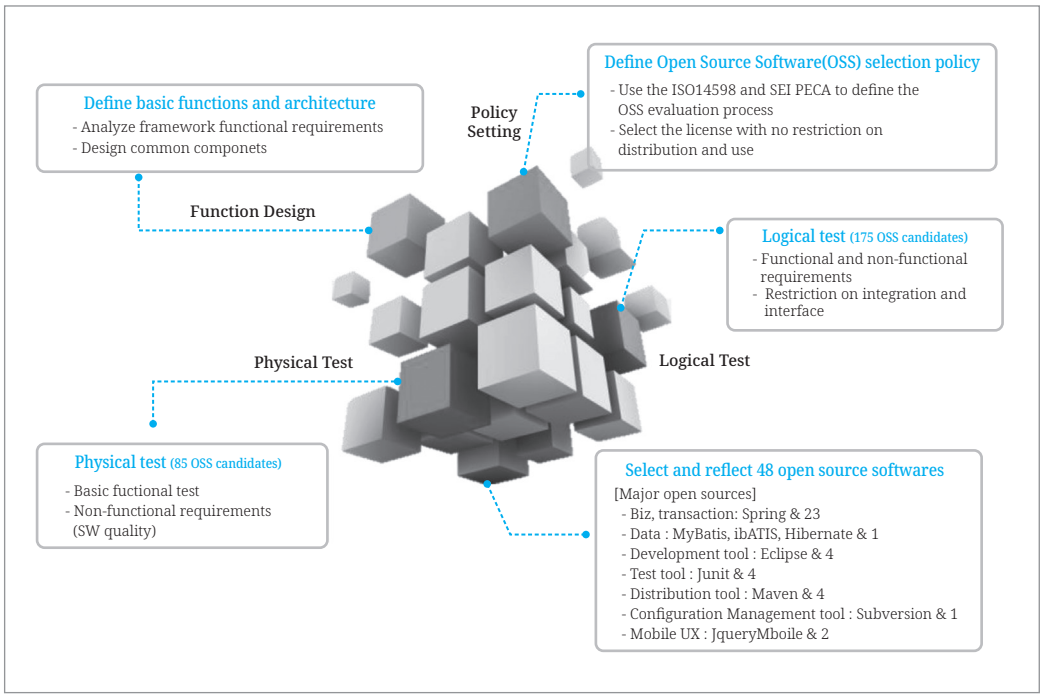
There was a large change in the development framework, called the KONEPS Phase 2 Establishment Project. Prior to that, it was customary for the e-government service development projects conducted in Korea to use the unique framework of the data system developers. Representative examples include AnyFrame for Samsung SDS, DevOn for

LGCNS, and NexCore for SKC&C. This led to many issues, such as the deteriorating efficiency and maintainability in development, as the development framework of some companies was not always used in the future or if the developer got replaced.

As a result, the Ministry of Public Administration and Security (then the Ministry of Security and Public Administration) improved the standardization, quality, and reusability of the application software by establishing a standard for the development framework when promoting the JAVA platform for the national digitalization project (e-government) in the domestic public sector in 2009. The eGovFramework was therefore developed and started to be distributed under an Apache 2.0 license in order to prevent greater dependency on the specific companies and the redundant development of the common components for each business. Starting with version 1.0 in 2019, the current version 3.0 is the latest version released in March 2020. The official service site is the Standard Framework Portal (https://www.egovframe.go.kr/).

Accordingly, the second stage KONEPS, which launched in 2013, naturally adopted the eGovFramework, which continues at present (see Figure 3-19).

[Figure 3-19] Open Sourcing of eGovFramework



Source: NIA (2017).

Meanwhile, PasS-TA (the official service site of PasS-TA is https://www.paas-ta.kr/), a Korean open cloud platform announced in 2016, supports more than six development languages, supports the various cloud infrastructure services (IaaS), automates platform installation, and the e-government standard framework is also installed. It supports the smooth implementation and continuous advancement of e-government services on the cloud platform.

The current technological development direction of the next-generation e-government framework consists of five service categories in relation to the provision of common services. These are e-government intermediation (brokerage) service, e-government common service, common system SW service, execution environment support tool service, and infrastructure resource service. The e-Government brokerage service will provide a SW marketplace function so that the commercial SW and private cloud services can be used in a pay-as-you-go system, and the e-Government common service will provide functions for implementing AI, BigData, and IoT-based services in a SaaS method. And in the case of the infrastructure resource service, it plans to provide a private cloud-based information infrastructure function through SDDC (data center virtualization) (see Table 3-3).

<Table 3-3> Technical Development Direction of Next-generation of eGovFramework

<table>
<tr><th colspan="2">Classification</th><th>Service Category</th><th colspan="2">Service Group</th></tr>
<tr><td rowspan="5">Information function service</td><td rowspan="2">Intermediation service</td><td rowspan="3">e-Government intermediation Service:
Public Service
Private Service</td><td colspan="2">Private SW service (on-demand)</td></tr>
<tr><td colspan="2">Private SaaS service (API Linkage)</td></tr>
<tr><td rowspan="3">Platform sevrice</td><td colspan="2">Public system sharing service (API Linkage)</td></tr>
<tr><td rowspan="3">e-Government common Service</td><td colspan="2">e-Government common componet service</td></tr>
<tr><td colspan="2">e-Government common base technology service</td></tr>
<tr><td rowspan="6">Information resource service</td><td colspan="2">intelligent technology service (AI, IoT, Big Data)</td></tr>
<tr><td rowspan="2">Commom system SW Service</td><td>Operation system(OS)</td><td>Middleware
(WAS, WEB)</td></tr>
<tr><td colspan="2">Data storage (DBMS)</td></tr>
<tr><td rowspan="2">Execution environment support tool service</td><td>Operation support tool</td><td>CI/CD tool</td></tr>
<tr><td>e-Government standard PW</td><td>Development support tool</td></tr>
<tr><td rowspan="2">Infrastructure Resource service</td><td colspan="2">SCN (Network, Security)</td></tr>
<tr><td>SDC (computing)</td><td>SDS (storage)</td></tr>
</table>

Source: Reorganized by Authors.

4.4. Next-generation KONEPS Development

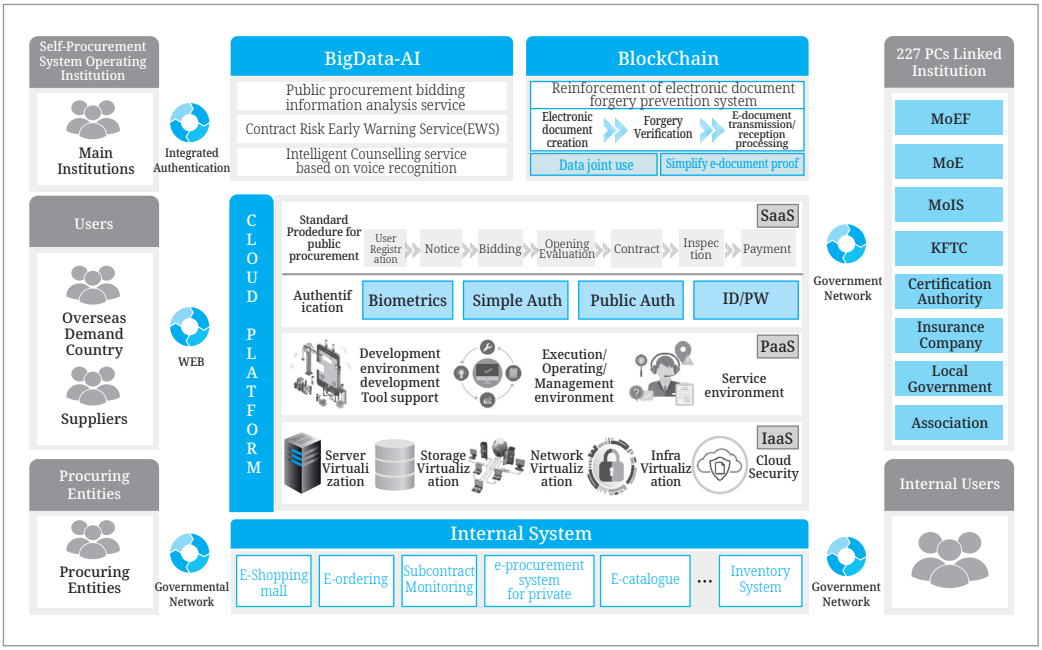
KONEPS has continuously improved its functions since the 2nd phase of the project in 2013, but problems in terms of stability, such as the sudden increases in obstacles and slowdowns have occurred, and the innovative services that utilize technologies for the 4th industrial revolution, such as AI, BigData, and Blockchain, need to be better integrated.

As a result, the current status and problems were diagnosed in the next-generation KONEPS construction project under a long-term plan via the establishment of the ISP (Information Strategy Planning) in 2018, and the ISMP (Information Strategy Master Plan) project for the detailed design was carried out in 2020. The establishment started in 2021 and aims to launch in 2023.

The next-generation KONEPS business boasts: 1) 'user-orientedness' through the intuitive and optimized user experience (UX)-based interface improvement, online processing of some handwritten tasks, etc., 2) Intelligent bidding information analysis using vast data and AI, intelligent consultation, and the contract risk analysis, prevention of forgeries and alterations through Blockchain technology, and the prevention of the duplicate submission of documents, and 3) 'The integration of a digital procurement window,' unifying the system of the institutions operating their own digital procurement.

At the time, 26 large-scale public corporations and public institutions, including KEPCO (Korea Electric Power Cooperation) and KORAIL, are operating their own electronic procurement systems, but in accordance with the revised Electronic Procurement Act that took effect on July 1, 2019 and the enforcement decree Strictly restrict new builds. In addition, if the existing operating system does not meet certain criteria, it is now possible to request conversion to use KONEPS compulsory (see Figure 3-20).

[Figure 3-20] Next-generation KONEPS Construction Project Target Model



Source: Public Procurement Service, Press Release (February 25, 2020).

4.4.1. Full-scale Introduction of Cloud

As shown in [Figure 3-20], the biggest change in the infrastructure of the next-generation KONEPS target model is the full introduction of cloud services. PPS plans to organize and operate a Private Cloud Zone for KONEPS services within the National Information Resource Management Agency. The cloud service will introduce not only IasS (Infra as a Service), but also PaaS (Platform as a Service) as a development and operation platform, and SaaS (Software as a Service) as a service.

In the case of IaaS, it is expected that it will be possible to allocate resources quickly even before and after holidays, when the business deadlines are concentrated. Examples include closing bids, signing contracts, making payments, along with other increased usage at the end of the year. In addition, PaaS will provide an environment in which DevOps can be applied more easily by utilizing the e-government framework, which serves as the basis of the existing KONEPS development.

In the case of SaaS, the goal is to provide services so that the 26 public institutions that have previously operated separate digital procurement systems can use KONEPS in an integrated manner while meeting their own unique requirements. This shows that KONEPS is on the path to becoming the single digital public procurement platform in name and

reality. Inefficiencies caused by the redundant expenditure of the digital procurement system maintenance cost will be improved, which means less discomfort for suppliers who must use several digital procurement systems.

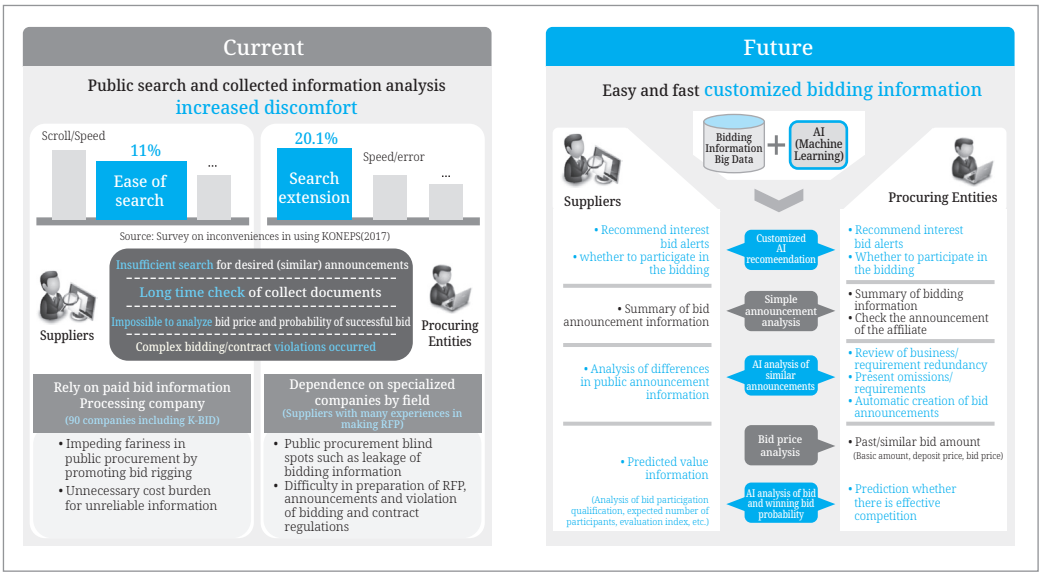
4.4.2. Reinforcing the Bidding Information Analysis Service

In the current version of KONEPS, search features for the desired similar bidding announcements are insufficient, it requires a long time to check the collected documents, and it is impossible to analyze the bidding prices and the probability of successful bids, causing a number of inconveniences. For this reason, companies participating in digital procurement often use paid services for processed bidding information, resulting in additional costs.

The next-generation KONEPS plans to reinforce a big data platform so that accumulated data can be utilized and AI technology can be applied to provide a service that allows suppliers to use the bid analysis information more quickly and easily. On the other hand, related services are also very important in terms of ordering agencies, and currently, due to the lack of bidding information analysis services, they rely on certain specialized companies to create the required RFPs (Requests for Proposals), thereby unnecessarily leaking the bidding information in advance. As a result, there are cases in which the fairness of procurement is impaired (see Figure 3-21).

However, when the new system is introduced, the ordering agency will be able to utilize a variety of similar bidding information services that they need, as well as receive an optimized RFP template, thereby reducing reliance on specific suppliers.

[Figure 3-21] Reinforcement of Procurement Information Service by Introducing Big Data and AI



Source: Public Procurement Service, Press Release (February 25, 2020).

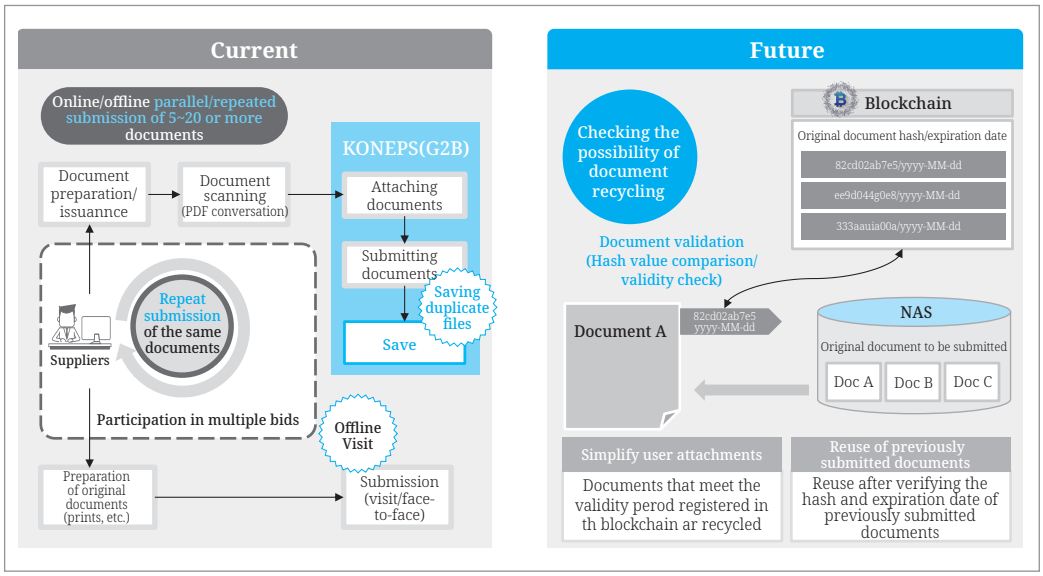
4.4.3. Simplifying Proofing of Digital Documents (Recycling of Repetitive Documents)

The most important thing in the digital procurement system is user convenience, and among them, it is very important to eliminate duplicate documents that were required to be submitted for bidding. This is crucial in enhancing work efficiency, not only facilitating the participation of bidders in digital procurement, but consequently shortening the preparation time for procurement participation.

Currently, in order to participate in public procurement, generally 5-20 types of documents are not only simultaneously submitted online and offline, and even though the expiration dates remain, there are cases where they are repeatedly submitted each time they participate in the procurement process.

However, by introducing Blockchain technology, it is possible to check the possibility of document reuse, and if the validity period of the registered document has not lapsed, the previously submitted document can be reused, thereby eliminating the inconvenience of the repeated submission (see Figure 3-22).

[Figure 3-22] Minimization of Duplicate Submission of Documents related to Procurement by Blockchain



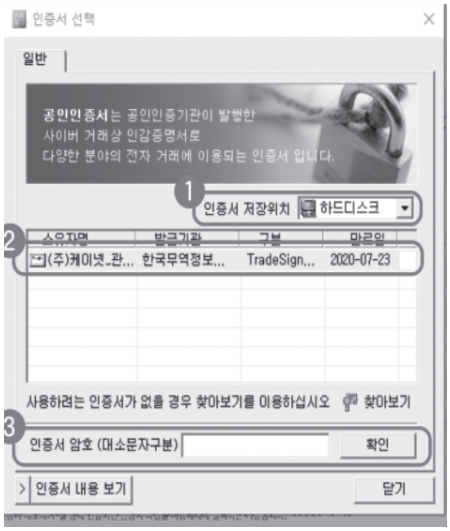
Source: Public Procurement Service, Press Release (February 25, 2020).

4.4.4. Introducing Various Supplier Certification Methods

Currently, suppliers can participate in bidding through KONEPS through PKI-based (Public Key Infrastructure) corporate certificates and the fingerprint authentication of the registered bidders. In order to prevent fraudulent bidding caused by lending corporate certificates, it is mandatory to use a fingerprint security token with the fingerprints of the bidding agents registered. However, in order to reduce face-to-face contact due to COVID-19, it has allowed bidding without fingerprints in exceptional circumstances during the pandemic (see Figure 3-23).

[Figure 3-23] Examples of Corporate Certificates and Fingerprint Security Tokens

Corporate certificate (example)



Fingerprint security token (example)

Source: Authors.

Although this process plays an important function in the security of digital procurement in various aspects, such as preventing bid rigging, the current fingerprint security token raises several problems. First, the fingerprint security token and corporate certificate must be purchased separately to participate in the KONEPS bidding. Second, it is necessary to install a separate program for the fingerprint security token, so there is a chance of security infringement on individual PCs. Third, there is the inconvenience of being required to visit the Public Procurement Service for fingerprint registration, and fourth, bidders have complained that there are cases in which the participation in bidding is not possible due to the low fingerprint recognition rate during the bidding process.

Accordingly, the Public Procurement Service aims to increase the convenience of KONEPS users and its own digital institutions by performing integrated authentication using Blockchain technology. In Korea, government agencies such as the Military Manpower Administration have carried out a project to switch to the user authentication function using Blockchain instead of the certificate-based login function used previously for civil service. Here, a platform that allows users to select and manage personal information based on biometric authentication (FIDO) such as fingerprint authentication and DID (Decentralized Identity, Distributed Identity) was used. In addition, by improving the system to create an environment where various private certificates can be used, the cost of purchasing certificates for procurement participating companies will be reduced.

4.5. Evaluation of Korea's Digital Public Procurement Experience

Assuming that the starting point of KONEPS was the year 2002, the continued service expansion and functionality of Korea's national digital procurement system has been enabled by consultations called the ISP (Information Strategy Planning). Behind the birth of KONEPS in 2002 was the Innovation Plan (BPR/ISP) for Activating G2B (Government to Business), and for the goal model, implementation strategy, and implementation plan for the next-generation KONEPS, the Complete Reorganization of the National Digital Procurement System ISP in 2018 and establishing strategies and implementation plans for the next-generation national digital procurement system in 2020 have played key roles.

In 2001, in the first consultation for KONEPS, the vision, direction and guidelines of G2B were established within a larger e-government framework, and the National Electronic Procurement System Establishment Strategy was developed. It performed the business process innovation task (BPR) related to procurement for the public procurement system through process innovation instead of digitalizing simple procurement processes. In addition, G2B-related contents and electronic forms were standardized, and based on this, the ISP and information infrastructure expansion plan to establish a single procurement window was confirmed.

In addition, in order to completely reorganize the outdated KONEPS system, its status and issues were assessed through the establishment of the ISP (Information Strategy Planning) in 2018, and the ISMP (Information Strategy Master Plan) project for detailed design in 2020 was carried out. Currently, the next-generation KONPES is being designed under a long-term plan.

In the consulting process, requests were collected from stakeholders, including system operating institutions, ordering agencies, public procurement vendors, and the managers of various related organizations such as the Ministry of Strategy and Finance, the National Tax Service, and financial institutions, which are the three pillars of digital public procurement. The utilization of the digital public procurement system is maximized through a user-centered system, such as by selecting a target model of the system to be built.

In addition, the joint foundation for e-government services called the eGovFramework played a crucial part in the successful development and operation of KONEPS. This has to do with the fact that for the successful system development and operation, domestic software engineers who participate in the system must have the foundation for continuous training and employment.

In Korea, most e-government services are developed through outsourcing. In the absence of an e-government framework, each outsourcing company created and used their own development framework, so whenever the contract was terminated and the company was changed. There were also cases where the company was very reluctant to change the company because it was very difficult to take over.

In Korea, the e-Government framework was developed by jointly participating in the National Information & Society Agency (NIA), a specialized public institution, and companies with interests in the SI (System Integration) project. After that, NIA provided free education and training for developers and provided technical support for problems occurring in development projects to which the framework was applied. And through the process of continuously improving the framework by analyzing problems occurring in the field, reliability and effectiveness were proven. These achievements can also be confirmed by performance as lays out in <Table 3-4>.

<Table 3-4> Performance of Domestic Application of eGovFramework

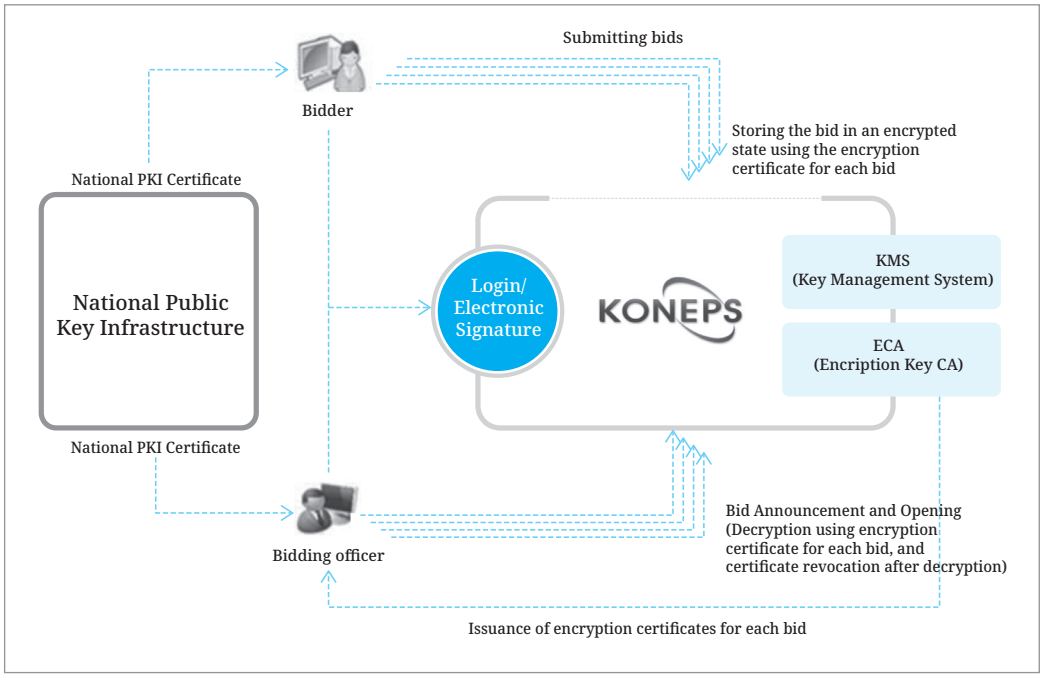
Year	2009		2010		2011		2012	
Size	No. of Case	Project Cost (million KRW)	No. of Case	Project Cost (million KRW)	No. of Case	Project Cost (million KRW)	No. of Case	Project Cost (million KRW)
Big	16	809.1	46	2,362.2	66	3,238.1	61	2,193.3
Medium	4	9.4	14	51.8	27	97.8	67	211.2
Small			9	6.1	19	15.0	55	37.4
Total	20	818.5	69	2,420.1	112	3,350.9	183	2,441.9
Year	2013		2014		2015		2016	
Big	80	2,563.9	60	3,446.8	72	2,533.3	95	1649.5
Medium	124	401.9	101	309.9	108	342.9	157	506.2
Small	96	61.7	73	50.3	58	41.3	107	73.2
Total	300	3,027.5	234	3,807.0	238	2,917.5	359	2,228.9
Year	2017		2018		Total		[Size]	
Big	166	3,878.0	164	4,460.1	826	27,134.4	Big: over 6.25 billion KRW Medium: between Big and Small Small: under 1.25 billion KRW	
Medium	273	857.7	264	790.9	1,139	3,579.7		
Small	168	123.7	141	108.9	726	527.6		
Total	607	4,859.4	569	5,359.9	2,691	31,241.6		

Source: Korea EximBank (2020).

Meanwhile, in the case of KONEPS, continuous efforts have been made to strengthen the security of the digital procurement system, and one of the biggest advantages is the application of PKI (Public Key Infrastructure) to maintain the security of bids. In the case of Korea, PKI is divided into a part used for authentication and signature of demanding entities and suppliers, and an internal PKI to strengthen the confidentiality of bid proposals, which refers to the latter.

The purpose of this is to encrypt information for each bid and issue an encryption key for decryption by the person in charge of the ordering agency. This is different from the one-person-one-certificate issuance system after identification, automatic issuance of certificates for each bid item, and an automatic discarding process after decryption is carried out. This is a process designed for the purpose of preventing leaks of bidding information by the system administrator of the Public Procurement Service, and it is a reasonable method for securing the reliability of the digital procurement system (see Figure 3-24).

[Figure 3-24] PKI Application Process by Bid



Source: Reorganized by Authors.

In addition, in a situation where non-face-to-face work has become inevitable even in public procurement due to COVID-19, the contact-less review and evaluation system has been expanded. In the past, online reviews were available for proposals of less than 1 billion won; however, this policy has changed so that bids larger than 2 billion won are subject to online evaluation, in order to help prevent the spread of infectious diseases.

To this end, the Public Procurement Service has opened the ‘e-order system’, which was previously only used internally, so that all public institutions can use it. The ‘e-order system’ supports the use of “services through the system from the beginning to the end of a project, from the creation of a proposal request, evaluation, and project management for the entire process of a contract subject to negotiation”.

In particular, regarding the performance of non-face-to-face work processing, KONEPS has played a pivotal role in ensuring that the public procurement work can be performed smoothly even during the pandemic such as COVID-19 by opening the virtual online evaluation function for each ordering agency (see Figure 3-25).

[Figure 3-25] e-Order System (Screen for Authorized Presenters of Proposing Companies)

<Authorization of presentation to the presenter of the proposal>

1. Confirm that the materials to be presented by the proposer have been properly registered.
2. Right-click on the name of the presenter of the proposer you want to present.
3. Select Presenter Privileges from the menu that opens.
4. If the presenter of the proposer clicks the present button before the presenter permission is granted, a notification of the presenter permission request is popped up on the screen of the evaluation officer.
5. When you click Accept, the presenter of the company has presenter rights.
6. When you click Accept, a notification is displayed to all users that the company’s presentation will be started.

Source: Public Procurement Service (2021).

5. Policy Recommendations for Rebuilding of the Next-generation CompraNet

5.1. Considerations

If the purpose of public procurement is to procure quality goods and services at a good price through fair competition in a timely manner, the digital procurement system to support this may be sufficient with leading products on the market.

However, considering the various functions that the national public procurement has to provide, such as the efficient execution of the national budget, the monitoring of contract management, and the expansion of accessibility for participating companies by providing convenience for digital procurement, the current solutions on the market cannot sufficiently satisfy these requirements. In addition, in order for public procurement to be used as a policy, such as contributing to the industrial development and job creation by enhancing the competitiveness of domestic SMEs, general package software cannot be used.

As can be seen from the previous analysis of the public digital procurement status in Mexico, Mexico has been using a packaged solution-based e-procurement system for public procurement for a long time.

However, in Mexico, the 58th President López Obrador, who took office in July 2018, put the eradication of corruption that had hindered the economic and social development of Mexico for the past several years as the top priority of the national administration and is trying to manage the government budget in a more transparent and efficient way. For that public procurement was transferred from the Ministry of Public Administration (SFP) to the Ministry of Finance and Public Credit (SHCP). Therefore, it can be said that Mexico's public digital procurement system is facing a major change.

Therefore, these policy recommendations are presented on the premise that the public digital procurement system is not based on a package solution, but is redeveloped as a system integration (SI) project concept using open source according to the Mexican e-government strategy.

Considering this point, policy recommendations will be presented in three main directions. The first is about the provision of knowledge bases. The second is about preparing the organizational foundations. The third is about vision establishment.

5.2. Building Knowledge Bases for the Next-generation CompraNet

Currently, the PDCP organization within SHCP not only utilizes open source software in line with the national digital strategy for new modules to be developed, but also has the technical capability to suffice CDED's Private Cloud. PaaS and IaaS utilization technologies based on various open source software currently being used and DevOps capabilities are at a sufficient level.

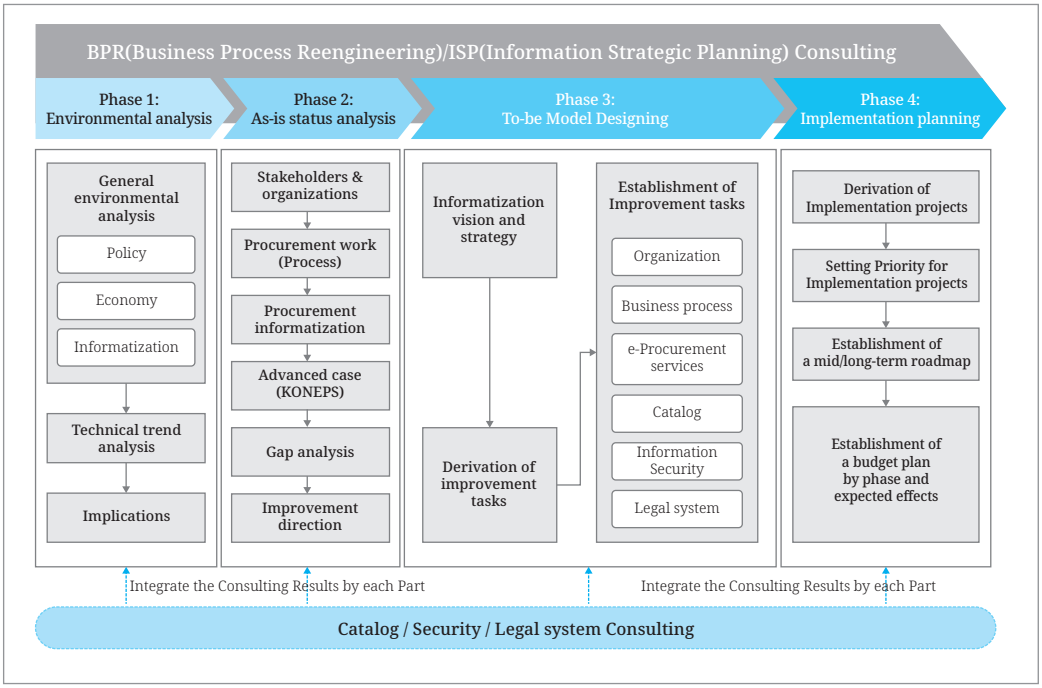
Mexico has such sufficient development capabilities, but unfortunately, there is no target model (or future model) for Mexico's public digital procurement, and it is judged that it only has an understanding of the modules necessary to implement the entire digital procurement cycle.

Therefore, the first policy recommendation is that, most urgently, a target model should be established through a comprehensive IT strategy consulting such as BPR/ISP.

It is necessary to conduct consulting for a comprehensive roadmap of the digital public procurement system. Currently, Mexico is progressing with improvement directions through various public procurement evaluation methods and consulting with OECD, IDB, etc. However, since the target model for Mexico going forward is not visible in terms of an information system, a Korea-like ISP/ISMP consultation should be carried out.

This should include a target model that the Mexican digital public procurement system (CompraNet) must have for at least the next three years, including the improvement of the technical problems of the current system, the implementation of functions for the process improvement, and the application of new technologies to expand the user service. It is necessary to establish and implement practical steps to take to achieve the target model. An open platform based on the interoperability of each module is important, but only when a comprehensive target model is established in terms of information systems/services can a system be deployed with directions and goals (see Figure 3-26).

[Figure 3-26] Consulting Phases of BPR/ISP



Source: Reorganized by Authors.

For this, it is necessary to understand the BPR/ISP consulting phases and the output of each phase through on/offline education and training. Based on this basic understanding, it is a good way to train the internal consultants to conduct consulting on their own, or to hire external consulting experts to draw up a target model together.

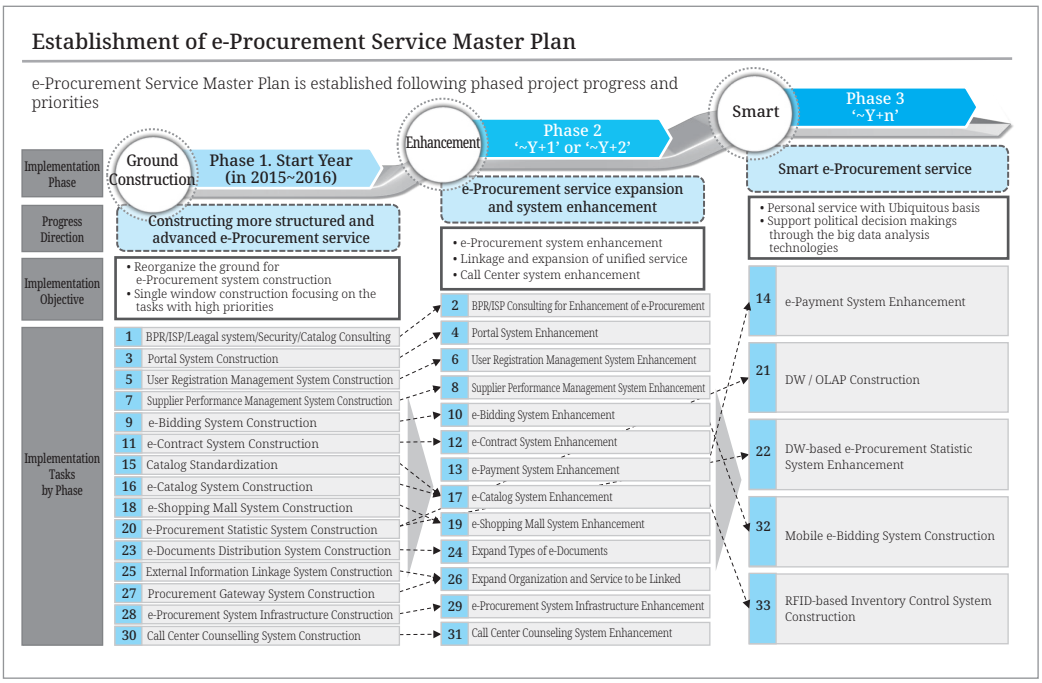
What must be kept in mind during this consulting process is that the key stakeholders of the three pillars of the digital procurement system, the demanding entities, the suppliers, and the system/development operating organization, should participate and draw their own requirements to find an agreement. For instance, when designing the e-bidding function, it is recommended that the list of necessary functions is confirmed by collecting the opinions of the demanding entities and suppliers, and included in the development list in consideration of feasibility and urgency. For reference, in the case of Korea, for the next-generation KONEPS project, the 'Support Team' for advice on the procurement business and the 'Informatization Department', the current KONEPS operating department, are participating inside PPS. In addition, externally, the 'Digital Procurement Innovation Forum' composed of ICT experts, the 'Electronic Procurement Council' in which an external self-procurement system operating the organization participates, and the 'User Council' in which the demanding entities and suppliers using KONEPS participate are being organized for the next-generation KONEPS.

In addition, in order to improve the completeness (business efficiency) of the digital procurement system, it is necessary to thoroughly investigate the externally linked system, and to consider the institutional support measures or incentives to induce their participation in policy.

It is also necessary to discover and systematize areas that can be contactless in the public procurement business. COVID-19 has been an opportunity to quickly convert many tasks that have traditionally relied on face-to-face interactions to be non-face-to-face. The most inevitable part of public digital procurement is the operation of an evaluation committee related to the supplier registration and technology evaluation.

On the other hand, once a target model is established based on the requirements of the stakeholders and the improvement of the business process, the execution power of the plan must be ensured by preparing a short and mid-term roadmap to complete it. In order to establish the roadmap, the implementation task (must include the budget) must follow the systematically selected priorities according to the clear criteria (see Figure 3-27).

[Figure 3-27] Example of Short and Mid-term Roadmap for Target Model



Source: Reorganized by Authors.

Clear criteria would include the strategic urgency of the implementation task, the feasibility of implementation (including securing technology and financial resources), and

the precedence between the implementation tasks. And once the criteria are established, the final roadmap must be completed with the participation of internal and external experts and policy makers in the decision-making process.

The second policy recommendation for building knowledge bases is to develop a development standard framework.

Currently, new modules in PDCP are being developed on their own by hired external experts, so it may not be difficult to manage and educate the development framework, but if considering a large-scale SI project in the future, the standardization of the framework should be considered.

It is necessary to determine a development framework that is optimal for PDCP rather than an open framework in order to maximize the code reusability and interoperability, increase development productivity, and improve quality. Since 2013, The NIA of Korea and CINVESTAV of Mexico have cooperated for projects through an MOU related to the eGovFramework (http://egovframe.cinvestav.mx/convenio). Therefore, it is necessary to share this experience and promote collaboration with the related organizations so that the Mexican public digital procurement platform can become a common foundation for the Mexican digital government.

Once the starting point could be the various open source technology sets used in the successfully established TDGF and other new modules. However, most importantly, it is necessary to form an organization in the form of a forum in which the various stakeholders interested in the development standard framework can participate. Stakeholders referred to here may include not only the software developers who are willing to participate in the digital procurement system establishment project, but also the officials from other government agencies or public institutions that want to develop the e-government services, and professional organizations such as IPN. The forum for establishing the development standard framework could need to be developed into a more stable form in the future for its scalability and continuous improvement.

There are development language and license issues as factors to consider when composing the development standard framework. Korea adopted Java as a development language for various reasons and composed the implementation tool, test tool, distribution tool, and configuration management tool as shown in <Table 3-5>.

<Table 3-5> Main Contents of Construction (e-Government Standard Framework)

No	Service Group	Service		Open Source	License
1	Implementation Tools	Editor	Source Editor	Eclipse	EPL & EDL
2			UML Editor	AmaterasUML	EPL 1.0
3			ERD Editor	AmaterasERD	EPL 1.0
4			Web Flow	Spring Web Flow	N/A
5			Code Inspection	PMD, FindBugs	BSD, LGPL
6			New Batch Template Project	Spring Batch	Apache License 2.0
7			New Batch Job	Spring Batch	Apache License 2.0
8			New Batch Job Launcher	Spring Batch	Apache License 2.0
9		Debug	Local Debug	Eclipse	EPL & EDL
10			Remote Debug	Eclipse	EPL & EDL
11	Test Tools	Unit Test	TestCase	Junit	CPL
12			Mock Support	EasyMock	MIT
13			DB Support	DbUnit	LGPL 2.1
14		Test Automation		Ant, Maven	Apache License 2.0
15		Test Reporting		Ant, Maven	Apache License 2.0
16		Test Coverage		EMMA	CPL
17		Batch Job Test		Spring Batch	Apache License 2.0
18	Distribution Tools	Build	Build Tool	Maven	Apache License 2.0
19			CI Server	Hudson/Jenkins	Creative Commons Attribution Share-Alike License, MIT
20			Nexus	Nexus	GPL
21	Configuration Management Tools	Configuration Management		Subversion	Subversion License
22		Change Management		jTrac	Apache License 2.0

Source: Korea EximBank (2020).

However, the PDPC team is currently using Python as its development language. When the forum is established, it will be enough to listen to the needs of various stakeholders, select the language most suitable for Mexico, and configure the framework.

Of course, the standard framework should be distributed as OSS (Open Source Software) that anyone can use for free. However, among the individual licenses of OSS, the licenses with the provision of the distribution reciprocity (eg CDDI, LGPL, EPL, CPL, etc.) are inevitably maintained. OSS without the distribution reciprocity clause should be produced and redistributed freely by applying the Apache License mutatis mutandis so that there is no obligation to disclose the source code.

By applying the development standard framework, the following effects could be expected (see Table 3-6).

<Table 3-6> Effects of Applying Development Standard Framework

Classification	Before the application of the standard framework	After the application of the standard framework
Prevent duplicate development	Duplicate development of the same function for each business operator	Prevent duplicate development with the reuse of a common module
Solve dependency on the company	Dependence on the business operator deepened due to the use of non-standard unique technology	Solve the dependency of the business operator using the standardized technology
Facilitate fair competition	Unfavorable to SME not possessing the framework	Improve the competitiveness of the SME with the free supply of the framework
Save link costs	Take lots of time and personnel in mutual connections	Easy connection with standardization of the link module
Effective maintenance	Difficult maintenance due to an insufficient development standard	Easy maintenance with modulation by the development standard
Improve export competitiveness	Full-scale redevelopment per country and project	Develop areas required only according to the features for each country

Source: Korea Eximbank (2020).

5.3. Building Organizational Foundations for the Next-generation CompraNet

In order to establish public digital procurement system through a comprehensive SI (System Integration) project, an organizational foundation as well as the aforementioned knowledge base is required. However, the current Mexican federal government's digital procurement team has about 40 people and is in charge of operating the existing CompraNet and developing new modules.

Mexico has a political system called a federal system and has the characteristics of the distributed procurement, whereas Korea has the characteristics of a central government

with a local autonomy and centralized procurement. Therefore, it is difficult to directly compare the public procurement organization and the public digital procurement unit in the two countries.

However, in many cases, the systematic digital public procurement system cannot rely solely on the internal development and maintenance by internal personnel, so in a situation where the development and maintenance must be performed using an external developer, despite the differences in the public procurement institution, the digital public procurement unit must be structured similarly.

In the case of PPS in Korea, there are the E-procurement Planning team, the E-procurement Management team, the Supplier Registration team, the Fair procurement team, and Procurement Price Management(investigation) team in the Procurement Management Bureau. Among them, the E-procurement Planning team, the E-procurement Management team and the Supplier Registration team are playing key roles directly related to digital procurement (see Figure 3-28).

[Figure 3-28] Public Digital Procurement Unit of PPS

Division	Details
E-procurement Planning (23 FTE) - All New KONEPS TF team	Overall management of KONEPS, statistics, security Preparing the sophisticating of the KONEPS
E-procurement Management (32 FTE) - Operatopm Support (Outsourced, 40 staffs) - System Maintains (Outsourced, 40 staffs)	Operating, monitoring and restricting of KONEPS Outsourced operation and maintains team
Supplier Registration Team (12FTE)	Registration of KONEPS user and suppliers
- PPS Call Center (80 staffs)	KONEPS helpdesk for public entities and suppliers
Fair Procurement	Investigating unfair activities in procurement process
Procurement Price Management	Investigating price of goods traded in procurement

E-GP Support Center

Source: Reorganized by Authors.

The policy recommendation for building organizational foundations is to organize the public digital procurement planning unit and technical analysis unit.

The newly formed digital procurement planning unit should be in charge of drawing up a blueprint for the next-generation CompraNet and overseeing and executing its execution plan. And for a large-scale project, it must also be in charge of the PMO (Project Management Organization) function.

At a minimum, the planning unit should be in charge of the following tasks:

- Overseeing and coordinating digital procurement-related policies;
- Matters related to the establishment and management of the procurement informatization business plan and project management organization (PMO);
- Matters concerning the generalization and adjustment of the procurement informatization budget;
- Matters related to the improvement of the laws and systems related to the procurement informatization;
- Matters concerning cooperation between the domestic and foreign organizations related to the procurement informatization;
- Matters concerning the promotion of the procurement informatization and the spread of use;
- Matters related to the procurement informatization education and training; and
- Collection, management and the analysis of public procurement statistics.

In order to take charge of these functions, the planning unit should include not only ICT experts including PMO, but also procurement regulation experts, experts in the procurement business process of demanding organizations and suppliers, and education and public relations experts.

On the other hand, the technical analysis unit should play the role of a technical manager who can make decisions about the application of IT technology necessary to configure the next-generation CompraNet. In addition, this unit should analyze the data owned by CompraNet in operation and establish a comprehensive plan for what data to be utilized and how to migrate into the next-generation CompraNet to be built.

The recent development of ICT technology can solve many difficulties in establishing a public digital procurement system. Therefore, the input of the demanding entities and suppliers related to the factors that hinder the use of the current CompraNet system needs to be addressed, and Big Data analysis, AI, and Blockchain technology have to be used during the process of solving the issues in order to reinforce the information services related to public procurement and enhance the convenience and security.

In addition, data migration is an important issue when transitioning to a new system, and a data migration plan is very important if the transition is gradual rather than big-bang. Therefore, it is necessary to establish a comprehensive data migration plan including the data transfer method and verification, reflecting the systematic analysis of the current data retention status in the CompraNet system and the design of the data structure of the new system.

If possible, it is a good way to organize a Technology Innovation Committee(TIC) to continuously improve the digital public procurement system. The success or failure of the public digital procurement systems depend on organic partnerships with demanding entities, suppliers, and platform operating institutions. Above all, user convenience is imperative. Therefore, the TIC should be organized with an open door so that the various stakeholders can participate.

And, it is also recommended regarding organizational foundations that it is to form a Pan-Mexico Public Digital Procurement Council with the public procurement officers at the federal as well as state level. As mentioned before, Mexico has a political system called a federal system and has the characteristics of the distributed procurement. However, regardless of these characteristics, public digital procurement systems often share the same procedures and issues. Therefore, it is possible to share a Pan-Mexico-wide awareness of the technical basis that Mexico's public digital procurement system should have and to solve the problems together.

Sufficient review and consultation through the council are essential when introducing new technologies, because the key point that experts give common advice to is 'stability', because stability takes precedence over innovation due to the nature of the stakeholder-sensitive public digital procurement system.

5.4. Establishing a Vision for the Next-generation CompraNet

The vision and goals of the public digital procurement system can be derived from the BPR/ISP consulting process, but this is bound to be a short and mid-term perspective because the BPR/ISP cycle is relatively short. Therefore, it is necessary to establish a mid- to long-term vision and the goals of the next-generation CompraNet separately from BPR/ISP and develop it with a roadmap of more than 5 years. In this vision, the dimension such as the spread and utilization of CompraNet should be included in the vision element rather than the technical element.

The policy recommendation for vision establishment is to aim standardization of public digital procurement system and leading service of digital government.

In Mexico, public procurement is carried out at various levels, including the federal government, state and local governments, and various governmental and public agencies. However, at present, the mandatory use of CompraNet only applies to procurement with the federal budget input, so for the rest, individual institutions can use their own procurement system to procure. In other words, there is demand for public digital procurement at each level in Mexico. For example, an institution such as the Mexican Electricity Federal Commission (Comisión Federal de Electricidad, CFE) may be representative. As mentioned before, Korea is planning to embrace the digital procurement system independently operated by institutions such as KEPCO in the next-generation KONEPS construction project.

The following vision would be an example: 「Implementation of One & Top Government based on an integrated procurement platform」 for the provision of transparent and fair standard procurement services.

Among the various digital government services, the public digital procurement platform contributes the most to government transparency and efficiency. Therefore, aiming for a standardized public digital procurement platform in CompraNet Mexico is to contribute to transparency and efficiency not only at the a federal level but also at a Mexican level, which can contribute to the competitiveness and enhancement of the related SMEs and the development of the related industries.

Considering that organizations such as CFE are being advised to electronically elevate the procurement process as much as possible while receiving consulting on the public procurement separately from the OECD, it can be said that the next-generation CompraNet can have greater driving and executive power by having such a big vision.

In addition, public digital procurement services can become a leading service for digital government. As mentioned above, it can be the most technologically powerful service as well as the most representative service in improving government transparency and efficiency. A successful public digital procurement service basically needs to be linked not only with the national budget accounting system or bank, but also with numerous institutions involved in the public procurement process and the information systems operated by those institutions. In the case of Korea KONEPS, it is currently receiving and providing information in connection with 226 institutions (Information systems) as shown in <Table 3-7> below.

<Table 3-7> Linked Institutions Status with KONEPS

Classification	Linked Information
Linking with institutions that have their own electronic procurement system (23) ex: Korea Electric Power Corporation	Supplier registration information, bid notice information, winning bidder information, unfair (illegal) company sanctions information, warranty relay, company information (fingerprint recognition)
Public institutions (46) ex: Korea Trade-Investment Promotion Agency	Certificate of full payment of the national and local taxes, business registration certificate, the certified copy of corporate registration, contract information, ordering information, inventory information, the National Tax Service stamp duty, National Tax Service closure or closure of the company
Guarantee (23) ex: Korea Credit Guarantee Fund	Bidding information, contract information, contract/bidding/prepayment/ defective/payment/product price guarantee
Association (13) ex: Construction Association of Korea	Evaluation data such as management status, construction capability evaluation amount, construction performance, and the status of technicians
Credit rating agency (10) ex: Korea Investors Service	Credit rating, company credit information, receive bank credit information (delinquency, national tax, local tax, etc.)
Company (75) ex: LG Electronics Inc.	Sending electronic documents such as the list information and contracts created at the KONEPS
Product Certification Body (8) ex: National Institute of Technology and Standards	Receive certification information related to the product qualification
Financial Institutions (5) ex: Woori Bank	Payment transfer request information, payment confirmation information, national housing bonds (Kookmin Bank, Nonghyup, Woori Bank), network loan
Accredited Certification Body (5) ex: Korea Electronic Certification Authority	Certificate validity information, certificate revocation list, timing check service
System Linkage (18) ex: National Tax Service (NAS)	Contract information, user information, inspection and inspection information, payment information, customs arrears information, contract performance information
Total : 226 organizations	As of January 2021

Note: ( ) are number of organizations linked with KONEPS.
Source: PPS (2021).

Therefore, it is possible to establish the next-generation CompraNet as a best practice linking the various organizations and information systems, and standardize the linkage technologies used at the same time to utilize it in various digital government services.

And, the digital procurement service (system) is a service and system that improves transparency and efficiency by handling the existing face-to-face tasks non-face-to-face, and can be the best practice in business process innovation. By actively introducing contactless

technologies in this field of the business process, contact between the suppliers and demanding the entities or procurement evaluation committees is reduced and the chance of corruption is also minimized. In addition, time-saving and improved work efficiency can be secured, and smooth operations during a pandemic like COVID-19 is still possible.

In this regard, the establishment of an evaluation functions in next-generation CompraNet, such as contactless authentication technology and video conferencing for technology evaluation, can go a step further in realizing the values of fairness and efficiency aimed at public digital procurement, beyond simply responding to infectious diseases.

5.5. Conclusions

The recommendations mentioned above were converted into tasks to be implemented and arranged in <Table 3-8> with summarized timing, stakeholders, and target performance etc. This is only the most basic content and could be further refined and expanded by the Mexico side.

<Table 3-8> Implementation of Key Policy Recommendations

Classification	Tasks to be implemented	Short/ Mid/	Target performance	By whom	Stakeholders	Contribution to Innovative CompraNet
Knowledge Bases	Establishment of Target Model	Short term	Approved Consulting Deliverables	SHCP	SHCP/ Demanding entities/ Suppliers	It will be the key part of the next-generation CompraNet on what's to be done and how to do it.
	Development Standard Framework	Mid term	Agreed Framework Set	SHCP/ IPN	SHCP/IPN/SI companies	It will be the technical base of development and operation for CompraNet.
Organizational Foundations	Public Digital Procurement Planning Unit	Short term	Commencement of Business	SHCP	SHCP	It will be a core unit for the improving public digital procurement system.
	Technical Analysis Unit	Short term	Commencement of Business	SHCP	SHCP	It will be the core unit of technology for improving the digital procurement platform.
Vision Establishment	Vision Establishment	Mid term	Approved Vision Statement	SHCP	SHCP/ Demanding entities/ Suppliers	It will play a central role in the mid- to long-term development direction of the public digital procurement institutions.

Note: According to the general consulting methodology, various evaluation indicators such as the posterior relationship, urgency, ease of implementation, and strategic importance are applied in the task prioritization. But this report adopts the form of the policy recommendation, so on the basis of the urgency and strategical importance, the timing was divided into short-term (within 1 year), mid-term (within 3 years), and long-term (within 5 years) by the author's judgment.

Source: Authors.

These policy recommendations are based on the basic premise that in order to rebuild the public digital procurement platform in the direction that Mexico wants, a new perspective should be approached. And in order to implement these recommendations as a rough guideline, a more detailed and detailed action plan may be needed.

References

ADB, e-Government Procurement Handbook, 2013.

KOICA, Establishment of e-Procurement System for Jordan, 2017.

NIA, eGovFramework New Leaflet, 2017.

OECD, Recommendation on Public Procurement, 2015.

OECD, Mexico's e-Procurement System, 2018.

OECD, Mexico's e-Procurement System: Redesigning CompraNet through Stakeholder Engagement, 2018.

OECD, Fighting bid rigging in Mexico: a review of CFE procurement rules and practices, 2018.

OECD, Follow up Report on Mexico's CompraNet Reform: Improving e-Procurement through Stakeholder Engagement, 2019.

PPS, KONEPS, Best Practice of e-Procurement, 2016.

PPS, Introduction of KONEPS, 2020.

PPS, Public Procurement Service, Establishing Next-Generation KONEPS (Narajangteo) by 2023, 2020.

SHCP, Procura Mexico Project, 2019.

SHCP, Methodology and Architecture of the Procura Platform, 2019.

ZDNet Korea, Korean open cloud platform 'Pasta' debut (https://zdnet.co.kr/view/?no=20160425115738), 2016.

Glossary

1. **Agile Methodology:** In software development, Agile practices involve discovering the requirements and developing solutions through the collaborative effort of self-organizing and cross-functional teams and their customer(s)/end user(s). It advocates adaptive planning, evolutionary development, early delivery, and continual improvement, and it encourages flexible responses to change." (Wikipedia, 'Agile software development').

2. **COST:** COST is a commonly used term to describe the purchase of a packaged solution which is then adapted (configured or customized) to satisfy the needs of the customer.

3. **DevOps:** DevOps is a set of practices that combines software development (Dev) and IT operations (Ops). It aims to shorten the systems development life cycle and provide continuous delivery with high software quality. DevOps is complementary with Agile software development; several DevOps aspects came from the Agile methodology." (Wikipedia, DevOps).

4. **G2B:** G2B stands for 'Government To Business', and public procurement is a representative example of this.

5. **MAPS:** MAPS is an international standard and universal tool for evaluating public procurement systems proposed by the OECD. It comprehensively evaluates four areas: (I) Legislative, Regulatory and Policy Framework, (II) Institutional Framework and Management Capacity, (III) Procurement Operations and Market Practices, (IV) Accountability, Integrity and the Transparency of the Public Procurement System.

6. **MAS:** MAS refers to a multi-supplier contract, and it is a system that allows each government customer to use similar goods/services in terms of quality, performance, and utility by signing a contract with a number of suppliers.

7. **Mercado Libre:** As an Argentinean company, headquartered in the United States, it is an e-commerce company with branches in 18 Latin American countries, including Mexico.

8. **OpenShift:** OpenShift is a hybrid cloud, enterprise Kubernetes application platform and is registered as the trademark of the RedHat company.

9. **PMO:** A project management office (abbreviated to PMO) is a group or department within a business, government agency, or enterprise that defines and maintains the standards for project management within the organization. The PMO strives to standardize and introduce economies of repetition in the execution of projects. The PMO is the source of documentation, guidance and metrics on the practice of project management and execution (Wikipedia, Project management office).

04

CHAPTER

Enhancing Utilization of Digital Public Procurement System

Teaksoon Lee (Korea IT Consulting)
Patsi Margarita Garrido Castro (Ministry of Finance and Public Credit)

Keywords
Operational Organization, HelpDesk, OneStop service, Small and Medium Enterprises (SMEs), Promotion and Training

Enhancing Utilization of Digital Public Procurement System

Teaksoon Lee (Korea IT Consulting)
Patsi Margarita Garrido Castro (Ministry of Finance and Public Credit)

Summary

The Mexican government set the elimination of corruption at the top priority of government policy, which had hindered the socio-economic development of Mexico for last several years, and transferred public procurement works from SFP to SHCP of more transparent and the efficient government budget operation. The public procurement system (CompraNet), which has been developed and operated since 1996, is required to be promoted and improved due to the limited computerization, lack of experts, license fee for the imported procurement system, the insufficient use of the system by government institutions, and the low participation of SMEs. Hereupon, the Mexican government requested for cooperation in order to share the experience of KONEPS, which was awarded as a successful case by international organizations, and to find the development plan in order to facilitate the public procurement system (CompraNet). Hence, the study team analyzed the current status of the CompraNet in Mexico and applied its results to the gap analysis with the KONEPS use cases. As well, the development plans for 4 topics of the CompraNet of Mexico, the development direction and policy recommendation to facilitate the CompraNet.

In this study, operational organization, procurement process, the help desk, promotion and education, SME supporting policies as the basis of the economic scale were suggested to facilitate the use of public procurement in Mexico through seminars and interviews with stakeholders using the CompraNet in Mexico. During the on-site survey, the study team implemented FGI (Focus Group Interview) with the operating institution, required institutions, and suppliers, the interviews and current status analysis in cooperation of the local experts to carry the surveys and analyze the current status of CompraNet. Consulting data for the overseas policy advisory, literature review, internet data search and the relevant data of the PPS(Public Procurement Service of Korea) were used as references. Especially, a result of the on-site survey, the Mexican government is interested in the KONEPS operation

unit, the e-Procurement supporting policy and training for SMEs. Therefore, optimized improvement plan fits on environment of the Mexican government was suggested focusing on these scopes. As well, the study team grasped the structure and current status of the CompraNet in Mexico by comparing the e-Procurement structures of each country and implemented the case study such as an organization structure, procurement process, and the help desk of KONEPS and gap analysis to suggest 4 improvement directions and policy recommendations to facilitate the use of the CompraNet Mexico.

The study team derived the implications based on the results of the current status analysis on the organizational unit of the Administrative Office of the Ministry of Finance and Public Credit (SHCP) and CompraNet. In terms of the use of the public e-Procurement system, though the procurement procedures from tendering and contract providing the online service, payment is being operated offline and these works are not linked with other institutions. In consideration of characteristics of public procurement structure and the gradual development of an operation capacity, it is required to set the introduction plan for a one-stop system in the mid and long term. In an aspect of digital public procurement system operation, it is required to be improved to a more systematic and organic unit from its initial operation unit. Therefore, the Administrative Office of the Ministry of Finance and Public Credit (SHCP), which is the principal agent of the digital public procurement system operation, is required to develop the services to resolve the complaints of users(Demanding agencies, suppliers) with overall review on the digital public procurement service and improve the operation capacity to maintain a digital public procurement system without any problems and grasp the inconvenience and complaints to resolve them.

In the development plan for the digital procurement system in Mexico, the development directions of the operation unit for CompraNet, the procurement process, helpdesk, promotion and training, and the supporting policy for SMEs in 4 aspects. First, in the aspect of the 'Efficient operation of the public procurement service', plans to properly hire the work forces for digital procurement works and improve the units with the systematic operation capacity to allow users a more convenient approach to the e-Procurement. Second, in an aspect of 'Completing e-Procurement life cycle', the implementation plan for the new e-payment system was suggested to offer the services of all procurement procedures and an online one-stop service with an information linkage. Third, in the aspect of 'Modernizing the customer service management system', the construction plan of the new call center was suggested to enhance the customer satisfaction with the systematic management of the e-Procurement system. Finally, in the aspect of the 'Substantialization of the policy', the SME supporting policies to encourage participation in the public procurement and improvement

plan for training to strengthen the procurement training system in Mexico were suggested to facilitate the use of the e-Procurement service.

The development plan of this study was mainly focused on the critical factors should be developed to facilitate the public procurement market in Mexico through the gap analysis between each country. During this project, the study team has verified that the stakeholders of the public procurement in Mexico have a strong will to facilitate the use of the e-Procurement system by expanding the e-Procurement services. The Mexican government recognized that there are still many tasks to be resolved since adoption and operation of CompraNet and actively adopt the additional services of the KONEPS of Korea in order to resolve those tasks and develop its services. Therefore, the study team expects that the development plans suggested herein can be the first step to the further development of the public procurement of Mexico and utilized as the basic data to propel the improvement of CompraNet, and furthermore contribute to the development of the industry and economy of Mexico through spreading the use of the public procurement market in Mexico.

1. Introduction

The Mexican Public Procurement System adopted the digital procurement and has been using and developing the digital public procurement system (CompraNet) since 1996 as the initial EDI procurement in Korea. However, due to the poor use of the system by the governmental agencies and the use of only 30% of the e-Procurement, the digital procurement was not activated and the procurement procedures that were not transparent were pointed out both internally and externally. Therefore, it is deemed necessary to upgrade CompraNet and improve the policies in order to extend its use.

Through this study, a method to vitalize digital procurement by the stakeholders using CompraNet and a support policy for SMEs which are the backbone of the economy are presented by stages. In addition, the CompraNet system and its current status could be understood and with the analysis of the organization and procurement process of KONEPS, Korea electronic procurement system, and the analysis of the advanced cases and gap such as the help desk, the policy improvement measures necessary to disseminate CompraNet are presented in this study such that it can be reflected in the dissemination roadmap. Although there have been difficulties to carry out the policy task on the topic of the Dissemination plan of the digital public procurement system due to COVID-19, it has been fortunate to conduct the field survey at a later date to overcome the survey errors in Korea. Interviews and the current status surveys were conducted in cooperation with the local experts to carry out

FGI (Focus Group Interview) with operational agencies, demanding agencies and suppliers. Overseas policy consultation data and the documentary study, internet data research were used as a reference, and as for the domestic reference, PPS data were used. In particular, since participation of SMEs in e-Procurement and the operational organization, and training have been areas of great interest, the direction of the optimal policy for the environment of the Mexican government was suggested.

2. Analysis of the Current Status of CompraNet

In order to identify the current status of the procurement market centered on CompraNet, the research team studied and analyzed the composition and roles of the Administrative Office of the Ministry of Finance and Public Credit (SHCP) which is in charge of the public procurement policy and its operation, the current status of the use of digital procurement, and the support system of CompraNet. Interviews with the demanding agencies of CompraNet and SMEs have also been conducted and the interview results have been analyzed.

In this analysis of the current status, based on the results of the above survey and analysis, factors that are obstacles to the vitalization of the public procurement market based on CompraNet and the directions for solving them have been derived.

2.1. Utilization Status of CompraNet

2.1.1. Overview

The purpose of this study is to clarify the mission and the vision of the operator of CompraNet, and the operation objectives, to identify the utilization status of CompraNet, to compare and analyze with KONEPS cases in order to use them in the improvement plans for enhancing the utilization of the public procurement.

[Mission]

That CompraNet be a standardized, transcendent and automated with the contracting process and strategy that maximizes the value of the State, applying the best practices, being an international benchmark, meeting the principles of economy, efficiency, effectiveness, transparency and impartiality and social responsibility.

[Vision]

To be the leading area in the transformation, innovation and continuous improvement of the Federal Public Administration's public procurement, making the contracting process more efficient in accordance with the best international practices through research, design, development and implementation as well as technological tools. To be a logical tool that allows the maintaining of an efficient, effective and transparent public procurement system that helps eliminate the sources of corruption associated with public procurement, making public spending efficient.

[Regarding the Operation of CompraNet]

To direct and operate the technological solutions of the Public Procurement Digital Platform; assessment and analysis of international practices, observing the needs of users, proposing actions to be systematized and automated, monitoring services and reports generated in their operation to ensure the operations of the systems established on the platform, avoid contingencies around contracts and provide solutions for its optimal operation.

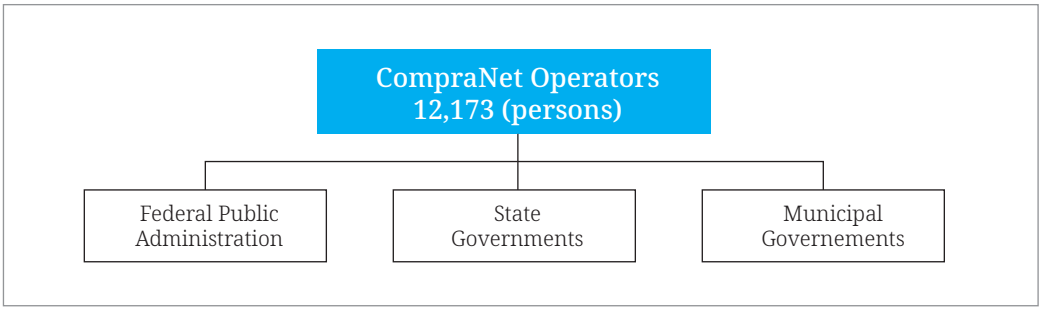
2.1.2. Organization of CompraNet

CompraNet is used by the three orders of the government: Federal, State and Municipal. It is operated by a total of 5,364 purchasing units, 1,809 of the Federal Public Administration, 1,213 at state orders and 2,342 at state orders. The number of people who operate CompraNet is: 6,118 in the Federal Public Administration, 3,134 operators in the State Governments, and 4,954 in the Municipal Governments (see Figure 4-1).

Regarding the job description, the operators of the purchasing units, are public officials assigned to the area of procurement and procurement works authorized by the Administrative Office of the Ministry of Finance and Public Credit (SHCP), to carry out the operations and procurement procedures in CompraNet. Each institution according to its size and activities decides the number of people in charge. Of the 5,364 purchasing units of the three orders of government operating CompraNet, each chooses the number of people with whom it can manage is the contracting procedures. On average, the institutions operate with 3 public servants, as a whole, the purchasing units registered in CompraNet operate with 14,196 people. The role ranges from conducting market research, planning public procurement, conducting procurement procedures, and contracts management. The operating agencies for the CompraNet infrastructure and application system are the

"Operations Direction" and the "Management Direction of the Integrated Information System". Both directions are composed of 8 people. In addition, there are 14 people that specialized in in-site technical support. Currently, the infrastructure of CompraNet is managed by the supplier BravoSoultion. Aside from this, a TDGF operation module is planned to be developed to conduct the public procurement related services, however developing 20 modules with only 8 people without any outsourcing requires a lot of time and it is expected to be difficult in automating the entre process of the e-Procurement (see Table 4-1 and Figure 4-2).

[Figure 4-1] CompraNet Operators



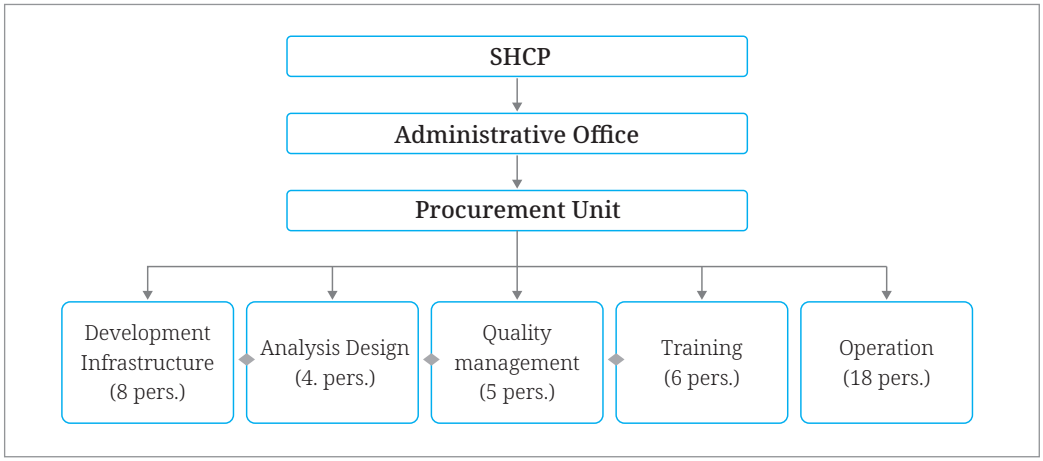
Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

<Table 4-1> CompraNet Application and Infrastructure Development Workforce

Category	Application		Infrastructure	
	Organization (Company)	Number	Organization (Company)	Number
Internal HR	SHCP	8	Infrastructure is managed by the supplier Bravo Solution,	Undefine
Outsourcing	INFOTEC	14		

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

[Figure 4-2] Organization Chart of SHCP Procurement Unit



Source: SHCP Interview Results (2021).

The Administrative Office of the Ministry of Finance and Public Credit (SHCP) is divided into 5 departments: Public Procurement Department, Public Function Department, Financial Management Department, Public Procurement Authoritative Interpretation Department, and System Department, and has been managing and operating CompraNet. However, there are no confirmed workforces for each department, and they have emerged in the Procurement Unit to proceed with their work. Therefore, in the future, in order to improve professional abilities, it is desirable to supplement the operating manpower in the vacant positions and assign them to the department in charge.

As the responsible area for the General Policy of Public Procurement, the Administrative Office of the Ministry of Finance and Public Credit (SHCP) should ensure that it has enough professional public officials enough in public procurement, with a high level of integrity, theoretical training, and fitness for the performance of the position, and for this to happen, it is necessary to provide the actors involved with a deep knowledge and specific skills as well as to be sure to keep them regularly updated. This requires effective and timely training to each of the elements involved in the recruitment process, in addition to comprehensive training that allows staff to be equipped with the necessary elements for decision making.

As shown in <Table 4-2>, the Procurement Unit has 77 vacancies out of 138 positions, and in the procurement management head of department, 52 out of 72 positions are vacant.

<Table 4-2> Procurement Unit

Position	Total positions	Total held positions	Total vacancies
Unit Head	1	1	0
Deputy Director General	3	2	-1
Coordination	2	3	1
Area Director	15	13	-2
Deputy Director	36	18	-18
Head of department	72	20	-52
Assistant	9	4	-5
Personal Operative	5	0	-5
Total	138	61	-77

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

For the professionalism and stable operation of the organization, it is necessary to make it a specialized and stable place with low turnover, and to urgently replenish manpower in the procurement-related department which is currently vacant.

2.1.3. Utilization Status of CompraNet Service

A. CompraNet Portal

The number of visitors who visited the portal for the use of the CompraNet service was counted by content from January 2020 to March 2021 (see Figure 4-3).

First, CompraNet portal statistics show that the number of visitors checking the ongoing process accounted for 83% of the total number of visitors, far more than any content, followed by contracts at 5% and bid registration at 3%. The rest is less than 10% of the total. These results can be seen from other report results that the CompraNet web site operates with only a few features (see Table 4-3).

[Figure 4-3] CompraNet Portal Homepage

Source: Mexico CompraNet Homepage (accessed March 3, 2021).

<Table 4-3> Amount of Visits of CompraNet Portal from January 2020 to March 2021

Option	Amount of visits	Percentage
Ongoing procedures	586,280	83%
Contracts	34,537	5%
Bidder registration	26,067	4%
Framework agreements	12,167	2%
Access to the Digital Store	10,287	1%
Courses	10,031	1%
CompraNet 3.0	9,428	1%
Sanctioned companies	8,641	1%
Federal regulations	7,857	1%
Total	705,295	100%

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

According to the OECD Report of Mexico's e-Procurement System (2018), information on the annual procurement plans and free contracts, bidding documents with the exception of limited competition, tender briefing minutes, and bidding information are uploaded in CompraNet. However, exceptions to the direct bidding, open bidding, market analysis information, responses to bids in a mixed process, documents on contract changes and complaint management were excluded, highlighted for improvements as it may be helpful

for the procurement stakeholders, but it doesn't include all information related to the procurement flow.

According to this survey, it was difficult to verify each institution since CompraNet wasn't linked with financial institutions, certification authority, and federal government systems. Thus, first of all, OM-SHCP, the infrastructure development department, has in mind to connect with systems as RUSP, which is managed by the Secretaría de la Función Pública. This system contains the data of the public servants of the Federal Public Administration. Beyond connecting with other systems, it aims to develop essential applications owned by the federal government for the management of the public procurement. In addition, it is expected that, in April 2021, the Module of the Annual Program of Acquisitions, Leases, and Services, and the Public Works of CompraNet will be published. Within the first semester of this year, there are plans to launch the Single Register of the Suppliers/Contractors Module. At the same time, SHCP is working on the Single Sing On module (part of it is already under development) and on the analysis and design of the contracting procedures module, which will enable the replacement of the Bravo Solution's CompraNet system.

B. Utilization Status of CompraNet

As shown in <Table 4-4> on the number of bids using CompraNet and the contract amount for the last three years, the small value contract accounts for more than 60% of the total contracts, however, the average transactions of less than 300,000 pesos (calculated from 2018-2020 Procurements) is about USD 2,623 per contract, which is quite a small amount and accounts for 37 % of the total contract amount. What can be seen as a result of the index is that a large number of manpower and time are consumed to operate and expand CompraNet, therefore, it is necessary to increase the small value contract amounts in the public procurement tender.

<Table 4-4> Number of Bids Using CompraNet and Contract Amount

(Unit: USD)

Year	Object	CompraNet contract (except small value trade)		Small value contract		Total	
		Number	Sum	Number	Sum	Number	Sum
2018	Procurement	21,939	7,101,654,769	75,052	323,614,836	96,991	7,425,269,604
	Leases	425	129,497,481	730	4,352,048	1,155	133,849,529
	Services	20,327	6,822,267,666	52,637	275,452,804	72,964	7,097,720,469
	Public work	18,220	6,928,658,138	1,470	13,754,240	19,690	6,942,412,378
	Public work-related services	2,432	2,259,393,752	959	8,038,954	3,391	2,267,432,706
2019	Procurements	21,327	7,618,584,022	87,345	313,745,395	108,672	7,932,329,417
	Leases	479	298,010,882	668	3,533,523	1,147	301,544,405
	Services	18,319	5,561,357,473	52,770	256,085,946	71,089	5,817,443,418
	Public work	9,470	3,629,086,237	868	7,238,477	10,338	3,636,324,714
	Public work-related services	1,720	196,563,135	800	4,449,298	2,520	201,012,433
2020	Procurements	26,408	8,182,921,629	68,698	260,096,393	95,106	8,443,018,022
	Leases	488	215,465,907	483	2,373,713	971	217,839,620
	Services	14,663	7,704,462,307	31,529	148,858,682	46,192	7,853,320,989
	Public work	7,741	6,050,453,552	783	5,898,952	8,524	6,056,352,504
	Public work- related services	1,190	214,291,333	448	3,420,941	1,638	217,712,274

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

However, the peculiarity of the above index is that when looking at the total number of annual contracts, the number of contracts and the amount of small value trade in 2020 decreased by 20% on average due to COVID-19 compared to 2018-2019, but the general contract and amount are slightly higher or similar except for small value contracts. This implies that SMEs are more vulnerable to external shocks and thus are greatly affected. Therefore, developing and supporting the competitiveness-enhancing policies for SMEs participation will help vitalize the public procurement (see Table 4-5).

<Table 4-5> Contracts and Contract Amount by Classification of SMEs

(Unit: USD)

Contract 2020			
Stratification	Number of contracts	Sum amount dollars	% amount
Undefined	36,986	2,735,998,470	12%
Medium	20,519	4,281,201,161	19%
Micro	38,917	2,179,581,512	10%
No SMEs	24,533	10,998,692,273	48%
Small	31,476	2,592,769,993	11%
Total	152,431	22,788,243,410	100%

Source: Interview results of SHCP (2021).

<Table 4-6> Small Value Contract (2020)

Small Value Contract (Less than USD 13,908 or 300,000 Mexican pesos)			
Stratification	Number of Contracts	Amount of Contracts (USD)	Amount (%)
Undefined	28,727	128,996,954	31%
Medium	11,486	47,791,217	11%
Micro	27,407	105,980,146	25%
No SME´s	14,753	62,258,101	15%
Small	19,568	75,622,264	18%
Total general	101,941	420,648,681	100%

Source: Interview results of SHCP (2021).

Looking at the number and amount of contracts in 2020 and beyond, the total number of contracts of SMEs is 60%, but 40% of the contract amount. Even for the small value trade of less than 300,000 pesos, SMEs trades only 57% of the total number of contracts and 54% of the contract amount. These indicators show that there is a need to develop and study the policies and systems that can facilitate the participation of SMEs in public procurement by improving the participation and proportion of SMEs such that the transactions are more vitalized (see Table 4-7 and Table 4-8).

<Table 4-7> Contract Amount in Public Procurement (2020)

(Unit: USD)

Recruitment Type	Contract Except Small Value Trade	Small Value	Total Contracts
Procurements	8,182,921,629	260,096,393	8,443,018,022
Leases	215,465,907	2,373,713	217,839,620
Services	7,704,462,307	148,858,682	7,853,320,989
Public work	6,050,453,552	5,898,952	6,056,352,504
Public work-related services	214,291,333	3,420,941	217,712,274

Source: Interview results of SHCP (2021).

<Table 4-8> Small Value Contracts Less than USD 13,908 (2020)

Recruitment Type	Small Value (USD)	Rate (%)
Procurements	260,096,393	62%
Leases	2,373,713	1%
Services	148,858,682	35%
Public work	5,898,952	1%
Public work-related services	3,420,941	1%
Total	420,648,681	100%

Source: Interview results of SHCP (2021).

When looking closely at the small value trade below 300,000 pesos, the small value contract accounts for 18.4% of the total number of contracts, of which procurement represents 62% and services 35%. On the other hand, public work and public work-related services are so small that the total doesn't reach 2% of small value trade. It seems necessary to increase bids in the public work sector for small value contracts in order to encourage SMEs to become competent. The user registration in <Table 4-9> shows that 323,223 companies have registered as suppliers since the start of public procurement, however only about 30,000 suppliers participates in the bidding every year. This shows that there is a significant imaginary number of suppliers because the data is not being managed. And, the e-Bidding accounts for 50% of all CompraNet bidding contracts, however the contract amount is only 30%, indicating that improvements need to be made.

<Table 4-9> Utilization of CompraNet in 2020 and 2021 Objectives

Category		As-is (2020)	To-be (2021)
User registration	Public buyers	12,179 agencies (accumulated data)	More than 12,451 agencies (April 8, 2021) On average, 90 public buyers were registered, if this trend continues during 2020, there will be an approximate accumulated figure for 2021 of 13,259
	Suppliers	23,126 suppliers	30,839 suppliers
Procurement plan		No	Expanded to the entire procurement plans
Tender announcements		14,387 cases	Tender announcements: 4,771 Expanded to the entire tender announcements: 39,383
Auction	Online	23 cases	22 suppliers participants in auctions
	Offline	The auctions are only electronic	
	Online percentage	100%	
Electronic contracting	Cases	74,027 cases	All contracts: 152,431 amount all contracts: 22,788.24
	Amount (MXN)	8,877.35 million of dollars	
Procurement lead time (notice to contracting)		Public tender 22.9 days restricted invitation 12 days	Public tender up to 35 days restricted invitation up to 25 days

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

In addition, the current tender notice period is short at 12 days, but in 2021, it will be increased to a maximum of 25 days to ensure transparency, and the open tender contractual period will be extended to 35 days. It is recommended that the annual procurement plans from all government agencies shall be disclosed on CompraNet for the potential bidders by the end of the year (or soon after budget approval), and then for fair and transparent competition a quarterly plan has to be posted on the portal before the beginning of the new quarter.

C. CompraNet Procurement Procedures

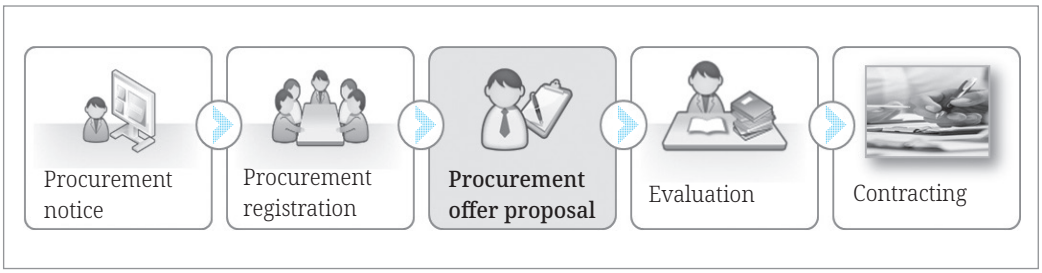
The procurement procedures on CompraNet proceeds in the order of procurement announcement, registration, price proposal, the selection of the lowest-priced offers by demanding agencies, the selection of the contractor, and the drafting of the contract. As a result of interviews with the suppliers on the bidding process, it was mainly pointed out that the upload capacity for bid attachments is low, which makes it difficult to register documents. In order to solve the upload problem, the suppliers contact the demanding

agencies and then send the documents directly, or receive an agreement to extend the deadline. In addition, suppliers participating in procurement for the first time had difficulty in using the system and made mistakes, and wanted a function that could guide them to the procurement platform. They also pointed out that after the award, they have to prepare new documents every time to enter into a contract, and the documents to prepare are also complicated and cause many difficulties (see Figure 4-4).

From the point of view of demanding agencies, the problems are as follows:

1. The accent and spacing had to be accurately indicated to search for information on participating suppliers, therefore, they requested improvements.
2. As there is no linkage in the process of awarding and transferring to a contract, the preparation of documents and the contracting process are complex causing a lot of work to be processed.
3. The problem that the contents of the attached file (excel) appear blank when writing the report on the results of the tender.
4. The amount was entered correctly in the system, but an error is displayed if the amount is large (more than 12 digits).
5. In the case of bidding by a foreign supplier, there is no device to correct the percentage of VAT (%), therefore an error occurs in the amount.
6. CompraNet shuts down after the recent system upload.
7. As with suppliers, there is a lack of training time, resulting in having difficulties to solve the shortage of tasks (only 4 hours of online training is given).

[Figure 4-4] CompraNet Procurement Procedures



Source: Interview results of SHCP (2021).

Furthermore, in public procurement, the e-Procurement accounts for about 30%, and the rest are mainly private contracts, limited competition contracts, and the nominated competition contract. However, since the e-Procurement is not legally enforced, the tender is conducted depending on the convenience of the demanding agencies. As a result of interviewing the procurement stakeholders such as the operating organizations and users,

it was desired that the system operates stably by automating the entire e-Procurement cycle. In particular, the demanding agencies and suppliers endure an inconvenience since the procedures from e-Contracting to e-Payment are not processed online. The online processing of all procedures up to e-Payment can result in a reduction in time and costs and increase the efficiency of the use of CompraNet. For this, as an improvement plan for CompraNet, the contents of e-Payment will be proposed. However, it is expected that the current package type modular method of CompraNet will require a lot of time for development and manpower.

2.2. Current State of CompraNet's Support System

2.2.1. Help Desk Operation Status

CompraNet help desk is managed by the CompraNet Unit of SHCP and consists of 22 people - 6 general counselors, and 16 people for technical consultation. The 16 technical personnel manage the help desk as well as CompraNet operation and maintenance.

Regarding the technical enquiries, the technical counselors perform remote on-line support or visit the demanding agencies or suppliers. However, as there is no separate call center and one person per department of the Administrative Office of the Ministry of Finance and Public Credit (SHCP) is working independently, telephone enquiries are received by the answering machine and the others are handled by e-mail and a callback service.

Since the help desk is not functioning in proportion to the number of contracts and the contract amount, an improvement plan for the help desk will be suggested in the public procurement improvement plan such that it can perform the duties of the call center (see Table 4-10).

<Table 4-10> Roles and Workforce of CompraNet Help Desk

Department	Roles	Pers. in charge	Remarks
Help Desk	Counseling, remote support, training, etc.	6 persons	Supervisor (0), counselors (6)
Engineering	Operation and maintenance of CompraNet application program and help desk CompraNet	16 persons	Person in charge of the CompraNet modules (16), person in charge of the Help Desk (6)
Administration	Legal counseling, etc.	4 persons	

Source: Interview results of OM-SHCP' by local consultant in Mexico (2021).

In <Table 4-11>, as for the number of phone enquiries through the CompraNet help desk, 2,726 calls were from demanding agencies and 3,814 from suppliers. In addition, 25,201 cases of remote support for public demanding agencies and 27,988 cases for suppliers were conducted via email, showing that most user enquiries are received by over 85% via email. It is found the response rate is low because SHCP CompraNet help desk mainly responds to calls with answering machines, therefore enquiries are received mainly via e-mail. However, from the user's point of view, direct enquiries over the phone can help solve the problem immediately, while email-based counseling has a time interval and if the desired response is not sufficient there will be many complaints from users such as demanding agencies and suppliers. It was analyzed that in terms of the operator of CompraNet, it is necessary to maintain a certain level of counseling by professionals, and to approach users with a foundation to support the counseling content and the management of the responses.

<Table 4-11> User's Remote Service (2020)

Service	User	Numbers	Cost
E-mail	Public buyers	25,201 remote consultations	No cost spent
	Suppliers	27,988 remote consultations	
Happy calls	Public buyers	2,726 remote consultations	
	Suppliers	3,814 remote consultations	

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

2.2.2. Promotion and Training of CompraNet

A. Promotion of CompraNet

Currently, there is no policy of promotion of CompraNet, only notices and support material which are disseminated through social networks. CompraNet is a system that needs to be used according to the regulations and the only promotion methods are as indicated below. There are currently two people dedicated for the promotion of the system but no person in charge.

YouTube: CompraNetMX
Facebook: Procura México
Twitter: @MexicoProcura

It is important for the Mexican government to disseminate and promote CompraNet, its use to increase the participation of companies and therefore, competition in procurement

procedures. In addition, promoting CompraNet increases transparency and credibility between the public institutions versus the citizens. To develop various actions such as the preparation of studies and surveys, to monitor indicators in the field of public procurement, and to promote the various modules of CompraNet and to promote beyond the social network, the Procurement Unit should receive an exclusive promotion item within its budget.

B. Education on the CompraNet

Within the Procurement Unit, the education area is divided into training sessions and international technology cooperation and there are 6 training instructors. The education is carried out in three modalities: face-to-face (currently suspended due to the COVID-19 health emergency), virtual and online. It also becomes two axes: technical and operational knowledge.

The requirements to participate in the training courses are:

1. For public servants: Identification of the institution to which it belongs to by requesting a form with their data.
2. For companies: Request a form with their data.

The training courses are available in the following link:
https://procure-compranet.hacienda.gob.mx/capacitaion/

The following support materials are used to provide training:

- User manuals;
- Video tutorials;
- Quick guides;
- Online platform (only for public servants);
- Presentations with information extracts; and
- Social Network posts.

From <Table 4-12>, the training on online registry and on the use of CompraNet is provided twice a year, 4 hours allocated for each session, and complaints were registered for the lack of time. In particular, suppliers entering CompraNet for the first time realize the need and the expansion of the training session. The main problem is the high turnover of staff within governmental institutions. This high rate doesn't allow people to specialize in the subject and the lack of commitment on the part of the public servants hinders the accumulation of knowledge. In the case of companies, where training is optional,

not participating in the training courses and not increasing their knowledge limits their participation in the recruitment procedures.

<Table 4-12> Training Session of CompraNet

Type	Target	Contents	Period	Method
Basic	Suppliers	User registration	2 per month	Collective
Basic	Suppliers	Use of CompraNet	2 per month	Collective
Advanced	Demanding organizations	Auction	4 per year	Collective
Advanced	Public officials	Use of CompraNet	1 per month	Collective
Advanced	Public officials	Auction	2 per month	Collective
Basic	Public officials	CompraNet accreditation	recurrent	Collective
Basic	Public officials	Normative courses	between 1 and 3 per month	Collective
Basic	Public officials	Use the Federal Government Digital Store	1 per month	Collective
Basic	Public officials	Módulo de Formalización de Instrumentos Jurídicos accreditation	Recurrent	Collective
Basic	Public officials	The Annual Program of Acquisitions, Leases and Services and Public Works of CompraNet accreditation	Recurrent	Collective

Source: Interview results of OM-SHCP by local consultant in Mexico (2021).

Until the situation of the COVID-19 improves, for the time being, the policy to promote the use of CompraNet is planned as follows:

- Migrate all courses to online mode;
- Virtual courses will be carried out for advanced and focused topics;
- Courses in face-to-face mode will be suspended until sanitary conditions permit, when they resume workshops will be held to facilitate teaching-learning.

In the case of training on CompraNet, instructors and procurement entities undergoing training (demanding agencies, suppliers) have a great interest in recruiting professional instructors and expanding the training hours for the stable training process of CompraNet. There is an urgent need of a policy to help increase the use of CompraNet by establishing a fundamental improvement plan. Therefore, a method that can be applied to public procurement training in Mexico will be presented with reference to the case of KONEPS.

3. Case Studies on the Dissemination of KONEPS

3.1. Evolvement of KONEPS

KONEPS, the Korean e-Procurement system, has been upgraded through 3 phases to enhance convenience and the efficiency of use by procurement stakeholders. In addition, the design and implementation of the KONEPS phase 4 new generation promotion project with industry 4.0 technologies will be processed from 2022 to prepare its new service in 2024 (see Table 4-13).

<Table 4-13> Evolvement of KONEPS

Phase	Major implementations	Detailed implementations
Phase 1 (1997-2001) Procurement EDI e-Bidding	• Establishment of e-Bidding services for improving simplicity and convenience of public procurement. • Establishment of e-Bidding service to conduct 67% of procurement works online.	• Electronic exchange of documents between demanding agencies and suppliers (1997) • Operation of an e-Bidding system (2000) • Completion of the e-Procurement system by establishing the e-Guarantee and the e-Payment systems (2001)
Phase 2 (2002-2008) KONEPS	• As one of the 11 major e-Government projects, PPS established and enhanced the KONEPS for expanding the e-Procurement system of the PPS to all public sectors. • Establishment of government implement systems to operate the leading e-Procurement system.	• Establishment of KONEPS (2002) • Provision of a CRM-based customized information service (2004) • Provision of a comprehensive online shopping mall (2006) • Provision of the mobile e-Bidding service (2008)
Phase 3 (2009-2021) Next-generation KONEPS	• Provision of customer-centric e-Procurement service with RFID, fingerprint verification, etc.	• Diffusion of the RFID-based item control system to the entire government agencies (2009) • Adoption of a fingerprint verification e-Bidding system (2010) • Smart KONEPS service (2011) • Establishment of a next-generation integrated KONEPS (2012) • Establishment of a next-generation comprehensive shopping mall (2013) • Establishment of a subcontract control system (2015) • Establishment of an e-Tendering system (2014- 2016) • Monitoring service to check the conformity of the public procurement contract (2016)
Phase 4 (2022-) Upgrade of Next KONEPS	• Adoption of the core technologies of the 4th industrial revolution such as AI, cloud, big data, IoTs, etc.	• BPR/ISP (2018 - 2019) • Feasibility study (2019) • Information strategy management plan (2020) • Detailed design and implementation (2021-2024)

Source: PPS (2020).

3.2. Operational Organization of KONEPS

3.2.1. Organization and Functions of PPS

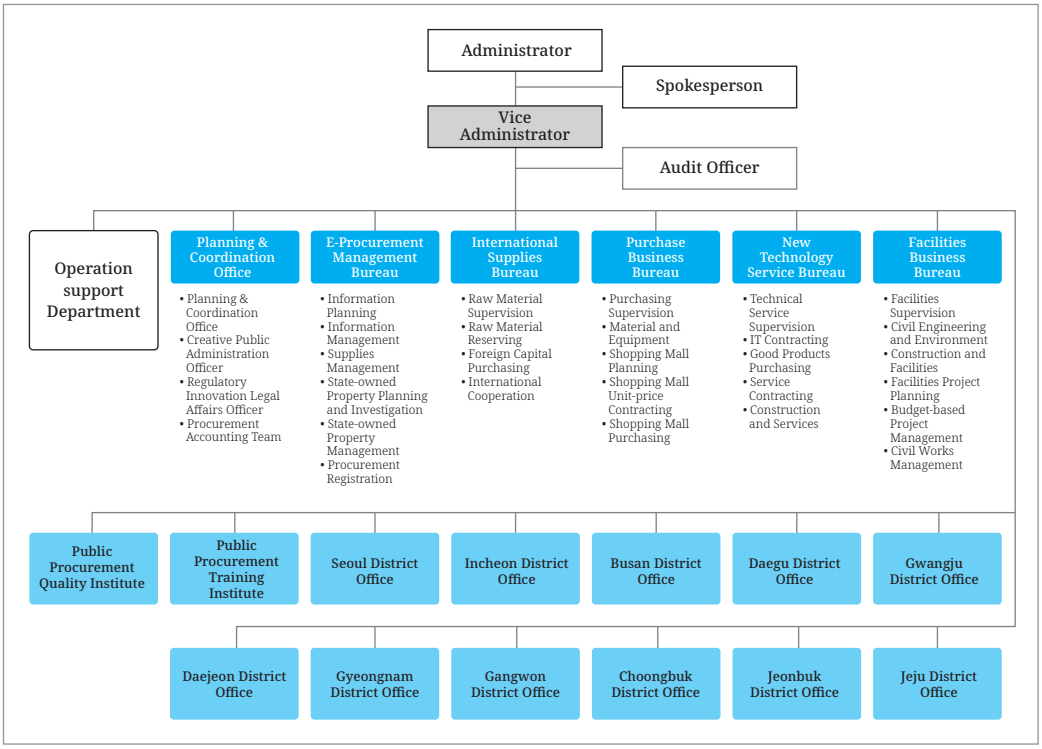
The history of the Korean public procurement started with the reorganization of the organizational system after the establishment of the Korean government in August 1948 with the establishment of the Temporary General Bureau of Foreign Capital, which was founded on January 1949, under the Prime Minister with an organization composed of 4 bureaus, 1 secretariat, and 12 divisions. In December 1949, the Foreign Capital Purchasing Service was newly established under the President of Korea with an organization consisting of 3 bureaus, 1 secretariat and 9 divisions. In February 1955, the Temporary General Bureau of Foreign Capital and the Foreign Capital Purchasing Service which operated separately were merged into the Foreign Capital Service with 3 bureaus and 13 divisions.

On October 2, 1961, it was organized as an external division of the Economic Planning Board and was reorganized into the Public Procurement Service. Afterwards, the PPS went through changes in an organizational status as an external division of the Ministry of Finance, as an external division of the Economic Planning Board. In 2008, it was organized as an external division of the Ministry of Strategy and Finance, and has maintained the organizational status until now.

Currently, the PPS consists of the Administrator, the Vice-administrator in the head office, 1 office (Planning and Coordination Office), 5 bureaus (Procurement Management Bureau, Procurement Bureau, New Technology and Services Bureau, Construction Works Bureau, International Procurement and Public Property Bureau), 2 institutes in the region (Procurement Quality Management Office, Public Procurement Training Institute), 11 offices (11 regional offices including Seoul PPS), 71 divisions and 5 teams, and the total number of persons of the PPS is 1,058 as of May 2021. Under its slogan 'Procurement of quality items at best value in a timely manner', the PPS is striving to achieve its vision as a 'World-class public procurement agency specialized in delivering and managing public resources' (see Figure 4-5).

- e-Procurement Bureau manages the implementation and operation of KONEPS.
- The works of the Information Planning Team and the Information Management Division which are the subdivision of the e-Procurement Bureau are described below.
- The role of the Information Planning Team is to conduct an overall coordination of the e-Procurement policies.

[Figure 4-5] Organizational Chart of PPS



Source: PPS web site (https://www.pps.go.kr) (accessed March 5, 2021).

The mission of the PPS is to conduct the procurement and management of goods, services, construction works necessary for public institutions to fulfill their duties. In order to accomplish the mission, it performs functions by field such as electronic procurement, product procurement, construction works and government property management. Accordingly, the objective is to set and improve the targets to support the efficiency and development of the public procurement by conducting efficient and transparent procurement of material resources in the public sector and supporting government to perform its function, and strengthening the procurement capabilities.

- The overview of the general status of PPS shows that (about KRW 22 trillion for goods and services, about KRW 12 trillion for construction works in 2017), it procures and provides goods (services) and public facilities required by construction contract management public agencies, and purchases and provides goods.
- Conduct a procurement support project by providing a total service for construction works required by the customer and verifying the total project cost for big-scale construction works (about KRW 20 trillion in 2017).
- Operate a commodity stockpile project, stockpile and the release of raw materials such

as aluminum at a proper time for a stable domestic supply. (about KRW 400 billion in 2017).

- Manage government goods and property, manage government-owned goods worth about KRW 17 trillion (1,230 pieces), manage government property to enhance its utilization. Public land stockpiling, inspection and audit of the government-owned property management status by public institutions.
- Operate KONEPS (Korea ON-line e-Procurement System), conduct the role of a single window for the public e-Procurement such as the integrated bidding announcement of public institutions. Utilized by 57,000 public institutions and 43,000 suppliers.

<Box 4-1>, <Box 4-2> and <Box 4-3> describes responsibilities of Information Planning Team, Information Management Team, and Procurement Registration Team.

<Box 4-1> Responsibilities of Information Planning Team

- Supervising / adjusting the policy related to e-Procurement
- Matters related to the establishment / management of project planning for procurement informatization
- Matters related to supervising and adjusting the budget for procurement informatization
- Matters related to the improvement of legal sentences or a system on procurement informatization
- Matters related to domestic/international cooperation for procurement informatization
- Matters related to the promotion of procurement informatization and its expanse of usage
- Matters related to training on procurement informatization
- Matters related to the establishment and implementation of a promotion plan for knowledge management and the operation of KMS (knowledge management system)
- Matters related to the operation and management of the CRM (Customer Relationship Management)
- Matters related to the operation and management of the PPS homepage
- Matters related to the information communication security and information protection
- Supporting the overseas export of the e-Procurement system
- Matters related to the management and operation of the DW (integrated procurement information system)
- Collecting, management and analysis of public procurement statistics
- Matters do not concerned in other divisions or teams

- **Policy and project planning related to e-Procurement**
- **Implementation of the legal system improvement, training & promotion, information security & protection**

Source: PPS (2021).

<Box 4-2> Responsibilities of Information Management Team

Matters related to the procurement informatization system operation

A. Matters related to providing an application system for the e-biddings of goods, services, civil works, and demanding agencies & suppliers
B. Matters related to domestic capital, foreign capital, facility, storage, service and commodity control
C. Matters related to the user registration, e-Guarantee, accounting, e-Payment, e-Certificate and etc.

※ KONEPS Outsourcing Management

- Matters related to work analysis/design and development/improvement of procurement informatization system
- Operation and management of key calculation machines/database/communication devices of procurement informatization system
- Matters related to domestic/international standard of e-Document related to procurement informatization
- Matters related to computation resources such as office automation equipment
- Matters related to management and operation of onnara system
- Matters related to portal contents provision and management of the national integrated e-Procurement system

- **Practical Operative Organization of KONEPS (Outsourcing for system operation)**
- **Implementation of operating works such as an internal application system related with KONEPS**

Source: PPS (2021).

<Box 4-3> Responsibilities of Procurement Registration Team

- Supervision and Management of the Complain Works
- Matters related to excavation and management of system improvement related to the complaints
- Matters related to evaluation report on the complaint/system improvements
- Matters related to the registration and the management of qualification for bidding participating with a national integrated e-Procurement system
- Matters related to the registration and management of the users or institutions using a national united e-Procurement system
- Operation of an e-Procurement Call Center
- Settings of the standard/scope of demanding agencies
- Matters related to complaints that are not concerned on other divisions

- **Registration and management of the bid participating qualifications and users, and institutions using KONEPS**
- **Work Implementation such as the Procurement Call Center Operation**

Source: PPS (2021).

Newly established in 2017, the Fair Procurement Management Team conducts the surveillance, the blocking, and the investigation of unfair activities. The Procurement Price Investigation Team investigates the price of goods traded during the procurement process, and due to the nature of the work, its personnel are kept confidential.

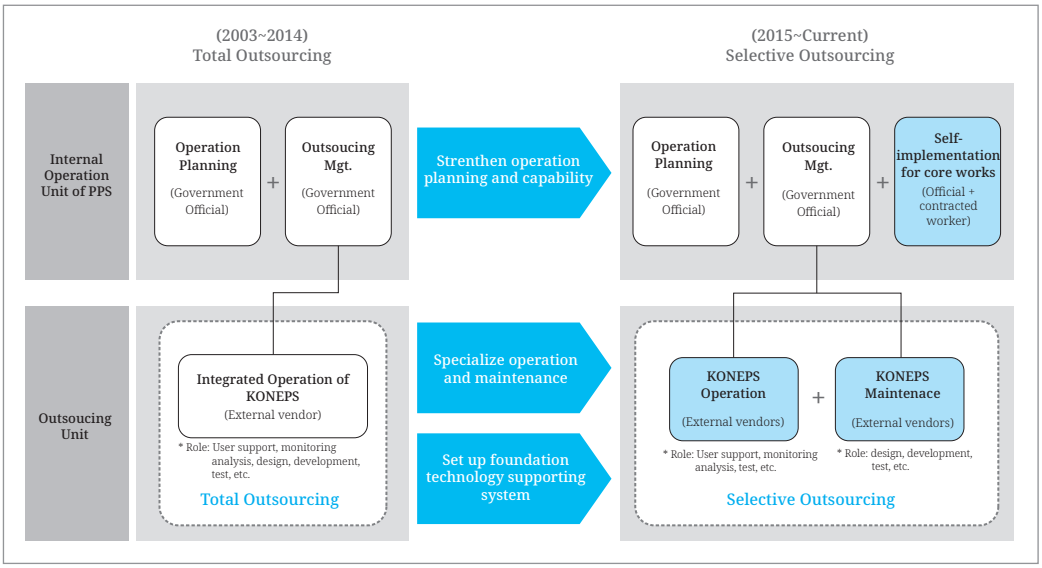
3.2.2. Operation Method of KONEPS

From 2002 to 2014, PPS has introduced a total outsourcing (method of entrusting the outsourcing to a single supplier) due to the lack of technical resources (human resource/management technique), system development and the increase of management costs and the application of new technology. However, since PPS has entrusted the consigned work to an external company for quite some time, it became dependent on a single external operator, the management ability of KONEPS degraded, and considering the specificity of the bidding business and the importance of data, there was a need to improve the operation method. Therefore, from 2015, PPS consigned separately the operation and the maintenance of KONEPS and adopted self-operation and flexible outsourcing method (the outsourcing is divided into several parts and entrusted to specialized enterprises by sector and by part) to directly conduct some of the operational tasks.

Currently, within PPS, in terms of the specificity of the bidding operations and the importance of data, the operation and maintenance of KONEPS are separately consigned,

and some of the operation tasks are consigned to flexible outsourcing which is directly operated by PPS. It turned out that the transition of operation has many advantages (see Figure 4-6).

[Figure 4-6] Transition of the Operation Method of KONEPS



Source: PPS (2015).

3.2.3. e-Procurement Business and Process of KONEPS

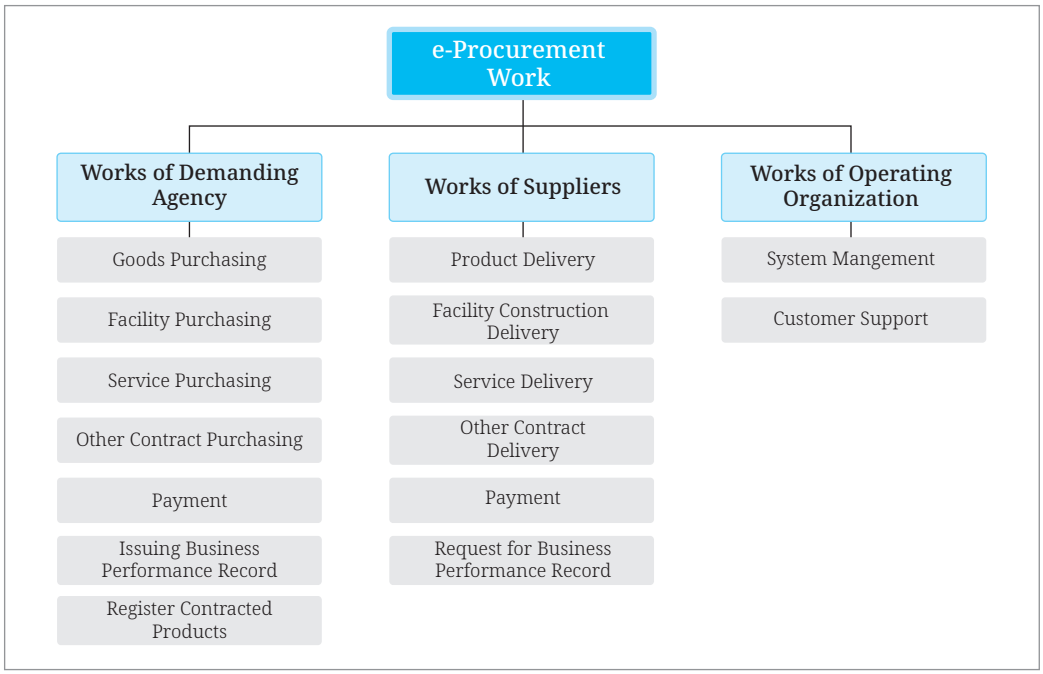
A. Function of the e-Procurement Business

The functions of the e-Procurement business can be divided mainly into the functions of the demanding agencies, suppliers and operational authority. The demanding agencies have the functions as a buyer and their functions are subdivided into the purchasing of products in regard of the demands on goods, the purchasing of facilities in regard of demands on construction works, the purchasing of services in regard of demands on service, price payment to suppliers, issuance of performance certificates that certify the completion of the fulfillment of the procurement project, contracted product posting that registers products on the e-Shopping mall through the product catalogue.

The supplying enterprises have the functions as a supplier and their functions are subdivided into the supply of facilities construction, bid submission on construction works, support participation in regard of the service request, payment request, performances certificate request to be requested after project completion.

The functions of the operational authority are subdivided into support for the management of the KONEPS and customer service (see Figure 4-7).

[Figure 4-7] Functions of e-Procurement Business of KONEPS



Source: PPS (2020).

B. Function of the e-Procurement Business

The main areas of procurement are Goods, Works (Civil works), Services. The e-Procurement Service is subdivided into a Service for Demanding Agencies and a Service for Suppliers, which are then subdivided to 10 major services (see Table 4-14).

<Table 4-14> Functions of Major Services of KONEPS

Level 1.	Level 2.	Contents of Services
Services for Demanding Agencies	Purchasing Goods	• Procurement business services on demand for commodities - Price investigation, determining estimated price, request for quotation, determining contract method, receiving request for purchase, selection of final winner, delivery and payment, request for delivery, request for commodity purchase, ex post facto management, bidding, request for procurement, review on request for procurement, demand
	Purchasing Facilities	• Procurement business services on demand for construction - Inspection and payment, signing contract, request for construction contract, receving construction contract, selection of final winner, ex post facto management, construction and audit, selection of estimated price, bidding, request for procurement, review on request for procurement

<Table 4-14> Continued

Level 1.	Level 2.	Contents of Services
Services for Demanding Agencies	Purchasing Services	• Procurement business services on demand for services - Inspection and payment, selection of final winner, ex post facto management, selection of estimated price, request for service contract, receiving service contract, bidding, request for procurement, review on request for procurement
	Payment	• Payment(Commodities / Civil Works / Services) service
	Approval on Performance Certificate	• Identification for performance certificate of supplier
Services for Suppliers	Providing Commodities	• Services such as receiving request for quotation, signing contract, delivery and ex post facto management, participation for bidding, receiving a request
	Civil Works	• Business service of implementing costruction for civil works - Participation for bidding ,signing a contract, ex post facto management, service implementation
	Providing Services	• Business service of delivery for services - Participation for bidding ,signing a contract, ex post facto management, service implementation
	Demand for Payment	• Payment(Goods, Civil Works, Services) service
	Request for Payment	• Business service that suppliers request performance certificate for public procurement to certain demanding agnecy

Source: PPS (2020).

C. e-Procurement Process

The main process of the e-Procurement includes user registration, the request of purchase/contracting, e-Bidding, e-Contracting, product deliveries, price payment and performance certification.

The user registration is the operation wherein the demanding agencies and suppliers register their information to utilize KONEPS. When the demanding agencies and suppliers register as users of KONEPS, they must register the official certificates. They have to visit PPS once at the beginning, register a fingerprint and receive approval from the responsible to complete the registration.

The operation of the e-Bidding is divided into tender announcements, submission of bids, bid opening and the selection of bid-winners. The tender announcements on products, civil works, services, lease, foreign capital, and reserves are posted on the portal of KONEPS and can be posted in accordance with the procurement items. The announcements are

posted after encryption using the official certificates. The participation to bidding means the participation of the suppliers to the tender in regard to the tender announcement by submitting the bid proposal and price proposal. In the selection of the bid-winners, the demanding agencies open the proposals submitted by the suppliers using the official certificates, integrate the evaluation results and select the final bid-winner.

Regarding the e-Contracting, whomever is responsible for the demanding agencies prepares the draft of the contract and sends it to the supplier who verifies and replies with the e-Signature. Then, whomever is responsible verifies the e-Signature and e-signs it to conclude the contract. This process is to conclude an untact online contract using an official certificate the official certificate to ensure transparency.

After entering into a contract, the supplier starts civil works and delivers products on the standards or requirements suggested in the tender announcements. The project is carried out through the request of the inspection by the supplier and an inspection by the demanding agencies by the stage of fulfillment. Once the start of civil works and product deliveries are completed, the demanding agency makes an e-Payment to the supplier.

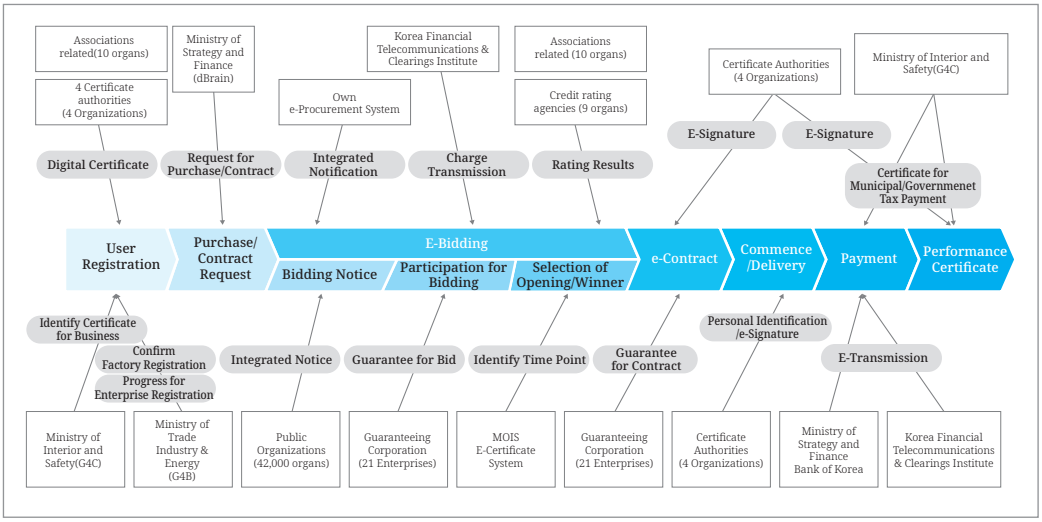
Once the supplier requests performance certificates on the civil works, services and goods, the demanding agency issue the performance certificates after verification of the execution of the procurement.

The core business of KONEPS are divided into 7 functions from the point of view of the electronic business process of the demanding agencies and suppliers, and the main process is defined based on this.

D. Major Structure of KONEPS

KONEPS consists of 3 main services - e-Procurement service, procurement administration service and the information management service - and 35 subsystems. In 2002, when KONEPS was first launched, it only provides services such as user management, electronic authentication, supplier information management, e-Bidding, e-Contracting, and e-Contracting (see Figure 4-8).

[Figure 4-8] Major Process of KONEPS



Source: PPS (2020).

Since it was launched in 2002, the PPS e-Procurement has been updated to expand its functionality. For example, the e-Shopping mall was created in 2006 and in 2008, the mobile e-Bidding service was added, and the mobile KONEPS service started in 2015, and the government inventory management became possible from 2009.

Therefore, the e-Procurement service with 17 subsystems is generally referred to as “KONEPS”. That is, KONEPS is not an isolated system but an integrated system. It was not built all at once, but has been continuously improved and developed since its implementation in 2002 to become user-friendly.

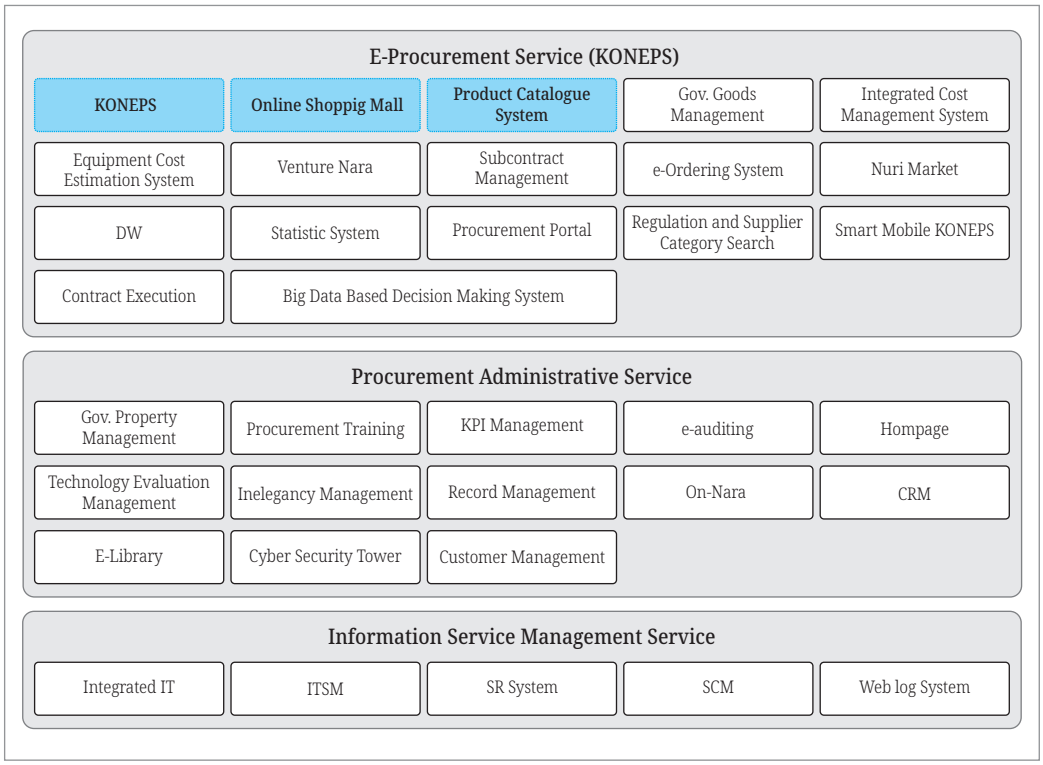
E. Services of KONEPS

KONEPS is a system that provides the integrated public e-Procurement service of Korea. According to the results of the statistics in May 2020, 57,000 demanding agencies and 437,000 suppliers are using the system. KONEPS drastically improved the convenience of the customer and reduced national budget with the unification into one single window with various bidding systems that was independently used in the demanding agencies. Furthermore, the user can visit PPS and register the information only once to use all e-Procurement services freely anywhere. It is structured such that services can be carried out online with a one-stop in linkage with the information of 221 institutions related with the e-Procurement such as the central government and public institutions, Ministry of Strategy and Finance (d-Brain), National Tax Service/Tax office, housing authority, certification related institutions, Industry association, credit rating institutions, guarantee institutions

(Seoul Guarantee Insurance), Korea Financial Telecommunications and Clearing Institute, etc.

The e-Procurement system, e-Shopping mall and e-Catalogue are the most important functions of KONEPS, and as for its core functions, there are e-Bid, e-Contract, and e-Payment. The support system through KONEPS consists of user management, e-Guarantee, company history management, document distribution. Besides those functions, there are RFID-based government goods management, system, government property system, e-Catalogue that are implemented in KONEPS portal system (see Figure 4-9).

[Figure 4-9] 3 Main Services and 35 Supplementary Services of PPS



Source: PPS (2020).

F. Status of On/Offline Process of KONEPS

In order to understand the status of the on/offline processing of the e-Procurement business, the on/offline business processing status are described based on the detailed operations that are adjusted into 16 stages by the procurement area, the core functions of KONEPS.

The detailed operations the core functions of KONEPS are readjusted into 16 stages (see Table 4-15).

- The majority of the 16-step e-Procurement work for Goods, Works (Civil works), and Services is processed online.
- Among all the procurement operations, the decision of the contract method, product deliveries/completion of works are conducted offline.
- Among all the procurement operations, bidding qualification registration, pre-qualification, technical proposal evaluation, product deliveries/completion of works, inspection/qualification are conducted in parallel on/offline.
- During the evaluation, inspection/qualification are processed online using the qualification system, however, the pre-qualifications are processed both online and offline.
- However, in the case of product procurement during an evaluation, the pre-qualification is not conducted.

<Table 4-15> Status of On/Offline Business Process of KONEPS

(●: On-line, ◐: On/Off-line, ○: Off-line, ×: Not Working)

Business Process \ Procurement Sector				Goods	Civil Works	Services
Request for Purchase / Contract		1	Request for Procurement	●	●	●
		2	Determining Contract Method	○	○	○
E-Bid	Bidding Notice	3	Bidding Notice	●	●	●
		4	Registration for Bid	◐	◐	◐
	Participation for Bid	5	Pre-Qualification	×	◐	◐
		6	Participation for Bid	●	●	●
	Bid Opening / Selection of Final Winner	7	Evaluate Technical Proposal	◐	◐	◐
		8	Bid Opening(Price)	●	●	●
		9	Screening(Qualification)	●	●	●
		10	Selection of Fianal Winner	●	●	●
E-Contract		11	Sign a Contract	●	●	●
Commencement / Delivery		12	Delivery / Completion	○	○	○
		13	Test / Inspection	◐	◐	◐
Payment		14	Request for Payment	●	●	●
		15	Payment	●	●	●
Performance Certificate		16	Performance Certificate	●	●	●

Source: PPS (2020).

G. Procurement Contract Method

In general, the procurement contract should be submitted to public competition, but in case the purpose, the character, the scale of the contract are judged necessary, the bidding qualification can be limited, and the contract can be processed through the nominated competition or free contracting.

KONEPS categories contracting the methods on the goods, civil works and services into public (open) competition, limited competition, nominated competition, general free contracting, small value free contracting, and processes the contract. As of January 2021, the competitive contract accounts for 83% and the free contracting 17% of the entire procurement contracts.

3.2.4. Government Procurement Call Center

In 2002, when the national electronic procurement integrated service, Korea PPS launched the Government Procurement Call Center as a customer support plan in order to solve the inconvenience and improve the satisfaction of the customer using KONEPS. In the initial stage, the call center flooded with enquiries on the use of KONEPS and the contract method resulting in the increase of complaints. Accordingly, the subdivision of work and the allocation of the right experts in the right place were well received by the users and contributed greatly to the establishment of KONEPS. The center was operated indirectly on an outsourcing basis in the initial stages but the started direction operation in 2004 to improve the quality of the counseling service and secure qualified operators.

The Government Procurement Call Center of PPS operates the first web-based call center of public institutions in Korea. It carries out a more efficient counseling service and is of a big help in the dissemination of KONEPS. The web call center system provides the various services of voice, conference call, and chatting as well as responding to the counseling request through internet.

The web call center system includes web call-through service, video conference service, web chatting service, escorted browsing service, and a file transfer service.

- Web call-through service
  - It is a voice-over-IP service that enables a direct call with counselors by clicking a button on the web window.

- Video conference service
  - It is a service that enables real-time video conversations with counselors through the internet.

- Web chatting service
  - It is a service that enables real-time text messaging between the customer and the counselor in linkage with the voice/video call functions.

- Escorted browsing service
  - It is a service that enables dialogue between the customer and the counselor while they share windows in real-time on the internet by utilizing a web-interfacing technology.

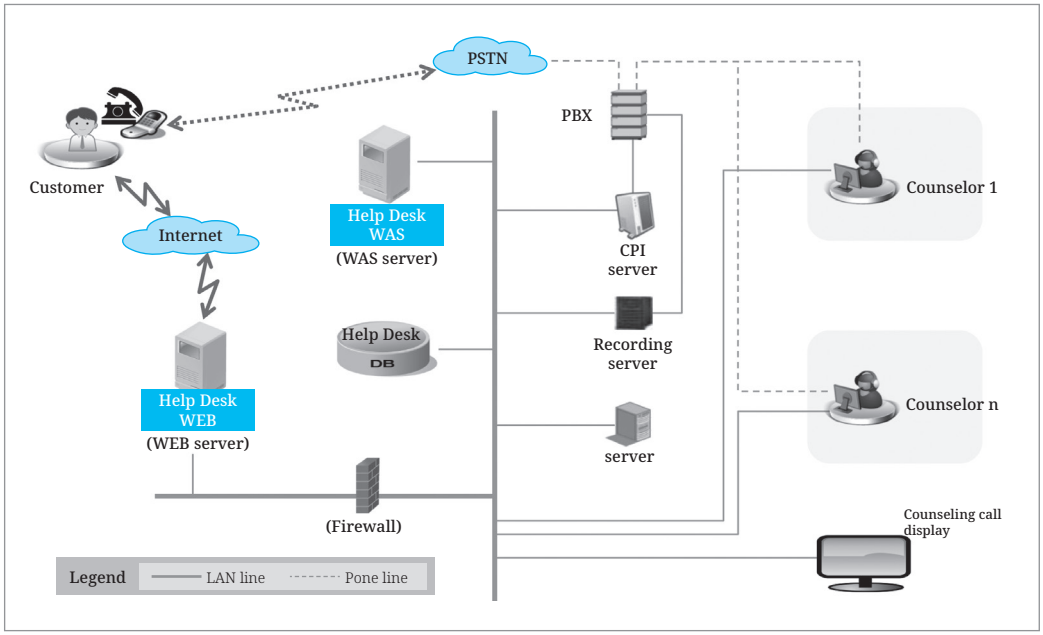
- File transfer service
  - It is a service that enables the mutual transfer of files between the customer and the counselor during dialogue.

Since the construction of the web call center, the call center has been reinforcing outbound-type call counseling through customized services as well as customer counseling services and is pursing being a CRM (Custom Response Management) call center for improving its marketing functions through the implementation of happy call systems.

As of December 2020, the Information Planning Team and the Procurement Registration Team are responsible for counseling work as well as the reception of customer complaints and the registration of bidding qualifications. The Procurement Registration Team which is in charge of the operation, started with 21 persons when it was launched in September 2003. Currently, it has a total of 113 employees: 1 leader of the Public Procurement Registration Team, 2 officials in charge of call center management, 28 officers carrying out public procurement registration, and 82 counselors.

The major equipment required for counseling and utilized in the call center include the CTI server, IVR server, web server, fax server, broadcast server, a 120-line switchboard, a 1200-channel recorder, PDP displays. Counselors provide the highest-quality counseling with digital telephone, PC, headsets, and webcams that enable a web-based counseling service (see Figure 4-10).

[Figure 4-10] Conceptual Diagram of the Government Procurement Call Center System



Source: PPS (2004).

In 2006, 3 years after the establishment of the call center, the score of the overall customer satisfaction was 80.9, which showed a high level of satisfaction. Among the clauses of the customer satisfaction survey, the activeness of the counselors scored 84.2, the kindness 86.7, and was identified to have a big impact on the improvement of customer satisfaction. By developing various consulting services, it enables and processes professional consultations such as the overall procurement work of KONEPS and legal counseling, thus improving customer satisfaction. The customer response rate automatically extracted from the customer counseling program has reached 95%, and the counseling performance has also increased.

3.2.5. Statistics of Procurement by SMEs

A. Statistics of SMEs

According to the statistics published by the Ministry of SMEs and Startups in 2019, the number of large companies was approximately 3,000, while the number of SMEs was approximately 3.8 million in all the industries, accounting for 99.9% of the number of total businesses. In addition, there are 17.71 million employees in all the businesses, of which 15.82 million are employed in SMEs, accounting for 89.7% of the total employees (see Table 4-16).

<Table 4-16> Statistics of SMEs in Korea

(Unit: Number of SMEs, %)

Category		2016	2017	2018
Business	All	3,676,499	3,737,465	3,813,723
	SME	3,672,327	3,732,997	3,809,011
	Percentage (%)	99.9	99.9	99.9
Employee	All (pers.)	17,051,453	17,294,316	17,711,917
	SME (pers.)	15,392,246	15,527,605	15,822,760
	Percentage (%)	90.3	89.8	89.7

Source: Ministry of SMEs and Startups (2021).

B. Statistics of Procurement of KONEPS

As of 2021, KONEPS is processing approximately 70% of the entire public procurement market in Korea. About 30% of the contracts by the central government, local governments and public companies are made through PPS, about 40% are made directly through KONEPS by the local governments and public companies, and 30% are processed through the procurement system (26 systems) operated by the special public enterprises such as the Korea Electric Power Corporation, Korea Gas Corporation, etc.

The tender announcements are published 100% on KONEPS through linkage with the e-Procurement systems of special public enterprises. The next generation of KONEPS that will be launched in 2024, plans to integrate 26 special public enterprises (see Table 4-17).

<Table 4-17> Statistics of PPS Contracting Performance

(Unit: KRW 100 million, %)

Category	2015	2016	2017	2018	2019	2020
Volume of total public procurement contracting performance (A)	1,103,830	1,177,861	1,371,671	1,412,752	1,599,816	1,757,904
PPS contracting performance volume (B)	358,490	350,763	379,676	385,908	452,493	480,545
Percentage (B/A)	32.5	29.8	27.7	27.3	28.3	27.3

Source: PPS (2021).

Among the public procurement, the competitive contracting is the bidding contract related with domestic-capital purchases, foreign-capital purchases, civil works, and bidding

material reserves. The free contracting applies to exceptional cases with special purposes and free collective contracting for the supporting sales of SMES. The volume of procurement is shown in <Table 4-18>. As of 2020, the competitive contract accounted for 77.6% and free contracting accounted for 22.4% of the total public procurement volume of KRW 48.9 trillion.

<Table 4-18> Proportion of Contract Methods by Competition Type

(Unit: 100 million, %)

Type		2017	2018	2019	2020	2021.3
Total Amount		38,766	39,301	45,986	48,890	14,338
		(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Competition contract	Amount	31,895	32,309	36,629	37,919	11,821
		(82.3)	(82.2)	(79.7)	(77.6)	(82.4)
	General competition	13,109	14,147	16,522	17,165	4,000
		(33.8)	(36.0)	(35.9)	(35.1)	(27.9)
	Nomination competition	46	87	74	90	14
		(0.1)	(0.2)	(0.2)	(0.2)	(0.1)
	Restriction competition	18,739	18,074	20,032	20,663	7,805
		(48.4)	(46.0)	(43.6)	(42.3)	(54.4)
Voluntary contract	Amount	6,871	6,991	9,357	10,970	2,517
		(17.7)	(17.8)	(20.3)	(22.4)	(17.6)

Source: PPS (2021).

There are 60,964 demanding agencies and 471,000 suppliers registered in Korea PPS. 99% of the public procurement contracts are conducted electronically and all price payments of the transactions are processed 100% electronically (see Table 4-19).

<Table 4-19> Volume of Demanding Agencies Registered in PPS

Category		Total	Gov't agencies	Local governments			Other institution					
				Local govt.	Educational institutions	Sub-total	Public institutions	Quasi non governmental institution	Other public institutions	Local public institutions	Others	Sub-total
2020	Nb.	60,964	5,210	6,932	11,992	18,924	1,009	1,450	452	250	33,669	36,830
	(%)	100	8.5	11.4	19.7	31.0	1.7	2.4	0.7	0.4	55.2	60.4

Source: PPS (2021).

In 2003, KONEPS started the e-Procurement service which was first adopted in 2002 and 29,925 demanding agencies and 92,042 suppliers used the e-Bidding service on a full scale (PPS White paper, 2008). At the start of the KONEPS service in 2002, the types of registered suppliers were not classified in detail in the procurement data and only the total number of companies was identified. However, the procurement statistics of KONEPS can now classify the registered suppliers into large enterprises, medium-size enterprises, SMEs, and non-profit corporations, etc. The number of procurement companies registered in KONEPS increased by approximately 511% for 17 years since 2003 to reach 471,000. Among them, the number of SMEs registered for the past 5 years accounted for over 97% of the total number of procurement companies. These results show that the public procurement market has also created the environments that vitalize the participation of the SMEs (see Table 4-20).

<Table 4-20> Statistics of Suppliers Registered by Type

(Unit: Number)

Category	2017	2018	2019	2020
Total (a)	373,833	400,915	434,062	471,100
SMEs	362,872	389,154	420,943	455,614
Medium-size companies	2,292	1,840	2,000	3,034
Large companies (corporate group with limited mutual investment)	694	701	783	1,039
Non-profit corporations and others	7,975	9,220	10,336	11,413

Source: PPS (2021).

(1) SMEs: Including the contract performance of non-profit corporations (Article 2, paragraph ④ of the Framework Act on Small and Medium Enterprises) that received support equivalent to small and medium-size enterprises under other laws since 2014

(2) Others: Non-profit corporation, companies engaged in financial and insurance-related services

C. Statistics of Procurement of the SMEs Registered in KONEPS

The public procurement of Korea offers a support policy that restricts the participation of large companies in favor for SMEs classified as socially disadvantaged in the industry economy. Every year, the PPS categorizes projects to support for SMEs in public procurement. In the past four years, the SMEs support has increased annually from 75.5% (KRW 28.6729 trillion) in 2017 to 74.0% (KRW 35.5450 trillion) in 2020 (see Table 4-20 and Table 4-21).

<Table 4-21> Support for SMEs in Public Procurement

(Unit: KRW 100 million, %)

Category	2017	2018	2019	2020
Total number of projects (A)	379,676	385,908	452,493	480,545
Support for SMEs (B)	286,729	289,785	334,667	355,450
Supporting percentage(B/A)	75.5	75.1	74.0	74.0

Source: PPS (2021).

<Table 4-22> Contract Amount by Enterprise in Public Procurement

(Unit: KRW 100 million, %)

Category		2017	2018	2019	2020
Total number of projects (A)		381,628	388,406	454,425	482,579
Large companies: corporate group with limited mutual investment	Performance (B)	51,132	47,411	60,201	62,435
	Percentage (B/A)	13.4	12.2	13.2	12.9
Medium-size companies	Performance (C)	38,566	43,851	53,029	58,319
	Percentage (C/A)	10.1	11.3	11.7	12.1
(1) SMEs	Performance (D)	288,419	292,131	336,415	357,282
	Percentage (D/A)	75.6	75.2	74.0	74.0
(2) Others	Performance (E)	3,511	5,013	4,780	4,543
	Percentage (E/A)	0.9	1.3	1.1	0.9

Source: PPS (2021).

3.2.6. Support Policy for the SMEs through KONEPS

A. Overview

The most basic national policy obligations to protect legally or support the SMEs is one of the national policies. As one of these policies, PPS has continuously improved the system by establishing a support policy that can effectively help them and achieve practical results using the unique functions of the PPS.

B. Support Policy for the SMEs

1) Good Government Procurement Product Program (Article 9.2 of Government Procurement Act)

The good technical products of the SMEs with high performance, technology and quality are designated as 'Good Procurement Products' and posted and notified through this program. The SMEs and venture business that have improved the quality of the procurement goods and developed new technology products, but are encountering difficulties in sales because they don't have any delivery history are supported by this program. The products designated as Good Products enter into the unit price contract through free contract to supply the demanding agencies. (Article 26 of the Law, Enforcement Decree on Contracts to Which the Government is a Party).

Products and software produced by SMEs and medium-size startups are subject to this program. Companies apply for designation of a Good Product for their products which are examined and designated. The product is designated as a Good Product for 3 years and can be extended for up to 3 years in consideration of the quality and performance. As of December 2020, 5,330 products are designated as a Good Product.

2) Good Public Procurement Joint Trademark Program (Article 9.2 of the Government Procurement Act)

This program supports the cooperation and relation of coexistence such as a share of technology among SMEs, delocalization, co-manufacturing, joint utilization of an A/S network in order to support the joint market in regard of the joint trademark good products that are developed and owned by 5 or more SMEs. (adopted in 2009). The free contract can be entered into for the procurement amount over KRW 20,000 or smaller than KRW 50,000. (Article 26 of the Law, Enforcement Decree on Contracts to Which the Government is a Party).

3) Competitive Contracting Program among SMEs

In this program, the products designated as competitive products can be procured only through competition among the SMEs in order to ensure the market of SMEs' products and to expand their business basis. (Article 7 of Law on Promoting the Purchase and Market of the SME Products).

4) Competitive Program for the Joint Supply of Competitive Products of the SMEs (Article 5.2 of the Government Procurement Act)

For the procurement of standard products among the competitive products among SMEs up to KRW 2 billion the demanding agencies enter into contract through competitive bidding among the joint suppliers that include at least one small enterprise or business (Scope of the standard product is product designated by the industrial standards council in accordance with the 'Industrial Standardization Act' and with low necessity to improve quality and develop technology).

5) Price Protection System for the SMEs

When selecting the bid-winner in the competitive bidding among the SMEs, the lower limit is guaranteed at 88% of the estimated price to prevent an excessive low-price bid from being selected (Refer to attachment 2 of the notification of SMEs Administration on 'Detailed Inspection Standards on the Contract Fulfillment Capacities in regard to the Purchase of the Products among the Competitive Products of the SMEs').

The contract price is guaranteed at 88% of the estimated price and for cleaning and guarding services, it is guaranteed at over 90%. In the case of the 2-step competition of the MAS contract of the competitive products of the SMEs, the contract is guaranteed at over 90% of the contract price.

6) Bid Submission Restrictions by Large Companies to the General Products Procurement Amount of Smaller than KRW 250 Million

The large companies are restricted in submitting the bids to the competitive bidding on general products, not the competitive products, amounting to less than KRW 250 million. (Article 21 of the Enforcement Decree on the Government Contract Law) (The engineering business in accordance with the Engineering Industry Promotion Act and the construction and technical services in accordance with the Construction Technology Management Act are excluded).

7) Recommendation System of Small Enterprise/Business in the Small Amount Free Contracting

The procurement of the competitive products of the SMEs amounting to less than 50,000 enter into free contracting with small enterprise/business recommended by the association

(Article 8 of the Enforcement Decree related to promote the purchase of SMEs products and to support the market).

8) Free Contract on the Products Manufactured with the Commercialized Technology Development

The SMEs develop the technology based on the demand of the demanding agencies and manufacture products with the technology selected and supported as the technology innovation promotion support project by the SMEs administration. In this case, the free contract is permitted when the buyer related to the demands at the initial stage decides to make purchase of these products (Clause 1.3 of Article 26 of the Enforcement Decree of the Government Contract Act).

9) Points Awarding Program for the SMEs in the Qualification Inspection

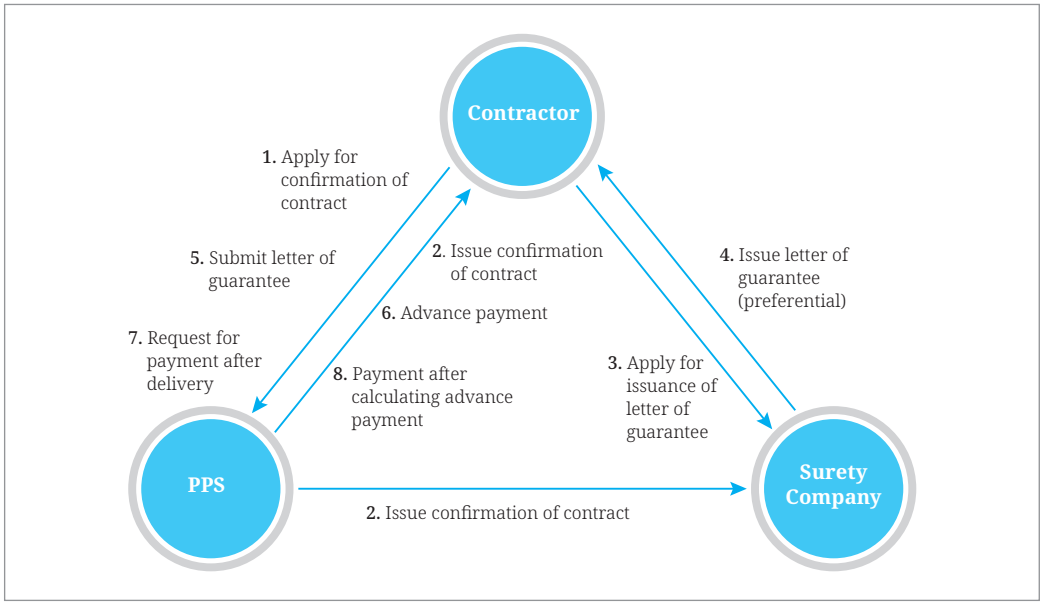
In order to expand the awarding of the SMEs, the SMEs who receive a score above the average is selected as the bid-winner. During the inspection of the qualification, additional points are awarded to the SMEs to support them win the contract (Article 7.3 of the Decree related to promote the purchase of the SMEs product and to support the market).

10) Liquidity Support for SMEs

a) Advance Payment Program:

- Applicable contracts: Civil works or the product manufacturing of KRW 30 million or over, the services of KRW 5 million or over
- Ratio of advance payment: Up to 70% of the contract amount
- Credit security: Guaranteed securities or guarantee bonds amounting to the 'sum of the advance payment and the agreed interest rate for the guarantee period' for the period of the 'contract fulfillment period + 60 days'
- Use of an advance payment: The advance payment will be used for achieving the purpose of the contract, preferentially to the labor cost and material cost (see Figure 4-11).

[Figure 4-11] Conceptual Diagram of the Advance Payment Program of PPS



Source: PPS (2021).

To solve the problem, PPS addressed the problems of the utilization of the program based on the opinions collected from the suppliers and meetings with surety companies. The advance payment program was implemented in September 2013 as an improvement plan.

- Improved convenience for suppliers to use the advance payment
  - Introduction to the advance payment program and how to use it through KONEPS and the Shopping Mall System for suppliers who are not accustomed to the advance payment program.
  - Comparison and checking of the guaranteed conditions of the guarantee fees by the surety companies in KONEPS.
  - When a supplier who has signed a contract requests a surety company to provide a quotation in KONEPS e-Contracting stage, the surety company provides the supplier with the quotation for advance payment guarantee conditions online.
  - To improve the supplier's convenience, the submission of excessive documents other than the specified ones is prohibited.
  - Minimal evidential documents are required such as the advance payment application sheet and the details of the use of an advance payment.

- Reduced rate of the guarantee fee for an advance payment
  - Reduce the guarantee fee rate for an advance payment involving SMEs to that of large companies.

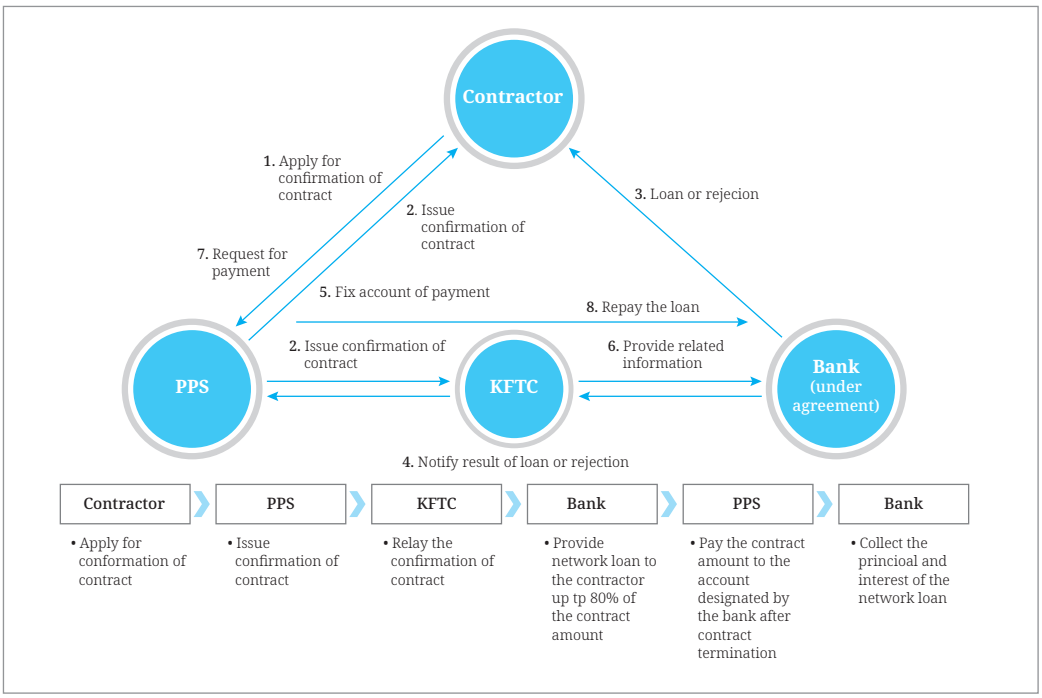
- In particular, the reduction of the rate is applied to suppliers with excellent technology who are certified as Good Procurement Product suppliers.

• Reduced burden of business cost related with an advance payment guarantee
  - When a supplier has acquired an advance payment bond, the interest rate of the Bank of Korea must be applied.
  - Contract period+30 days is issued for the contract of which the contract period is up to 60 days and the differentiated advance payment guarantee periods are applied.
  - Imposition of the agreed interest rate considering imputable causes in case of delivery delay

b) Network Loan Program:

In this program agreed with the financial institutions, the SMEs which are facing difficulties in securing production capital due to the lack of mortgage ability can get a loan of which the amount is up to 80%of the contract amount and can repay the loan with the price payment received upon contract fulfillment. This program was enacted in 2006 and currently 14 banks have made an agreement. In 2017, KRW 480 billion has been used as a loan and in 2018, KRW 430 billion (see Figure 4-12).

[Figure 4-12] Conceptual Diagram of the Network Loan Program of PPS



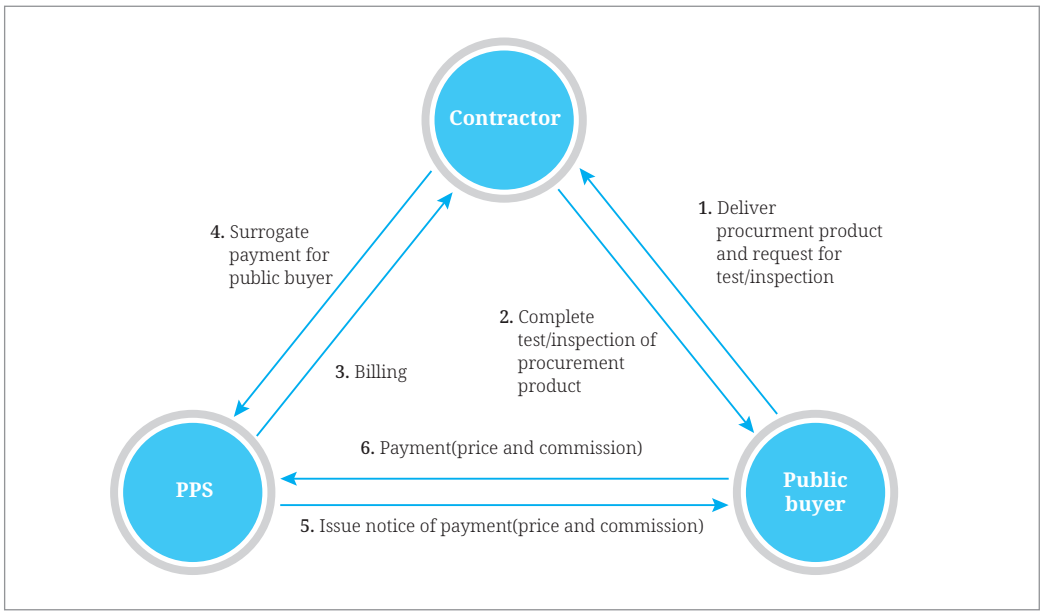
Source: PPS (2021).

c) Procurement Product Surrogate Payment:

This program applies to procurement products entered into by PPS. In this program, when the supplier completes delivery correctly to the demanding agency, it requests payment to PPS instead of requesting to the demanding agency. Upon receiving the request, PPS makes the payment of the delivery to the supplier on behalf of the demanding agency, and collects the payment from the demanding agency afterwards (see Figure 4-13).

When SMEs were facing liquidity difficulties due to the global financial crisis in the second half of 2008, PPS developed this surrogate program with an exception to the principle of payment by demanding the agency to support SMEs. Since September 2009, the surrogate payments became mandatory for products of unit price contracts and for products of a lump-sum amounting up to KRW 100 million.

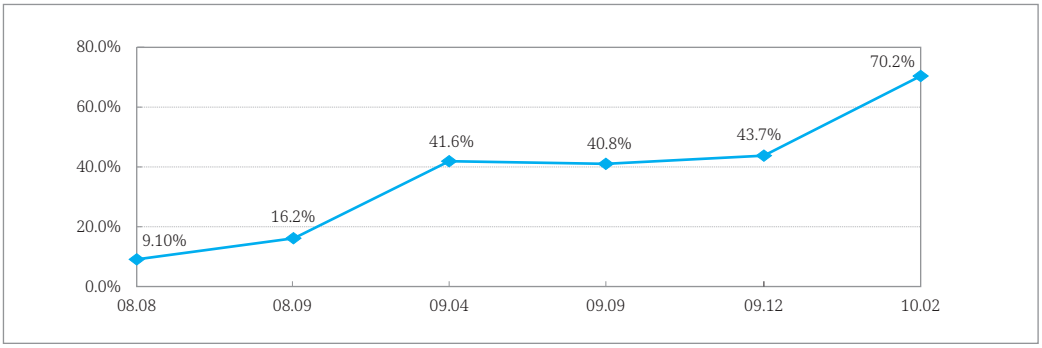
[Figure 4-13] Conceptual Diagram of the Surrogate Payment Program of PPS



Source: Ministry of Strategy and Finance (2015).

The procurement product surrogate payment is preferred by most suppliers as the supplier can receive payment within 4 hours of request. This program made it possible to resolve the lack of liquidity of small and medium-size suppliers (see Figure 4-14).

[Figure 4-14] Increasing the Ratio Trend of the Surrogate Payment of PPS



Source: PPS (2010).

3.2.7. Promotion of KONEPS

Currently, PPS utilizes 3 methods to promote KONEPS: mass media, online promotional media, and offline on-site visits.

Firstly, mass media promotions are carried out in daily/weekly newspapers, TV utilizing press releases, article submission, briefings and interviews to promote the procurement policies of PPS, the service improvements of the e-Procurement and KONEPS services. In particular, PPS unitizes various promotional means such as special/serial advertisements, interviews, article submissions, and the lectures to effectively promote the procurement policies.

Secondly, for online promotion, PPS utilizes SNS such as the web magazine which is published every month, Naver blog and Facebook, Twitter, video posts on PPS tv YouTube, creates and provides various online contents such as e-Newsletters, infographics, and Webtoons. It also operated the PPS Cyber Promotion Hall and the KONEPS Virtual Experience Hall, which have now ceased their services due to the reorganization of the next-generation KONEPS. In business agreements with demanding agencies such as the central government departments and institutions, PPS also promotes KONEPS on the homepages, blogs, Facebook of the public institutions (see Table 4-23).

<Table 4-23> Online Promotion of KONEPS

Category	Online addresses and main pages	
Naver blog	http://blog.naver.com/ppspr	
Facebook	https://www.facebook.com/ppspr	
Twitter	https://twitter.com/ppspr	
YouTube	https://www.youtube.com/user/ppsprno1	
Homepage introducing KONEPS	http://www.g2b.go.kr/gov/koneps/pt/intro/intro_01.html	
e-Newsletter	Infographic	Webtoon
128	36	33

Source: PPS (2021).

Currently, the procurement information open portal (https://data.g2b.go.kr:1443/pt/main/index.do) is open, allowing a detailed search of all the procurement information of PPS.

And thirdly, for offline promotion, PPS carries out various activities such as KONEPS Expo (organized every year in April), public procurement exhibition halls, on-site visits to the demanding agencies and suppliers by the Director of PPS, meetings, invitational events, and public design contest for the KONEPS service brand.

PPS started to organize the KONEPS Expos in full scale in 2009 to provide SMEs with opportunities for selling new technology-based products and helping start-ups enter the public procurement market. However, in 2020, due to the COVID-19 pandemic, the events have been cancelled and an online conference has been organized in September. PPS is preparing an exhibition with national and foreign companies under the theme of K-Quarantine (see Figure 4-15).

[Figure 4-15] 2021 KONEPS Expo (KOPPEX 2021)

Source: PPS (2021).

Originally, the Korea Public Procurement Expos were considered as a place that would provide opportunities for the purchase managers of demanding agencies to compare various public procurement products manufactured by SMEs, and to select optimal goods and services through one-to-one meetings with suppliers. These Expos feature not only programs that invite overseas buyers to give opportunities to outstanding public procurement suppliers to advance into international public procurement market, but also various procurement training programs in regard to the systems related with public procurement such as the MAS and how to use KONEPS.

Therefore, PPS provides opportunities by organizing the KONEPS Expos every year, which have various effects such as securing the viability of SMEs and venture companies, improving the quality of public procurement products, stimulating the constant technical innovation of products manufactured by outstanding SMEs and expanding sales channels through the promotion thereof (see Table 4-24).

<Table 4-24> Results of Korea Procurement Expo

Year	Exhibited items	Participating suppliers	Booths	Concurrent events
2019	1020 items	440 suppliers	900 booths	14 events
2018	892 items	306 suppliers	739 booths	14 events
2017	873 items	283 suppliers	733 booths	15 events
2016	822 items	251 suppliers	668 booths	18 events

Source: PPS (2021).

3.2.8. Training on KONEPS

A. Overview

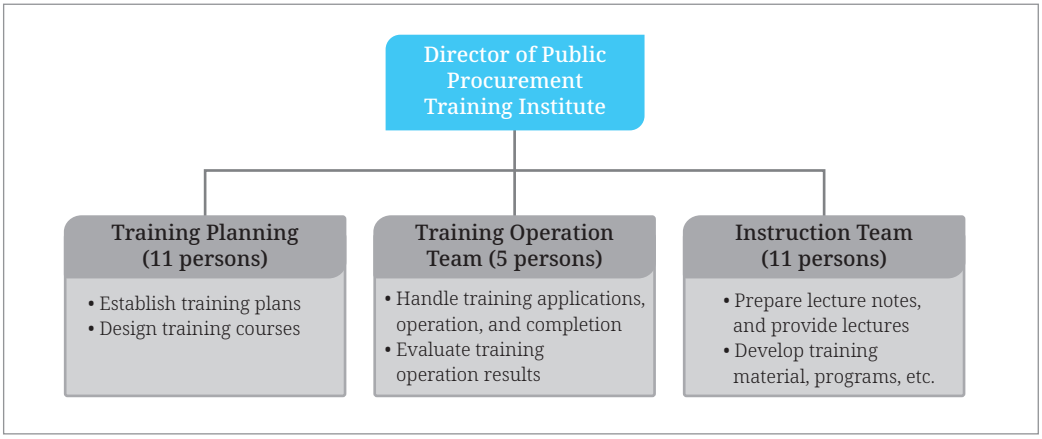
Since 1985, PPS has provided public procurement training for the purchase managers of public institutions to improve expertise in public procurement. The training was extended to suppliers from 2010. In the past, the Procurement Training Operation team of PPS was in charge of the training, however with the need for a specialized educational institution that can respond to the rapid expansion of public procurement, the Public Procurement Training Institute was established in April 2014, as an organization to takes charge of such public procurement training. The institute provides training for not only demanding agencies such as government agencies, public institution, and educational institutions, but also public procurement suppliers, and now hosts 10,000 trainees every year.

Today, in order to efficiently carry out the procurement operations in line with rapid procurement, changes in policies and the environment, and globalization, it is necessary to train excellent procurement specialists.

B. Organization of the Korean Public Procurement Training Institute

The Institute consists of the Training Planning Team which establishes training plans and designs training courses; the Training Operation Team which manages training requests, operation, certification, and evaluation of programs; and the Instruction Team which writes lecture plans, develops textbooks and programs (see Figure 4-16).

[Figure 4-16] Organization Chart of the Korean Public Procurement Training Institute



Source: PPS (2021).

C. Curriculum of the Training

The KONEPS public procurement training plan for year the 2021 is comprised of 65 courses, 308 sessions, 25,150 people, and customized training programs on demand are excluded. The 2021 performance of e-Learning was adjusted to 75.3% to that of 2020 considering the special situation due to COVID-19. The number of trainees planned for 2021 accounts for 85.2% of the 29,523 people in the 2020 performance (see Table 4-25).

<Table 4-25> Overall Plan of Public Procurement Training Institute (2021)

Category	Trainees	2020 Performance (pers.)	2021 Plan			
			Nb. of courses	Nb. of sessions	Nb. of trainees	Ratio compared to 2020 (%)
Total		**29,523**	**69**	**308**	**25,150**	**85.2**
Collective training	PPS	68	10	21	830	1,220.6
	Demanding agencies*	7,890	34	131	7,090	89.9
	Suppliers	1,605	12	40	2,080	129.6
	Foreign government workers	-	-	-	-	-
	Sub-total	9,563	56	192	10,000	104.6
Consigned training	PPS	232	3	6	300	129.3
e-Learning	Common	19,728	10	110	14,850	75.3

Source: PPS (2021).

- 2021 Plan: 65 training courses, 307 sessions, 25,150 trainees (The customized training programs are excluded from the number of courses and sessions)
  - The employee of PPS can also attend the training course for demanding agencies (The 2021 PPS employee performance is expected to increase more than planned).
- **Collective training:** due to lack of infrastructure, the number of trainees is calculated at the same level as the number planned in 2020 (104.5% compared to the previous year's performance)
  - The online remote training performance is included in the collective training performance.
- **Consigned training** (provided in foreign languages by means of telephone): Calculated at the same level as the number planned in 2020 considering the budget.
- **e-Learning:** Considering the special situation due to COVID-19, the performance of 2021 is adjusted to 75.3% of that of 2020.
  - The number of trainees planned for 2021 (25,150 people) accounts for 85.2% of 29,523 people in 2020.

The expert training is provided to employees of PPS, public institutions, and suppliers on categories such as: contracting procedures for goods, services, and civil works; KONEPS-based MAS, purchasing of products, services, and civil works, e-Bidding, and public open tenders; and bidding, contracting, inspection and testing that utilizes the Subcontracting

Control System. All the courses commonly include certification for public procurement experts.

The consigned training is provided to PPS employees in 3 foreign languages of English, Japanese, and Chinese by means of telephone for 5 months. The e-Learning is provided online by the Cyber Training Center on the following topics: the basics of public contracting of the goods, services, and civil works; the management of government-owned properties; management of international contracts; MAS contracts; and the Good Product Program.

Due to the prolonged COVID-19 pandemic, the target for e-Learning for 2021 is set at 75% compared to the previous year. However, since the procurement training was implemented in 2008, it has increased every year, and in 2020, the training courses and sessions increased by about 500%.

It can be seen that purchases of procurement specialized education on the procurement has been activated in earnest when the e-Learning has been expanded to include trainees from both public institutions and suppliers since 2012. In addition, the number of trainees from the demanding agencies sharply increased since 2013 because the upgraded new generation KONEPS-related training sessions became mandatory for the purchasing staff of the demanding agencies. Meanwhile, PPS spends an annual average of approximately KRW 1.2 billion in public procurement training.

D. Improvement of Training Service through Capacity Building of Instructor and Operational Workforce

- The specialized training to improve the instructing skills must be completed in order to enhance the instructor's lecture skills such as communication skills and to develop their ability to manage the lessons involving the participation of the trainees.
- Training class monitoring and consulting for the head instructors and full-time instructors (11 instructors) (once a year).
- Instructors frequently reflects the enactment and amendments such as public procurement contract regulations, in the curriculum to improve professionalism. (reflect in the fundamental documents on the procurement contract).
- Designate and manage the workforce in charge of the mid and long-term planning for developing human resources in consideration of the the environment changes and the required capacity of PPS.
- Enhance feedback after verifying the trainees' opinions through a survey on the training courses.

- Verify the effectiveness of the training sessions and conduct a trainee satisfaction survey for feedback.

4. Comparative Analysis between Korean and Mexico's e-Procurement System

4.1. Overview

In this section, the comparative analysis on the survey results on the implementation of KONEPS and the CompraNet of Mexico in terms of the e-Procurement operational organization, procurement operations, services, and support for SMEs, training has been conducted.

As for the operating organization, Korea separates the operation and maintenance, and concentrates on the management, while in Mexico, all five departments in the *Oficialía Mayor* takes direct charge of all tasks. A comparative analysis on the strengths and weakness of these operating organizations has been conducted to derive improvements. In addition, in the area of public procurement and services, the contents of the two countries were mutually reviewed in terms of the computerization, and the areas to be improved in priority for the vitalization of public procurement by the SHCP have been studied. Similarly, improvements that need to be made in the current state of support for the call centers and SMEs and the training promotion have been identified according to the situation in Mexico.

4.2. Comparative Analysis between Korea and Mexico

The main contents related to Korea's KONEPS and Mexico's CompraNet are summarized in the <Table 4-26>.

<Table 4-26> Comparison of Korea's and Mexico's e-Procurement Service

Category		Korea (KONEPS)	Mexico (CompraNet)	Remarks
Type of organization	Integrated operation of operation/maintenance	X	●	
	Separated operation of operation/maintenance	●	X	
	Outsourcing	▲	▲	Managed by the Bravo Solution
Task in charge	Portal	●	●	
	User registration	●	●	
	e-Bidding	●	●	
	e-Contract	●	▲	After winning the bid, the e-Contract is entered into in a semi-automatic manner (Documents preparation to demanding agencies)
	e-Payment	●	X	
	Auction/Reverse auction	●	●	Korea only operates the reverse auction
	External linkage/ Document distribution	●	X	
	Products catalogue	●	▲	21 categories of products registered, 210 office supplies registered (Mexico)
	Datawarehouse	●	X	
	Shopping mall	●	X	
	Information security	●	▲	Mexico only uses e-Signature
	Call center	●	X	Work in each dept. of the Administrative Office of the Ministry of Finance and Public Credit (SHCP)
	Infrastructure	●	●	Managed by a separate institution or department in both countries
	User training	●	▲	Conducted by an affiliated organization in Korea
Support for SMEs	Financial support	●	X	
	SMEs preference system	●	X	

Source: Interview data of Mexico operational institution (2021).

The operation organizations in Korea and Mexico differ greatly due to the difference in their procurement methods. In Korea, which is based on the centralized procurement, PPS (an independent agency) focuses on the procurement operations, whereas in Mexico,

a decentralized procurement is operated and the Administrative Office of the Ministry of Finance and Public Credit (SHCP) is in charge of its operation. Korea has been developing the public procurement by implementing a large operating organization because the country conducts focused procurement. In the case of Mexico where the decentralized procurement is conducted, the organization which is under the SHCP is small but has a work load, so areas for improvement have been identified and summarized to maximize its strengths. Korea and Mexico have a lot in common in the basic e-Bidding process. However, some differences were found in the handling of online processing and external linkage, e-Payment, e-Shopping mall, call center, support policies for SMEs, and procurement training.

In Korea, the entire process from user registration to e-Payment is processed online, however Mexico's CompraNet has some parts that cannot be connected online, so it needs to be improved. In particular, during the submission of the tender document, complaints about the attachment registration, the search for inappropriate companies, the error in the document of the bid-winner, the e-Contract required documents should be resolved. In addition, it is necessary to adopt a system that can process the entire bidding process online up to the e-Payment with a link to the external institutions.

In addition, according to this study, an online shopping mall with a new module that is currently not in CompraNet is under development.

Korea's call center responded positively to the users from the initial phase of KONEPS, and was highly satisfied, which helped a lot with the implementation of the system. There is also a need for ongoing management and training, with the number of counselors increased from 22 to about 110. Therefore, it will be useful for the development of CompraNet to bring together the counselors dispersed in the five departments of the current Administrative Office of the Ministry of Finance and Public Credit (SHCP) and to prepare a plan to create a call center.

Regarding the support policies for SMEs through e-Procurement, Korea established a financial support system and support policies. In order to help SMEs which represents 99% of the total enterprises to enter the electronic procurement market, preferential programs for SMEs such as the points awarding program for the SMEs in the qualification inspection, competitive good government procurement product program, the contracting program among SMEs, bidding price protection program, bid submission restrictions by large companies are being developed. In addition, financial support programs such as the procurement product surrogate payment program, the advance payment program, the network loan program have been established to support SMEs with insufficient liquidity.

Thanks to these types of supports, SMEs account for 74% of the total public procurement market as of 2020. Likewise, in Mexico, the majority of the industrial sector is occupied by small and medium-sized enterprises, but they represent only 30% of the total public procurement market. Therefore, there is a need to establish the preferential policies for SMEs and financial support such that SMEs can enter and vitalize the public procurement market to disseminate the use of CompraNet.

As for the training of CompraNet, due to a lack of operating staff, the training course is limited to 4 hours and new companies entering the procurement market are having difficulties using the system. Moreover, as the instructors also perform various tasks resulting in a high turnover rate, it is necessary to make improvements to reduce it.

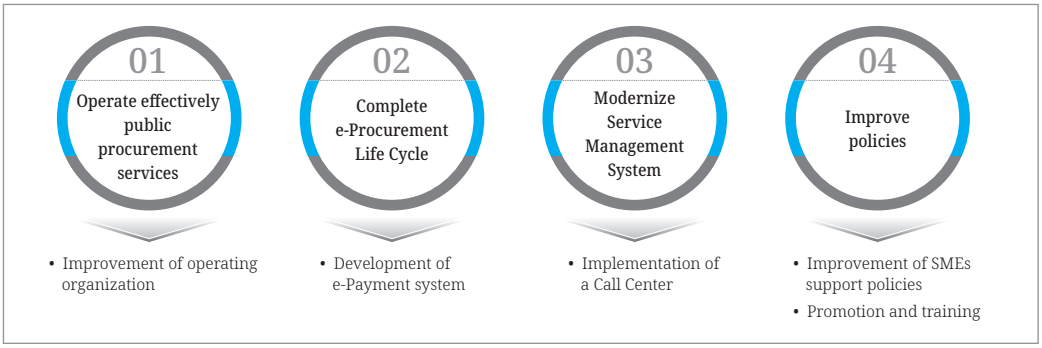
Therefore, in the case of Korea, after establishing an independent training center to take charge of the training courses which were managed by a single department and enhancing professional competencies, the interest in KONEPS has increased and the number of training subjects and trainees increased by 500% compared to the initial stage. Mexico should also develop a policy to improve education by encouraging dedicated training institutions or professional instructors.

5. Improvement Measures for the Use of e-Procurement System in Mexico

5.1. Overview

The operating organization and public procurement status of the e-procurement services operated by the Mexico's SHCP, the voices of the procurement's principal subjects (demanding agencies and suppliers), and the case studies of Korea's KONEPS have been studied. And, the comparative analysis of the surveyed and analyzed public procurement service systems between Korea and Mexico has also been conducted. Thus, based on the results of the previous research, the research team hereby suggested the directions for improvement at four perspectives to spread the use in order that the Mexico's national public procurement service can operate public procurement more efficiently and transparently (see Figure 4-17).

[Figure 4-17] Directions for Improvement of Pubic Procurement Services



Source: Authors.

The first direction for improvement is the systematic improvement of the efficient operating organization for Mexico's public procurement service. The purpose of this direction is to improve the organizational system in order that the public procurement users can access the e-Procurement more conveniently and perform the public procurement tasks.

The second direction for improvement is a measure to complete Mexico's entire e-Procurement cycle. A measure to improve the current offline payment service to an electronic payment service that handles payments electronically was suggested.

The third direction for improvement is the modernization of the management system of the public procurement customer service. In this direction, an improvement measure for the Call Center Service that provides customer service with an efficient and modernized system was suggested.

The fourth direction for improvement is a measure to make the policy more substantial. This direction suggested the policy support measures for revitalizing participation in public procurement of the small and medium-sized enterprises (SMEs), which are socially underprivileged, as well as the improvement measures of promoting public procurement and education.

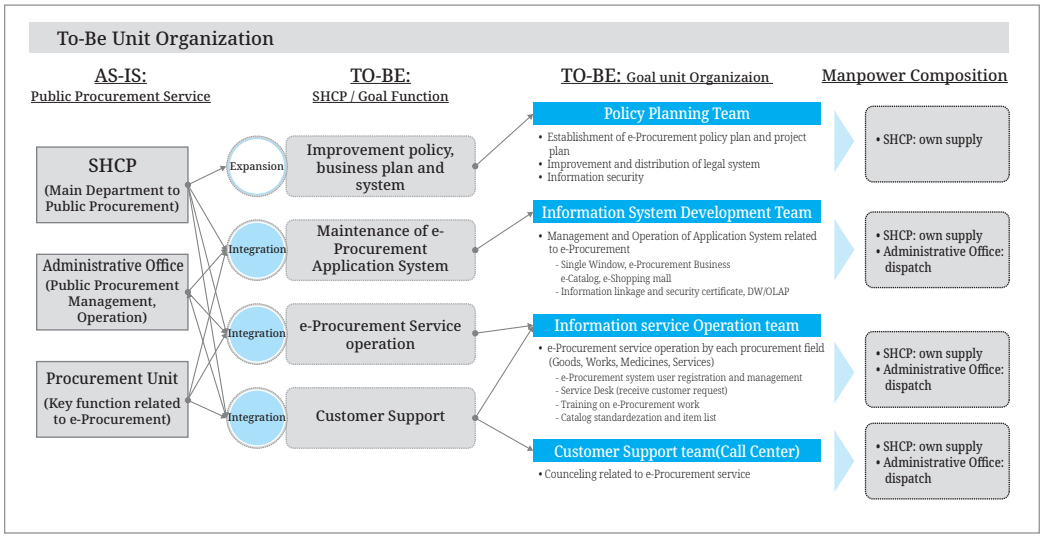
5.2. Efficient Operation of Public Procurement Services

This direction suggested the composition and role of the integrated operating organization for the e-Procurement tasks of Mexico's SHCP, based on the present state of KONEPs' composition for the operating organization in Korea. Through pushing forward systematic e-Procurement informatization project, reviewing the e-Procurement informatization project and unifying coordination to facilitate the management and control

of general informatization task and procurement system, definite electronic procurement informatization tasks, and to secure a foundation for an organic organizational cooperation system culture by splitting R&R were suggested as the improvement measures.

It is a change to accomplish for enhancing the performance ultimately, by managing systematically in order that the operating organization of the public procurement can be successfully transformed from the current state to the future target state and procurement stakeholders accommodating and quickly adapting to the change in the operational organization that conducts public procurement tasks electronically by using the e-Procurement (see Figure 4-18).

[Figure 4-18] Operating Objectives of Unit Organization



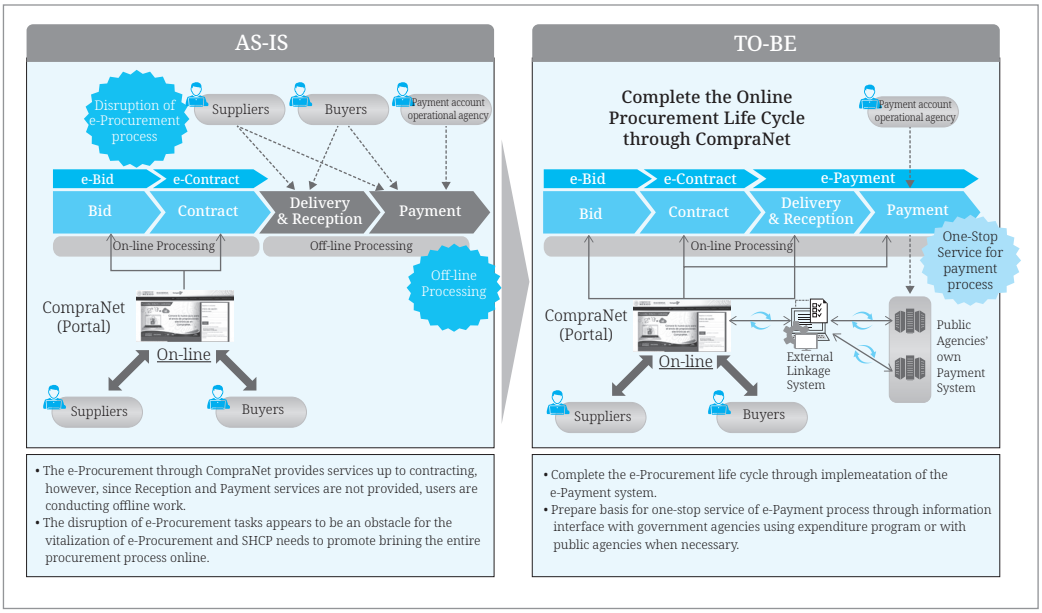
Source: Authors.

5.3. Completion of e-Procurement Life Cycle

In this direction, an electronic payment system is a process that improves the payment handlings so that it can be received electronically when the supplier charges the buyer offline and receives the payment for goods after the supplier has completed the fulfillment of the contract for the procurement. The majority of the electronic payment process is processed online, but if a Guarantee Against Defaults is required during the billing process, check the information by interfacing with the information system of the bank. Also, the buyer checks the supplier's demand for payment online and requests payment by the national financial system or its own financial system in order that the payment can be transferred electronically to the supplier.

The electronic payment system separates its functions into construction start, delivery management and payment management. In the construction start and delivery management function, the buyer receives the quotation and inspection request for the completed part of the contract from the supplier. The buyer checks the contents and makes the electronic payment with respect to the inspection results. The payment management function checks that the buyer receives the invoice from the supplier. If there is nothing wrong with the billing, make a request for the payment of the billed amount electronically and transmit it online to the financial system. Also, transferring the processing results of the payment from the financial system shall in turn be transmitted back to the electronic payment system so that it enables the buyer to check the payment processing (see Figure 4-19).

[Figure 4-19] Goals of Mexico's e-Payment System



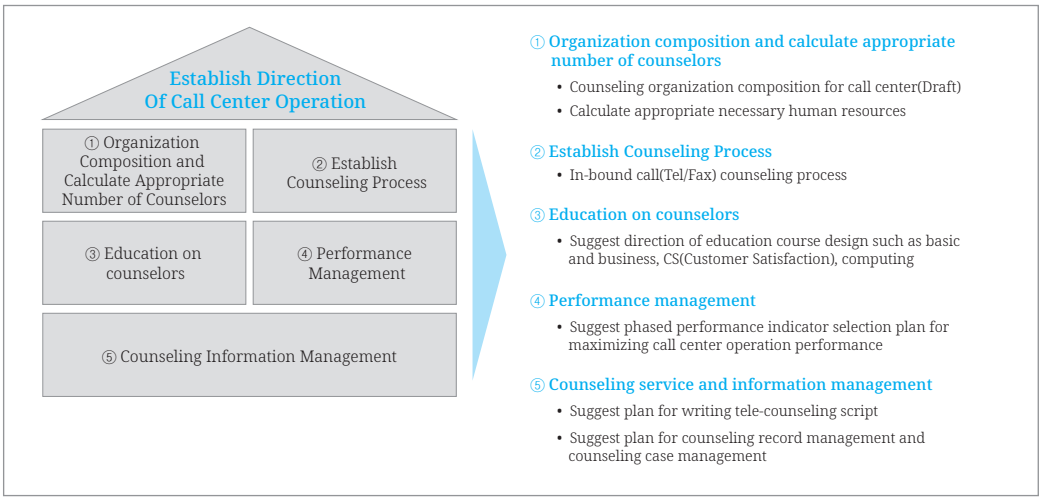
Source: Authors.

From the user's point of view, the electronic payment system has the advantages of preventing the waste of the administrative ability by the rapid payment processing and enabling the suppliers to immediately secure liquidity funds necessary for running the business. Nationally, there is an advantage in that transparency in the use of public budgets paid in the public procurement process is strengthened. One of the things to consider when constructing an electronic payment system is to check the diverse interfacing methods such as the web service or database and database connection when interfacing the online information of the financial system in order to select the optimal method that is suitable for the construction environment.

5.4. Modernize Customer Service Management System

As a measure to establish a plan to build a Call Center in order to maximize the customer satisfaction using Mexico's e-Procurement service, the purpose is to provide an On/Off-line services for communication activities with the users, such as the information guidance for the e-Procurement users, customer inquiries, complaint reception/handling, etc. Currently, the Mexico SHCP's secretariat is scattered across five departmental offices to provide the help desk which offers counseling services thus dealing with their task through e-mail rather than direct counseling with users. Hence, there are expected effects to increase the customer convenience by establishing a Call Center and unifying the consultation window, maximizing customer satisfaction by a prompt response to consultation requests related to the electronic procurement, and prevent the loss of administrative ability in the field due to the frequent consultation in terms of work efficiency. Thus, for the convenience of using the electronic procurement system and smooth task processing service, the target and direction range of the operating model that the call center should have is defined in [Figure 4-20].

[Figure 4-20] Operating Model of the Call Center

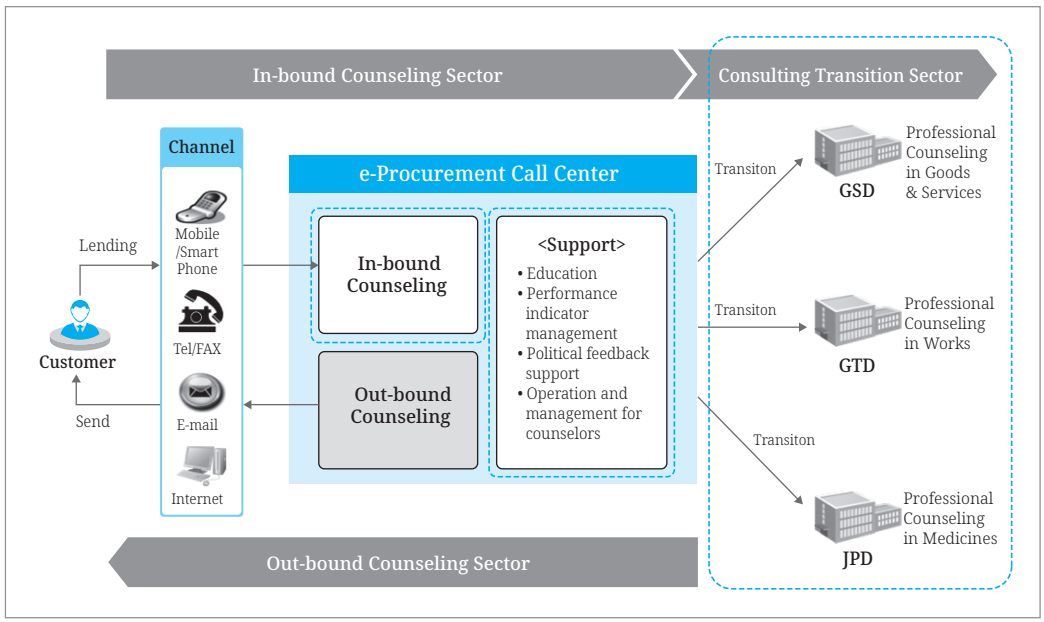


Source: National Information Society Agency (2004).

The organization of the e-Procurement Call Center is appropriate to consists of the 1st counseling part (simple counseling guide: such as guiding user registration and electronic procurement system usage) and the 2nd counseling part (with the high level of task difficulty and counseling that requires the processing authority due to the nature of the consultation, counseling transferred from the 1st counselor, counseling that requires the approval of a civil complaint handling manager, or authoritative interpretation), and cooperation with the Administrative Office of the Ministry of Finance and Public Credit (SHCP) is required for

the transfer of professional counseling. To calculate the appropriate number of counselors, the Erlang C formula is used. However, since Mexico's current help desk responds to calls using automatic telephones, the number of counselors is insignificant, so it is impossible to calculate the number of counselors. When responding to a general consultation in the future, it should be calculated by applying the Erlang C formula. The core task of the Call Center is to perform the role of a consulting HUB for the comprehensive e-Procurement information service, the guidance service of various channels that are in-bound to the Call Center and transfer the consultation of the inquiries, perform the outbound services of the results from consulting requested by the customers, and also to perform outbound services such as the promotion and research of public procurement related policies/events (see Figure 4-21).

[Figure 4-21] Counseling Process of the Call Center



Sources: PPS (2004) and reorganized by Authors.

Since counselors are most frequently in contact with the civilians related to e-Procurement, so it is necessary to set up a training program to increase the customer satisfaction and conduct systematic training to improve the call center service quality. Counseling training should be conducted by dividing into basic training, occupational training, CS (Customer Satisfaction) training, and computational training. First, the basic training introduces the purpose and main tasks of the electronic procurement system and call center, basic service regulations, roles, and the definition of responsibilities for each position of the call center, and internal rules and policies such as the rotation of

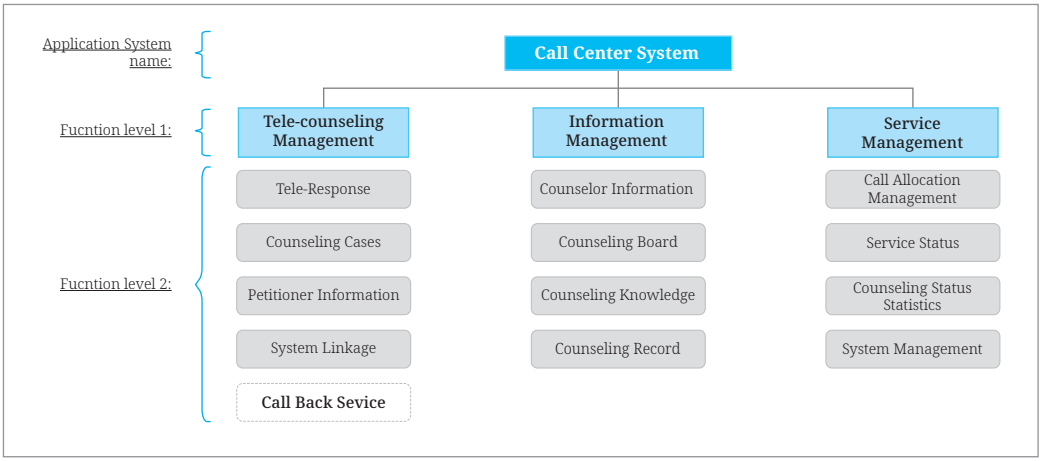
the call center. The occupational training includes information on handling complaints throughout the procurement process such as tips for handling complaints related to the electronic procurement legal system and user registration, and the CS training includes the basic etiquette and communication skills of telephone consultation, an understanding of customers and customer service, basic counseling skills, identifying the types of complaint, tips for responding/approaching each type of complaint, study on questioning techniques, how to overcome customer objections, counseling points, techniques to end counseling and basic complaint handling techniques.

However, since it is more effective to hire an external professional instructor than its own personnel, it is necessary to consider hiring an external instructor for CS training. Lastly, computational training is training for new counselors or when a new system is introduced, and it provides instructions on utilizing the counseling system, explanation for each civil complaint handling process, and the hands-on system security training and precautions when using it.

When operating a call center, it is necessary to prepare objective evaluation standards for the performance management of the operation and management. Also, it is necessary to measure and apply the performance from the operational point of view for the quality and efficiency of the call center services and manpower management. If the results of the performance measurement are insufficient, implemented training for enhancing the counselor's operating system and competence can be used as the basic data to determine it. It is necessary to manage the indicators for the performance management by stage in the early and stabilization phase of the call center operation. In the future, when the call center is operated and entered into the stabilization phase, the performance management goal should be focused on improving customer satisfaction.

Lastly, the functions of the Call Center are divided into the compositions in [Figure 4-22].

[Figure 4-22] Conceptual Diagram of the Call Center's Functions



Source: National Information Society Agency (2004).

The expected effects from the improvement of the Mexico CompraNet call center environment are:

- Reduce the sense of distance from users and restore trust by proactively responding to customer service that has previously responded passively.
- By establishing a consultation process, know-how is accumulated through the standardization of work processing.
- Work efficiency is improved by resolving the repeated similar civil complaints
- As an outbound service, eCompraNet can be promoted at low cost and with high quality.
- By promptly responding to customer requests, it improves the operational tasks and gives a sense of trust.
- The systematic management of the customer complaints are made to secure the records management and information on the processing contents.
- Quantitative performance management indicators can be prepared.
- Customer complaints can be minimized by responding to the direct consultations.
- Reinforce the convenience of access to the information procurement services for consulting customers and improving satisfaction.

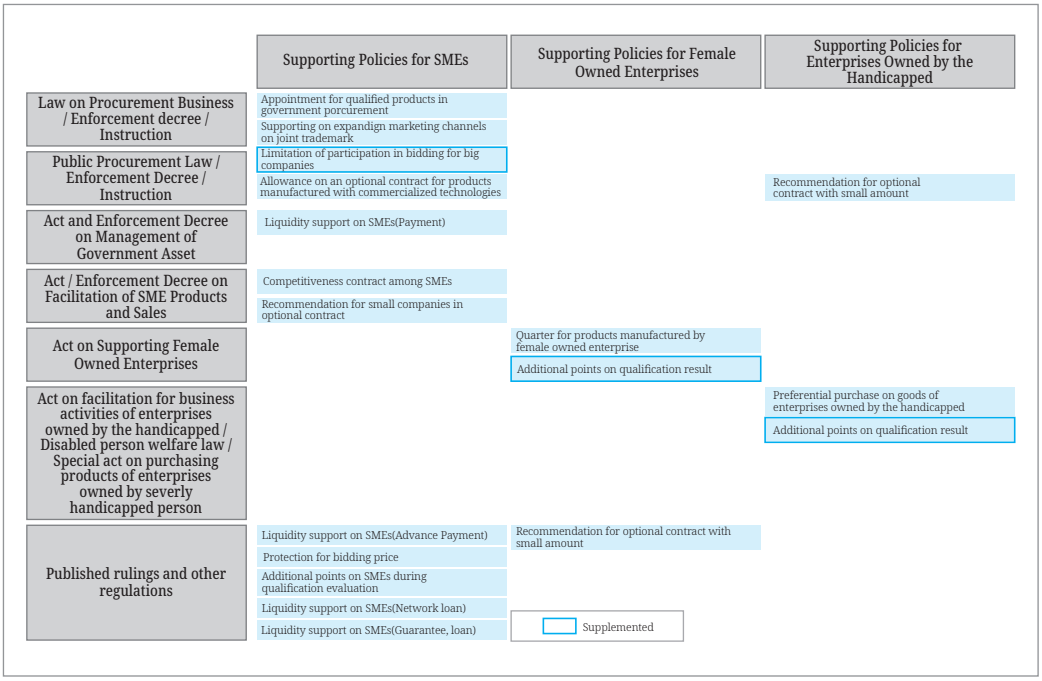
5.5. Improvement of Policy

5.5.1. Small and Medium-Sized Business Support Policy

One of the fundamental duties of the nation is to consider SMEs, which are socially underprivileged enterprises, and to support SMEs by utilizing the purchasing system of the national public procurement. However, since SMEs are a very broad and diverse group, the aim is to help spread the use of SMEs by preparing an improvement measure that can help objectively and efficiently for the public procurement system.

As described in Clause 2 Status Analysis, the supporting policies and financial support systems for socially underprivileged enterprises such as small and medium-sized enterprises should be developed and improved consistently for revitalizing the Mexico national public procurement system. Mexico's current supporting policy for socially underprivileged enterprises has a system that grants additional points during the tender qualification examination for SMEs, however it does not seem to be of much help to SMEs. In the case of the supporting policies for SMEs, it is recommended to improve policies in the purchasing, contracting, and financing area that can broadly support SMEs by amending/reamending the State Procurement-related Contract Act, Act on the Promotion of SME Purchase, and marketing support. If SMEs take the initiative to participate in public procurement by expanding their opportunities, it shall create the effects of further increasing corporate profits. If the support policies for SMEs, which are socially underprivileged enterprises, are prepared, the following effects can be expected. First, since SMEs account for more than 95% of the companies in Mexico, it can facilitate the revitalization of the national economy. Second, the government shall gain trust from the people through the nation's support to the socially disadvantaged and third, a consensus of the social community is formed by strengthening education and training through public procurement and consideration for long distance SMEs (see Figure 4-23).

[Figure 4-23] Supporting Systems and Policies related to Socially Underprivileged Enterprises



Source: Korean Law Information Center (2020).

5.5.2. Measures to Support Liquidity of Funds for SMEs

SMEs need to secure the smooth liquidity of funds in order to maintain and operate for most enterprises. However, it is difficult for most SMEs to secure funds due to external environmental changes and economic conditions.

As mentioned in the case of the implementation and operation of KONEPS in Korea in Clause 3, most of the SMEs that account for 99% of the total companies in Korea are having difficulties in securing the liquidity of funds. Thus, the Korean Public Procurement Service has established and implemented various systems to support the liquidity of funds for SMEs to promote public procurement.

Comparing the advance payment system for public procurement in Korea and Mexico, the execution period of the contract subject to the advance payment and the advance payment rate are different. However, the subject of the procurement contract and payment, the methods of securing the bonds are mostly similar. Therefore, Mexico needs to consider supplementing the system such as maintaining the advance payment system and, if necessary, reducing the execution period of the contract subject to the advance payment or raising the advance payment rate from the current level (see Table 4-27).

<Table 4-27> Comparison of Advance Payment between Korea and Mexico

Capital liquidity support program		Korea	Mexico
Advance payment	Public procurement contract entities	• Public buyers-suppliers	• Public buyers-suppliers
	Public procurement demanders	• Public buyers	• Public buyers
	Advance payment entities	• Public buyers	• Public buyers
	Contract fulfillment periods	• No shorter than 60 days	• No shorter than 90 days
	Advance Payment timing	• Before contract fulfuillment	• Before contract fulfuillment
	Advance Payment ratios	• Up to 70% of contract amount	• 50% advance payment for SMEs if the manufacturing process is longer than 60 days
	Credit security	• Guaranteed securities or guaranty bonds	• Guaranty bonds
	Relevant laws / regulations	• Management of the National Funds Act and the Contracting Rule	• Article 13th of the Law on Public sector Acquisitions, Leases and Services. • Article 15th of the Law on Public Works and Related Services.

Source: Authors.

Currently, Mexico does not have such a substitute payment scheme implemented by the Korea Public Procurement Service. Therefore, when considering that a new substitute payment scheme is applied in Mexico, this system must be premised on securing a sufficient budget for Mexico's SHCP as the general institution of the demanding agencies to pay the procurement contract price. However, securing a substitute payment budget is not a matter of departments, but the budget should be arranged by nationally improving the system and it is very difficult with only the funds of a specific procurement department. In addition, since SHCP carries out the distributed procurement work that is different from that of Korea, there is no justification for paying the procurement contract price of other public institutions instead. Therefore, it was considered that the application of the substitute payment scheme for the procurement contract price would be very difficult in Mexico's reality (see Table 4-28).

<Table 4-28> Comparison of Surrogate Payment between Korea and Mexico

Capital liquidity support program		Korea	Mexico
Surrogate payment	Public procurement contract entities	• PPS-suppliers	Not applicable
	Public procurement demanders	• Public buyers	
	Surrogate payment entities	• PPS	
	Surrogate Payment timing	• Within 4 hours upon reception of payment request	
	Surrogate Payment ratios	• 100% of the request payment amount	
	Credit security	• None	
	Payment collection method	• Payment amount + fee (public buyers → PPS)	
	Relevant laws / regulations	• Government Procurement Act	

Source: Authors.

Comparing the network loan system implemented in Korea with Mexico, Mexico does not currently have a loan system such as a network loan in which a loan is obtained based on a procurement contract. A network loan requires that the government should make the associate bank be involved. This is because, it is a system in which a stake is formed called a direct interest rate and claim security between the procurement contracting company and the associated bank, it was reviewed that it would be applicable if the SHCP plays the role of an intermediary between the associated bank in Mexico and the contracting company (see Table 4-29).

<Table 4-29> Comparison of Network Loan between Korea and Mexico

Capital liquidity support program		Korea	Mexico
Network loan	Applicable contracts	• Limited of contracts for which the PPS makes surrogate payments upon contracting between the PPS and the supplier	Not applicable
	Loan payment entities	• Banks under an agreement	
	Loan payment timing	• Upon reception of the contract certificate and the loan application	
	Loan ratio	• Up to 80% of contract amount	
	Loan collection method	• Principal amount + interest rate (supplier → bank)	
	Relevant laws / regulations	• Internal rules of the banks under agreement and the Specialized Credit Financial Business Act	

Source: Authors.

For an introduction to the basic concept of the network loan, refer to the previous case of KONEPS. In order to achieve the goal in Mexico, it is to provide loan-related information to prevent the abuse of network loans. For example, after receiving a network loan, information on companies with non-performing loans due to the non-fulfillment of a contract, etc. is provided to the associated bank on a quarterly basis, and to gain trust from the banks that have negotiated with the SHCP.

If SHCP intends to implement a CompraNet-based network loan service, interface CompraNet with commercial banks from a technical aspect and financial information security must be strengthened to relieve the users' anxiety. Also, it is necessary to expand the associated banks in order to revitalize the service.

It is hoped that the liquidity of the funding policy for SMEs in Mexico will be improved by referring to the goals and countermeasures to revitalize of the network loans as in <Table 4-30>.

<Table 4-30> Objectives and Measures for Network Service to Vitalize Capital Liquidity Support

Objectives	Measures	Details of the measures
Provision of network loan information for SME capital liquidity support	Provision of network loan information through CompraNet	• Information on the overview of the network loan service, how to use it and the banks under agreement will be provided through the CompraNet. • Loan conditions specified by banks will be posted on the CompraNet (eligible beneficiaries, loan limit and loan period).
	Introduction to the network loan service in the stages of e-Bidding and e-Contracting	• The network loan service will be introduced in the e-Bidding stage by including it in the tender announcement. • Introduction of the network loan service will be included in the stage of e-Contracting such that there can be no supplier who has concluded e-Contracting but cannot use the network loan service due to information shortage. • In addition, information on the network loan service will be provided to the contractor (SME) by e-mail in the e-Contracting stage.
Online service support for facilitating application for the network loan service	Intermediation of the network loan service through CompraNet	• For making banks lower their interest rate through competition, loan conditions specified by the banks will be disclosed on the CompraNet and will be updated each quarter. • If the supplier desiring to apply for the service allows, information on the public procurement e-Contracting of the supplier will be provided to the banks under agreement such that the information can be utilized in the loan application evaluation.

<Table 4-30> Continued

Objectives	Measures	Details of the measures
Online service support for facilitating application for the network loan service	Intermediation of the network loan service through CompraNet	• Through discussion among public buyers, suppliers, and the banks, the loan repayment period will be set to be sufficiently long (example: within 30 days after completion of procurement contract), such that inconvenience of the loan extension can be minimized.
Improvement of the reliability of the network loan service	Provision of loan-related information for preventing misuse of the network loan	• For suppliers who fail to fulfill contracts after receiving the network loan, and cause insolvent obligation, information on the suppliers will be provided to the banks under agreement each quarter of the year such that the reliability of the network loan service of the banks can be improved.

Source: Author.

5.5.3. Promotional Plan

It is recommended to build a virtual experience center on CompraNet to promote public procurement in Mexico and provide services through the three experience halls including the e-Procurement promotion hall, the e-bidding experience hall, and the e-Procurement experience hall for the first-time users of CompraNet. In the CompraNet promotion hall, the composition and development stage of the CompraNet system, CompraNet statistics, and promotional videos can be consisted as services. The electronic bidding experience hall shall be composed of visitors to directly experience electronic bidding and learn the process by entering the electronic bidding experience hall through the electronic bidding experience guide. Also, the e-Procurement experience hall checks the work flow between the demanding agencies and the suppliers for the entire e-Procurement process, enables the subjects of procurement (users and suppliers) to easily recognize the procurement process. In addition, online and reinforcement strategies are needed. SNS PR is a low-budget and high-efficiency medium, therefore, it is required to renew the existing SNS and actively develop a new SNS promotion program and use the main portals or nationwide government sites to add a web banner or links, and carry out a campaign with a strategy to strengthen the closeness of the public using infographics. The production and distribution of CompraNet PR leaflet/brochure, the face-to-face publicity such as the forum, workshop, international events, etc. and the public-friendly ambassador system can also be used to increase the familiarity level of CompraNet. CompraNet will be widely known to the public through the diversification of contact points through banners and QR codes, media advertising strategies such as broadcasting and newspapers, contribution to the newspaper/magazine 'Opinion Leaders', various promotions such as the dissemination of new information on CompraNet procurement policy in TV and radio stations, and this will help promote the public procurement.

5.5.4. Measures to Revitalize CompraNet Training

In order to perform the efficient procurement work in line with today's rapid procurement and policy environment changes and globalization, it is necessary to nurture outstanding experts on procurement. It is necessary for revitalizing the procurement with the Mexico's SHCP at the center of it, prepare the future by establishing a separate training department that can nurture procurement experts, provide accumulated procurement know-hows and experiences a training service for the procurement stakeholders.

The training organization is required to be divided into three main areas:

① Planning team that establishes education and training plans and designs education and training courses,

② Operation team in charge of training application, operation, completion and the evaluation of the training operation, and

③ Professors team that prepares lecture plans, develops textbooks and programs for actual procurement training. It is recommended to organize a dedicated training team as early as possible to contribute to the spread of CompraNet by equipping a public procurement training system suitable for the current state of Mexico.

6. Policy Recommendation

In the measures to spread the use of CompraNet of this KSP Mexico project, the current public procurement using status in Mexico was investigated and Korea's KONEPS operation cases were shared to compare and analyze cases with Mexico. Based on the comparison results, the directions for the improvement of public procurement in Mexico was suggested and the improvement measures were recommended for the purpose of revitalizing the use and operation of CompraNet.

Accordingly, this research team investigated and analyzed the current status and the issues of SMEs related to the public procurement through an on-site interviews, along with the analysis of the organizations, tasks, and processes related to the e-Procurement services in both Korea and Mexico. Also, the direction for development of Mexico's public procurement system was derived by comparing and analyzing the e-Procurement organization, work, service, SMEs supporting policy and the training of both countries

by investigating the introduction and operation cases of KONEPS, Korea's e-Procurement system.

In order to revitalize the public procurement market through Mexico's e-Procurement system, the research team has set 4 strategic directions including the 'Efficient operation of the public procurement services', 'Completion of the e-Procurement life cycle', 'the Modernization of customer service management system', and ' the Improvement of policy', and improvement plans in each direction were suggested above.

From the perspective of the first direction, 'the Efficient operation of the public procurement services', a plan to improve the organizational system was suggested such that the users of public procurement can perform public procurement tasks and for this, a basis for the organic organizational cooperative system with overall digitization tasks and procurement system management and control, and accurate e-Procurement informatization task and the division of R&R is suggested through the promotion of the e-Procurement informatization project with public procurement operation entities, project review and the unification of the adjustment.

From the perspective of the second direction, 'Completion of the e-Procurement life cycle', the users have the advantages of preventing the waste of the administrative power with the rapid payment process, and the suppliers can immediately secure the liquidity necessary for the business operation. And for the country, a measure of the new establishment for the e-Payment system was suggested to provide a one-stop online service that can improve transparency in the use of the public budget during the public procurement process.

From the perspective of the third direction, 'the Modernization of customer service management system', a measure to establish a new call center was suggested to increase the customer satisfaction and systematic management of the e-Procurement service. It consists of establishing a separate help desk that unifies counseling window and increases the customer convenience and from the perspective of work efficiency, it can prevent the waste of administrative power due to frequent counseling.

Lastly, from the perspective of 'the improvement of policy', an improvement plan for the support policy of SMEs and financial support, that encourage participation in public procurement in order to revitalize the use of e-Procurement services. Also, suggestion on the education and training improvement measures and promotion were proposed to strengthen Mexico's procurement training system.

The development plan of this study was suggested with a focus on areas that should be developed to vitalize the Mexico's public procurement market through analyzing the differences between the two countries' public procurement services. In order to promote the development plans proposed in this study to be helpful for the development of public procurement in Mexico, strong leadership and a will to carry out are necessary to establish a continuous promotion cooperation system and secure manpower and a budget.

The research team affirmed that public procurement officials in Mexico have high level commitments to revitalize the use by expanding the e-Procurement services, while carrying out this project. While introducing and operating CompraNet, the Mexican government still has many challenges to solve, and hopes to proactively accept more services from Korea's KONEPS for development and resolution. Therefore, the research team expects that the development plan suggested in the report is the first step for the future development of public procurement in Mexico and is used as the basic data to drive the improvement work, and furthermore, it is expected that it will contribute to the development of the industrial economy through the spread of the use of the public procurement market in Mexico.

References

ADB, e-Government Procurement Handbook, 2013.

KOICA, PMC for Implementation of e-Procurement System in Jordan, 2015.

Korea Federation of SMEs, Public Procurement for SMEs Products Program, Korea Federation of SMEs, 2012.

Ministry of Strategy and Finance, Contracting Rules of the Ministry of Strategy and Finance, Ministry of Strategy and Finance, 2017.

Ministry of Strategy and Finance, PPS, The Law, Enforcement Decree, and Enforcement Rule on Contracts to Which the Government is a Party, Ministry of Government Legislation, 2017.

Ministry of Strategy and Finance PPS, The Law, Enforcement Decree, and Enforcement Rule on Public Procurement, Ministry of Government Legislation, 2017.

Ministry of Planning and Finance, Ministry of Science, ICT & future Planning/Ministry of land, Infrastructure and Transport, PPS, Korea Federation of SMEs, The National Contract System of the 2014 Will be Changed as This, 2014, Ministry of Planning and Finance, 2014.

National Computerization Agency, A Study on Strategies for Adopting Call Centers in the Public Sector, National Computerization Agency, July 2004.

OECD, Follow up Report on Mexico CompraNet Reform, 2018.

OECD, Review of Mexico's e-Procurement System, 2018.

Park, S., *et al.*, Research on the Operational Process Improvements Through Analysis of Information System Obstacles, Korean Operations Research Management Science Society, 2008.

PPS, Procurement Statistics, 2003.

PPS, Guide Manual of the PPS Web Call Center, 2004.

PPS, White Paper on Procurement Innovation of the Participatory Government - Until We become a Global Leader, 2007.

PPS, 60 Years History of the PPS, 2008.

PPS, White Paper on Public Procurement, 2008.

PPS, The PPS Expands Surrogate Payment for Public Procurement Products (Press Release), 2010.

PPS, Korea Online E-Procurement System of the Korean e-Government System (UN Presentation Material), 2013.

PPS, Analysis Report of Overseas Procurement Trend Market in the First Quarter of 2013, 2013.

PPS, The PPS Provides Liquidity to SMEs through an Improved Advance Payment Program (Press Release), 2013.

PPS, The PPS Provides Network Loan for Supporting SMEs with Lower Interest Rate and Higher Usability (Press Release), 2013.

PPS, Introduction of KONEPS Expo, 2014.

PPS, Statistics of Public Procurement, 2021.

PPS, 2021 Business Planning of PPS, 2021.

PPS, Organization of the PPS (http://www.pps.go.kr/kor/jsp/introduce/organization/org.pps), 2021.

PPS, Statistics of Public Procurement. (http://www.pps.go.kr/kor/jsp/ offerData/statistics/statistics05.pps#), 2021.

PPS, KONEPS Expo, 2021, www.koppex.com.

The Export-Import Bank of Korea, 2013 System Consulting (Part of e-Procurement), 2014.

Yang, J.S., and Kim, H. Discussions on Government Procurement in Multilateral Trade and Policy Implications, Korea Institute for International Economic Policy, 2001.

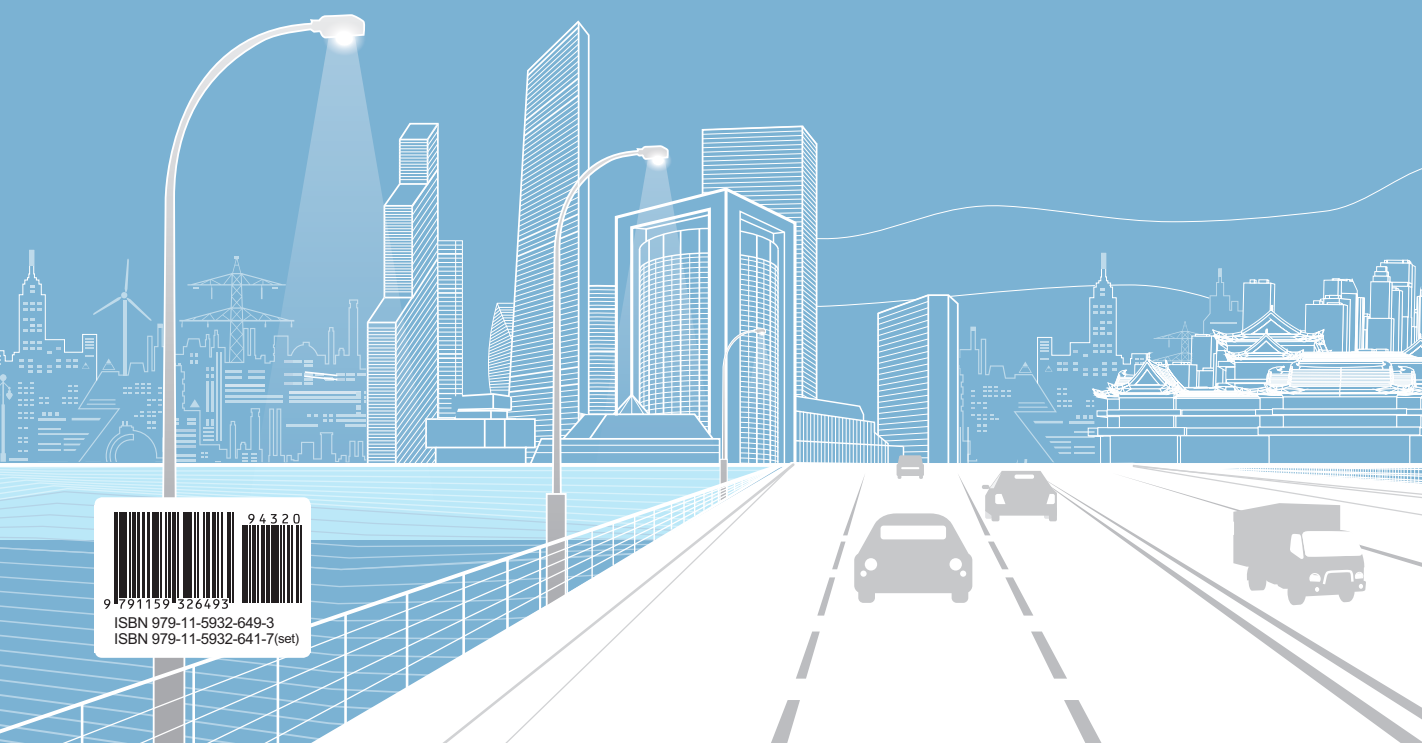
Ministry of Economy and Finance (MOEF)
Sejong Government Complex, 477, Galmae-ro, Sejong-si 30109, Republic of Korea
Tel. 82-44-215-7747
www.moef.go.kr

Korea Development Institute (KDI)
Namsejong-ro, 263, Sejong-si 30149, Republic of Korea
Tel. 82-44-550-4114
www.kdi.re.kr

Korea IT Consulting (KITC)
#1503, Leaders B/D, 63, Seochojungang-ro, Seocho-gu, Seoul 06651, Republic of Korea
Tel. 82-2-582-2400
www.itall.net

Korea Institute of Procurement (KIP)
319, Eonju-ro, Gangnam-gu, Seoul 06226, Republic of Korea
Tel. 82-2-796-8234
www.kip.re.kr

Knowledge Sharing Program (KSP)
www.ksp.go.kr



9 791159 326493 94320
ISBN 979-11-5932-649-3
ISBN 979-11-5932-641-7(set)