Korea's Combined Census in 2020

The 31st Population Census Conference, Nov. 29. 2022
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1 **History of Census in Korea**

1) Census Population Counts, 1925 – 2021

(million)

- **19.5** (1925)
- **25.9**
- **30.9**
- **40.5**
- **51.1**
- **51.9**

1925 · 1935 · 1949 · 1960 · 1970 · 1980 · 1990 · 2005 · 2015 · 2020

The first population census in Korea

Including **housing census** components

Launching **internet response option**

Introducing a **combined census approach**

Using **tablet PCs** for field enumeration

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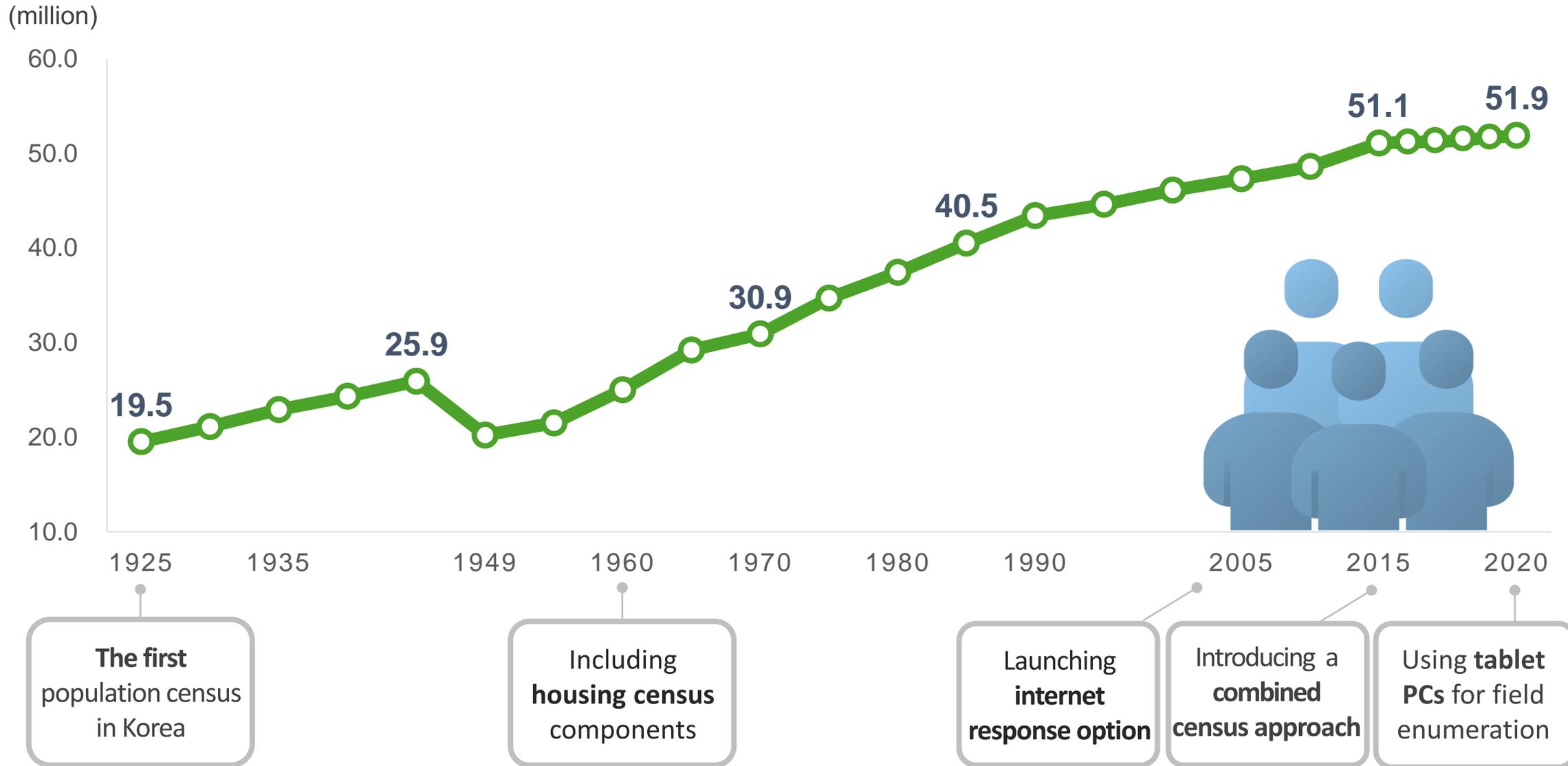
2) Changes in the Census Methodology

1960 ~ 2010

Short-form — Includes basic items such as name, age, sex, household composition and housing characteristics

Long-form — Includes detailed items such as economic activity status, commuting to school or work, etc.

Enumeration
(100% population)

Sample survey
(10% of all households)

2015 ~

Available administrative data

Yes → **Short-form**

No → **Long-form**

Register-based census
➕
Field sample survey (20%)

2020 Population and Housing Census

3) Combined Census in Korea

- A **register-based census** is a new census method that produces statistics by using administrative data related to population, households, and housing.

- Since 2015, KOSTAT has conducted the **register-based census** to collect data for the short-form questionnaire items every year:
  - Gender, Age, Relationship to head of household, Nationality and so on.

- Every five years, KOSTAT has conducted the **field enumeration** for 20% of total population to collect long-form questionnaire items:
  - Education, Commuting time, Place of work, and so on.

Sector	Survey Items	2010 Census	2015 Register-based Census
Population	Name	●	●
	Gender	●	●
	Age	●	●
	Relationship to Household Head	●	●
	Education	●	○
	Marital Status	●	○
	Nationality	●	●
	Date of Entry	●	●
	Place of Birth	○	○
	Place of Residence 1-Year Ago	○	○
	Place of Residence 5-Years Ago	○	○
	Date of Marriage	○	○
	Number of Children	○	○
	Family Clan	-	●
	Year of Nationality Acqusition	-	-

● Complete enumeration items
● Register-based census long-form items
○ 20% of sample survey short-form items

Source: Table from KOSTAT. 2018a. "Introducing Register-based Census in Korea."

Framework of the combined census in Korea

Register-based census (Short-form items)
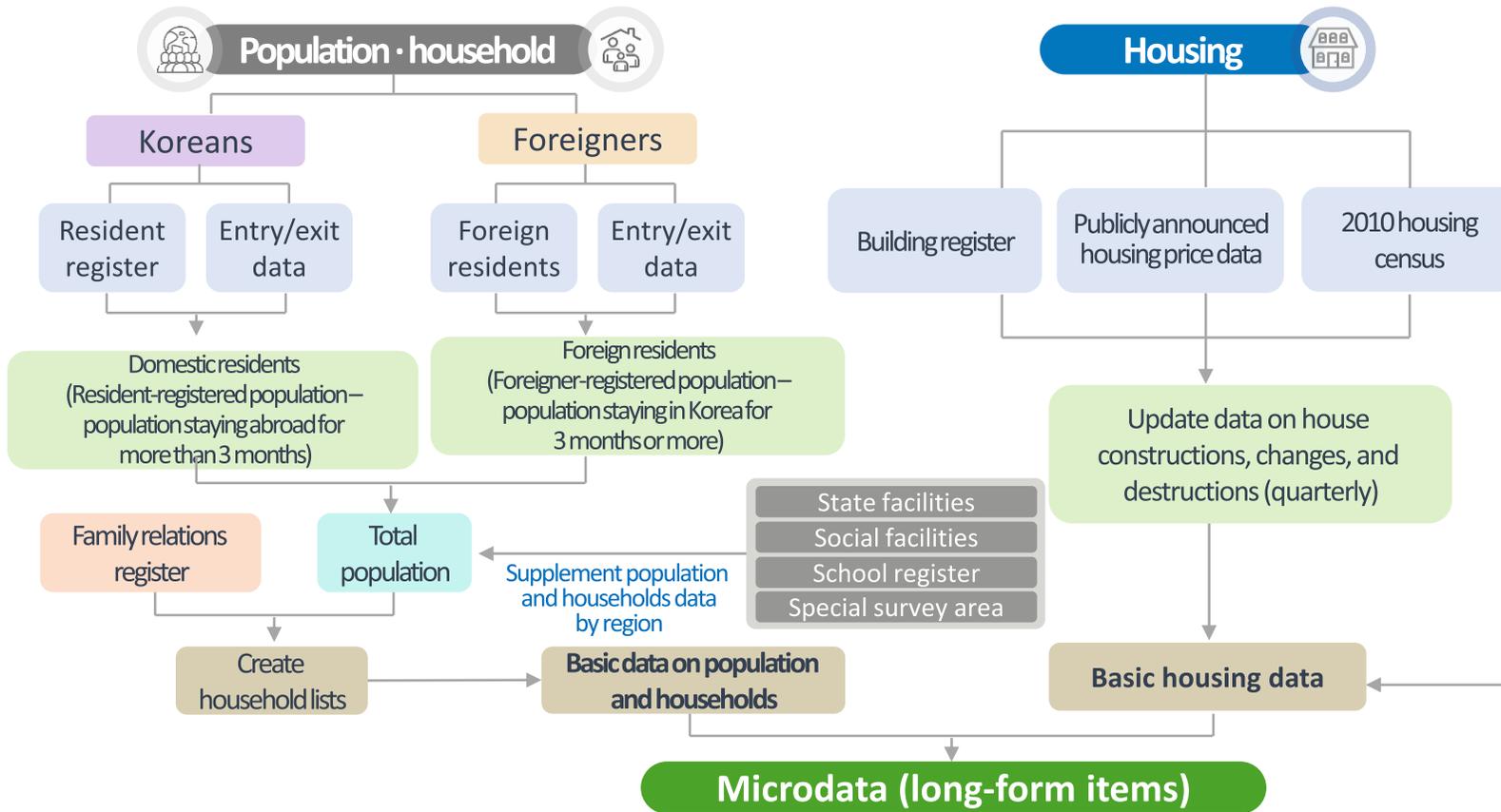
Field sample survey (Long-form items)

Population · household

Koreans

| Resident register | Entry/exit data |

Domestic residents
(Resident-registered population –
population staying abroad for
more than 3 months)

Foreigners

| Foreign residents | Entry/exit data |

Foreign residents
(Foreigner-registered population –
population staying in Korea for
3 months or more)

Family relations register

Total population

State facilities
Social facilities
School register
Special survey area

Supplement population
and households data
by region

Create household lists

Basic data on population and households

Housing

| Building register | Publicly announced housing price data | 2010 housing census |

Update data on house constructions, changes, and destructions (quarterly)

Basic housing data

Microdata (long-form items)

Household & Housing Basic Information Survey (Address canvasing)

Set up Enumeration Districts

Sampling (20% of pop.)

Conducting field survey

Data processing

Data dissemination
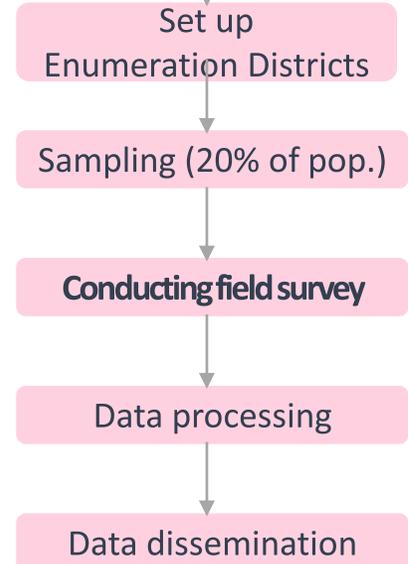
Microdata (short-form items)

3) Combined Census in Korea

Transforming phases from the traditional census to the combined census

Review (2007-2010)	• Studied register-based census methodologies, reorganized legal systems, acquired administrative data, established infrastructure
Analysis (2011-2013)	• The 2010 Census was conducted using the traditional field enumeration method. • After that, KOSTAT compared administrative data with the 2010 Census data to identify the cause of the difference, evaluated the quality of administrative data, improved the linkage method, etc.
Application (2014-2015)	• Expanded administrative data sources, established and linked databases on population, households, and housing. • KOSTAT internally compiled register-based censuses with the reference years from 2011 to 2014.
Dissemination (2016~)	• Conducted a register-based census every year after dissemination of the first register-based census results in 2015.

2 Challenges and Strategies of 2020 Census

Increasing diversity of population and complex household living arrangements

- Decreasing traditional nuclear family households: (2000) 57.8% → (2010) 49.4% → (2015) 44.9%
- Increasing shares of single-person households: (2010) 23.9% → (2015) 27.2% → (2019) 30.2%
- Increasing non-conventional housing living quarters: (2000) 0.6% → (2010) 3.0% → (2015) 3.7%

Increasing non-response rate and decreasing cooperation with the government

- Increasing non-response rates of the census: (2010) 1.7% → (2015) 2.4%

Changes in IT environments

- Internet (PCs) response rates of the Census : (2005) 0.9% → (2010) 47.9% → (2015) 48.6%
- The smartphone penetration rate in Korea : (2019) 95%
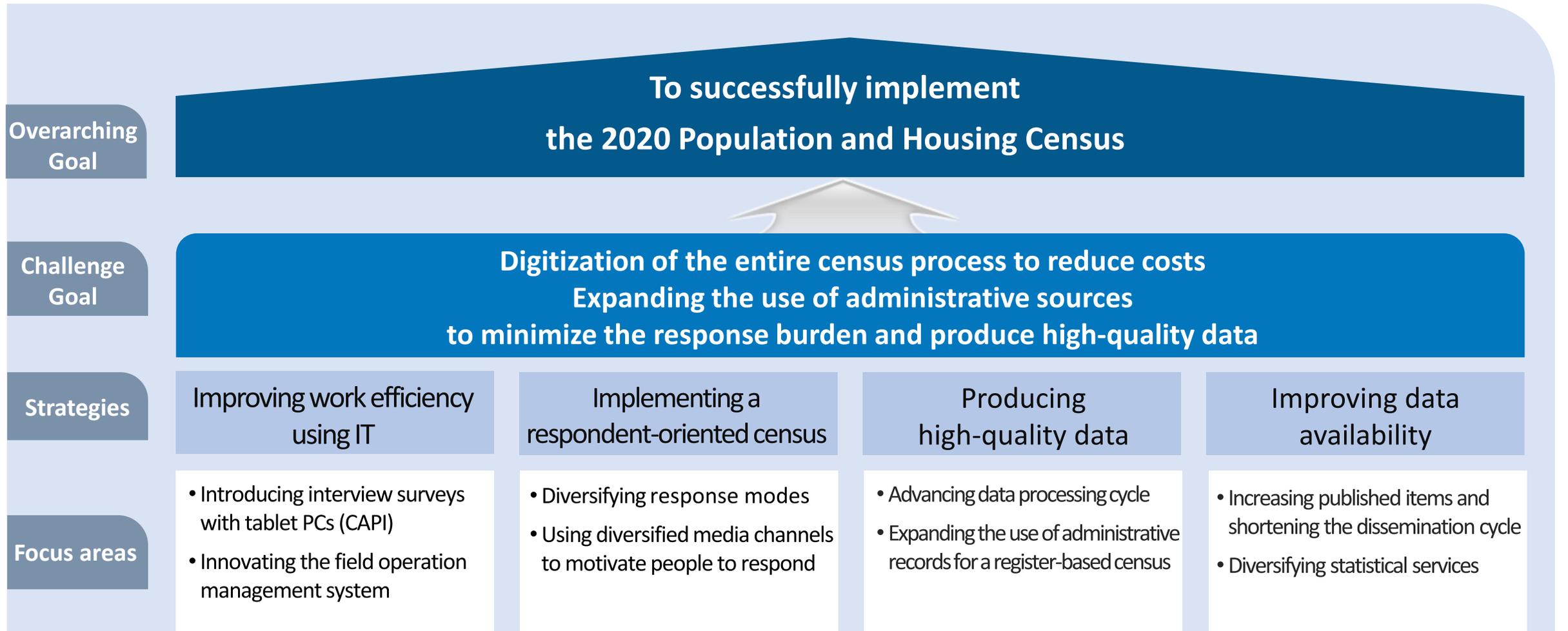
Expanded legal basis for using administrative data

- Reorganized the legal system for implementing a register-based census
  * Amendment to *Statistics Act* in 2009 and 2014
- Expanded the scope of public institutions that provide data for KOSTAT: to include central administrative agencies, local governments + judicial agencies (2014)

Growing field enumeration cost and census budget constraints

- Census budget (KRW): (2005) 129 billion → (2010) 180.8 billion → (2015*) 125.7 billion
  * Thanks to the register-based census introduced in 2015, total census costs have decreased compared to the previous cycle, but field enumeration costs have significantly increased

2) 2020 Census Strategies

Establishing 2020 Census strategies through internal and external environmental analysis

Overarching Goal	**To successfully implement the 2020 Population and Housing Census**
Challenge Goal	**Digitization of the entire census process to reduce costs / Expanding the use of administrative sources to minimize the response burden and produce high-quality data**

Strategies	Improving work efficiency using IT	Implementing a respondent-oriented census	Producing high-quality data	Improving data availability
Focus areas	• Introducing interview surveys with tablet PCs (CAPI) • Innovating the field operation management system	• Diversifying response modes • Using diversified media channels to motivate people to respond	• Advancing data processing cycle • Expanding the use of administrative records for a register-based census	• Increasing published items and shortening the dissemination cycle • Diversifying statistical services

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3) Overview of the 2020 Census

Census reference day

- Nov. 01, 2020. 0 a.m.

Enumeration period

- Internet self-response: Oct. 15-31 (17 days)
- Field interview (nonresponse follow-up): Nov. 1-18 (18 days)

Target of census

- All Koreans and foreigners residing in the territory of the Republic of Korea as of survey reference date, and their living quarters

Organization

- Organized by Statistics Korea and implemented by local governments
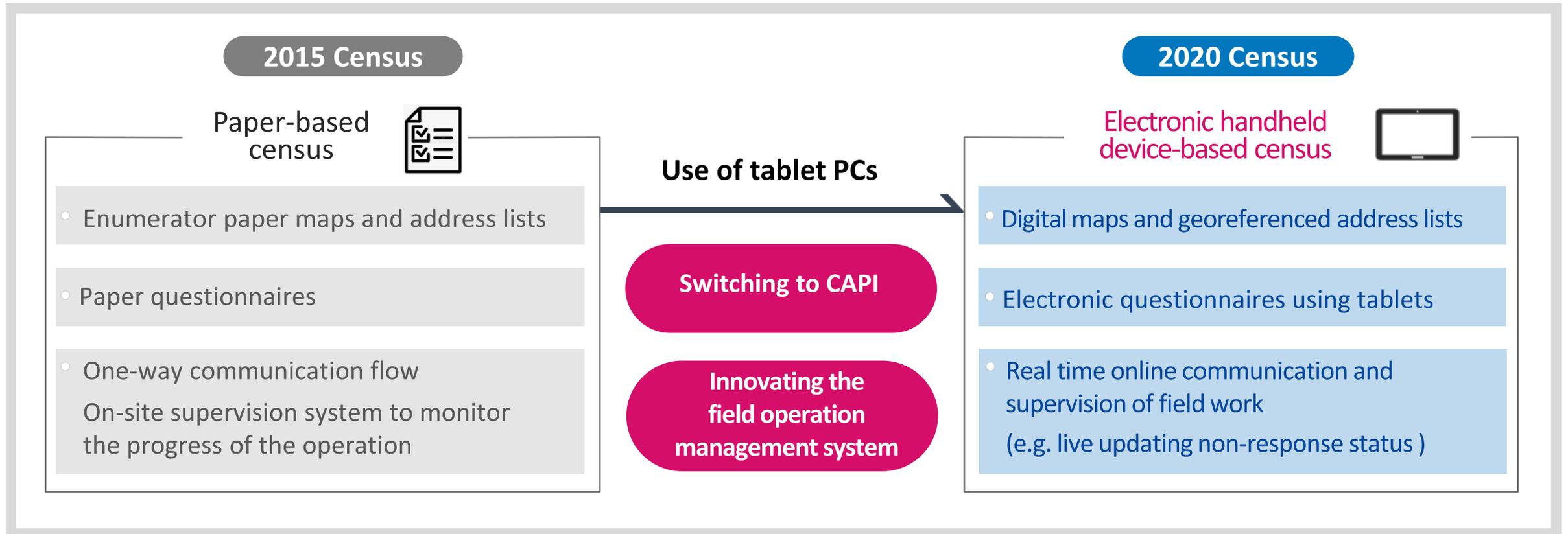
Census items

- 55 items (45 covered by field sample surveys, 10 substituted with administrative data)
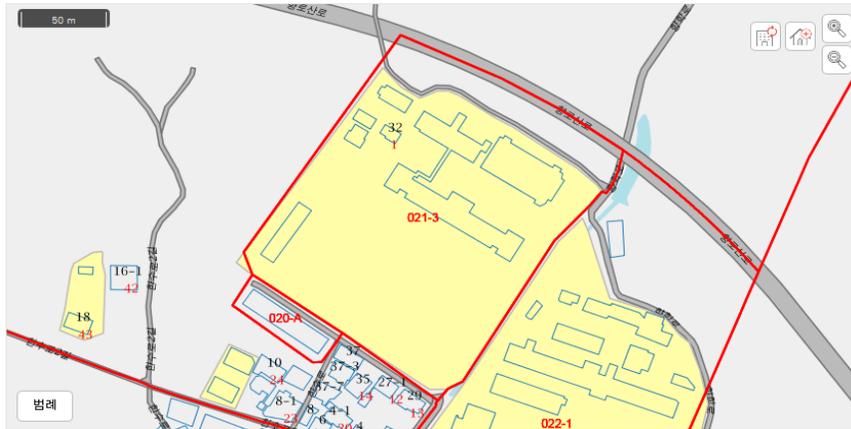
4) The first use of tablet PCs to collect census data

◻ The first use of handheld computer devices (tablet PCs) to collect census data in the field enumeration

- Replacing paper-based enumerator maps and address lists to digital maps and georeferenced address lists
- Changing from Paper and Pencil Personal Interview (PAPI) to Computer-assisted Personal Interview (CAPI)
- Providing real time two-way flow of field operation information (e.g. monitoring enumerator work and updating non-response status)
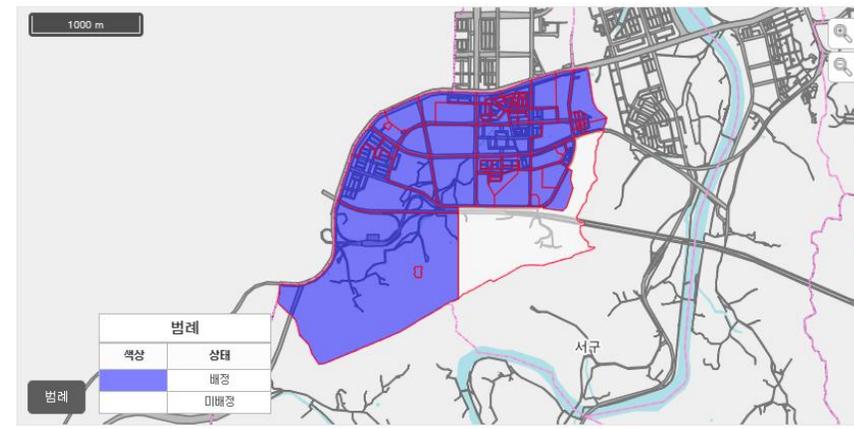
2015 Census

Paper-based census

- Enumerator paper maps and address lists
- Paper questionnaires
- One-way communication flow
  On-site supervision system to monitor the progress of the operation

Use of tablet PCs

Switching to CAPI

Innovating the field operation management system

2020 Census

Electronic handheld device-based census

- Digital maps and georeferenced address lists
- Electronic questionnaires using tablets
- Real time online communication and supervision of field work
  (e.g. live updating non-response status)

Enumeration district map

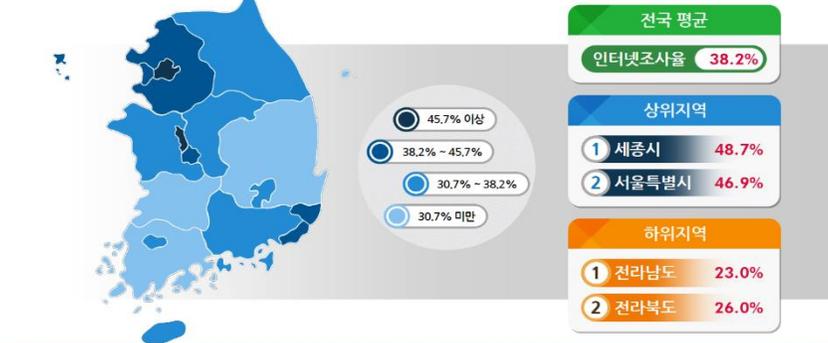## Enumeration work assignment

Progress rate by response mode
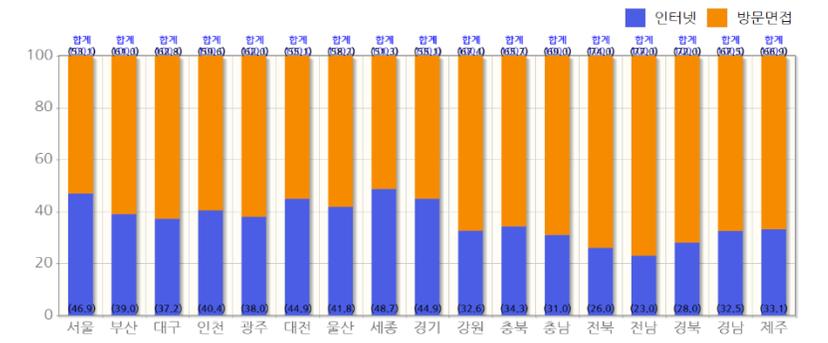
Progress rate of internet response

☐ Eliminated the need of daily meetings with field managers and enumerators at the census management centers by introducing tablet PCs

  * The previous census required frequent visits for enumerators to receive daily cases and submit paper questionnaires/reports back to field managers.

☐ Reduced the number of census field management centers and staff, and simplified field management system
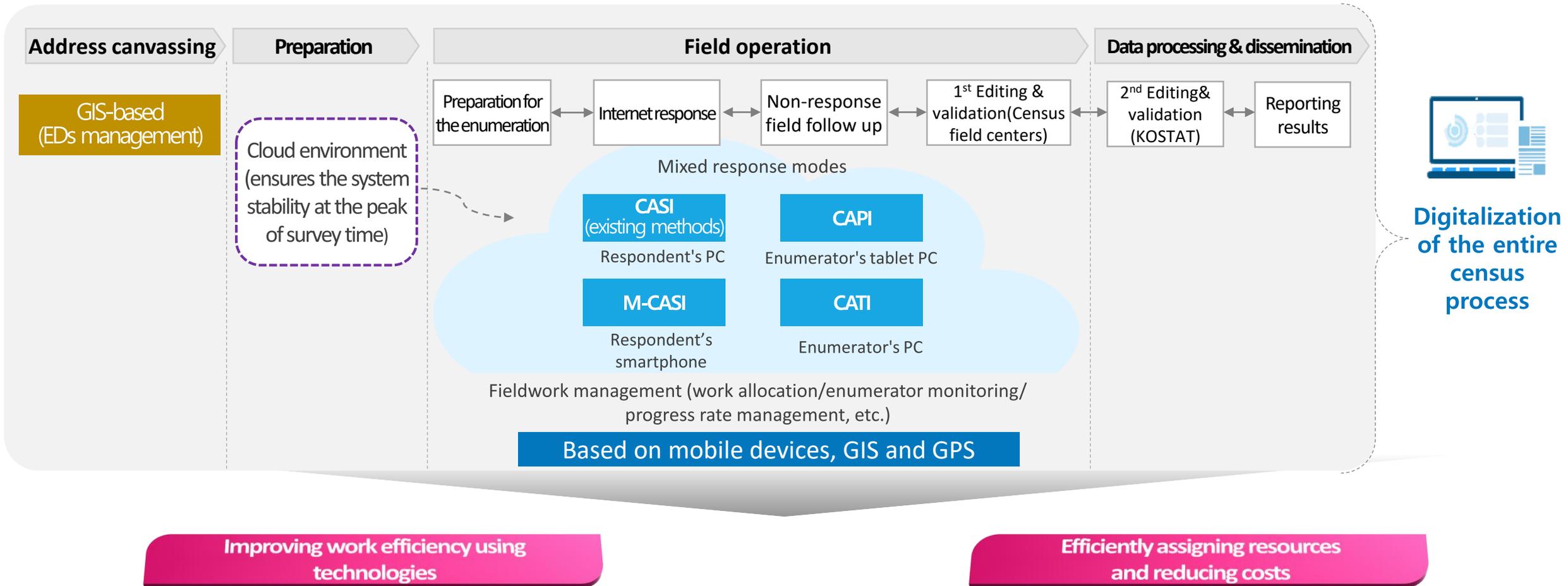
- Reducing the number of field census centers as 92.8% (3,500 sub-municipal level centers in 2015 → 250 municipal level centers in 2020)

- Reducing staff working in census centers 38.6% (44,000 → 27,000, down): labor costs and operating costs saved

- Simplifying work management system 2020: KOSTAT ↔ City and Province ↔ Municipal ↔ ~~Sub-municipal~~

17　　　　　　　　　　　**250**　　　　　　　　　　　**3,500**

Statistics Korea

Provincial level local governments (city, province)

Municipal level local governments (Si(city)/Gun/Gu)

Census field management centers

Field managers

Supporting staff

Enumerators

Sub-municipal level (Eup, Myeon, Dong)
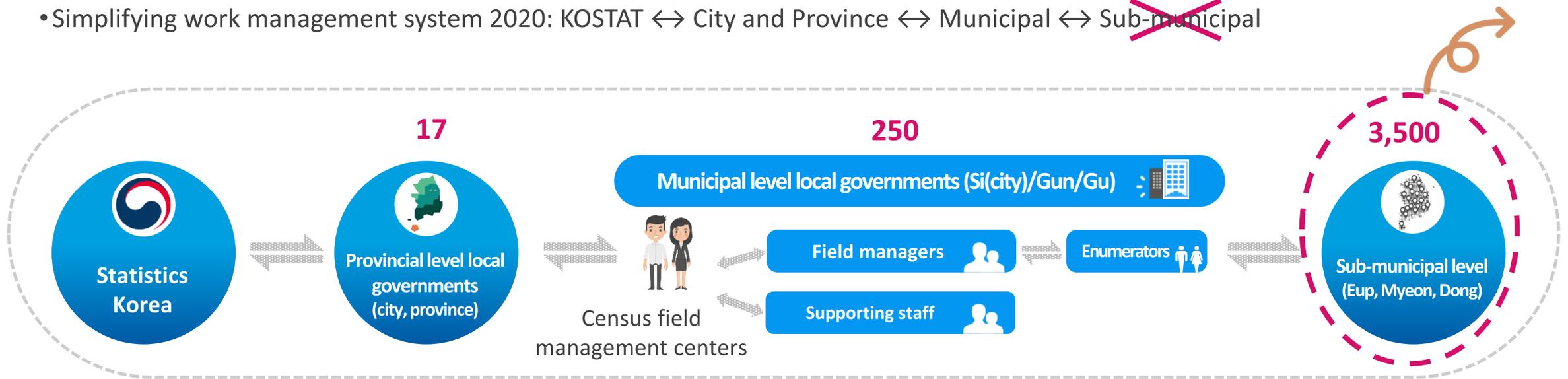
6) Digitization of the entire census process

◻ Digitalized the entire census process in line with the introduction of tablet PCs

Address canvassing	Preparation	Field operation				Data processing & dissemination	

GIS-based (EDs management)

Cloud environment (ensures the system stability at the peak of survey time)

| Preparation for the enumeration | ↔ | Internet response | ↔ | Non-response field follow up | ↔ | 1st Editing & validation(Census field centers) | ↔ | 2nd Editing& validation (KOSTAT) | ↔ | Reporting results |

Mixed response modes

CASI (existing methods)
Respondent's PC

CAPI
Enumerator's tablet PC

M-CASI
Respondent's smartphone

CATI
Enumerator's PC

Fieldwork management (work allocation/enumerator monitoring/ progress rate management, etc.)

Based on mobile devices, GIS and GPS

Digitalization of the entire census process

Improving work efficiency using technologies

Efficiently assigning resources and reducing costs
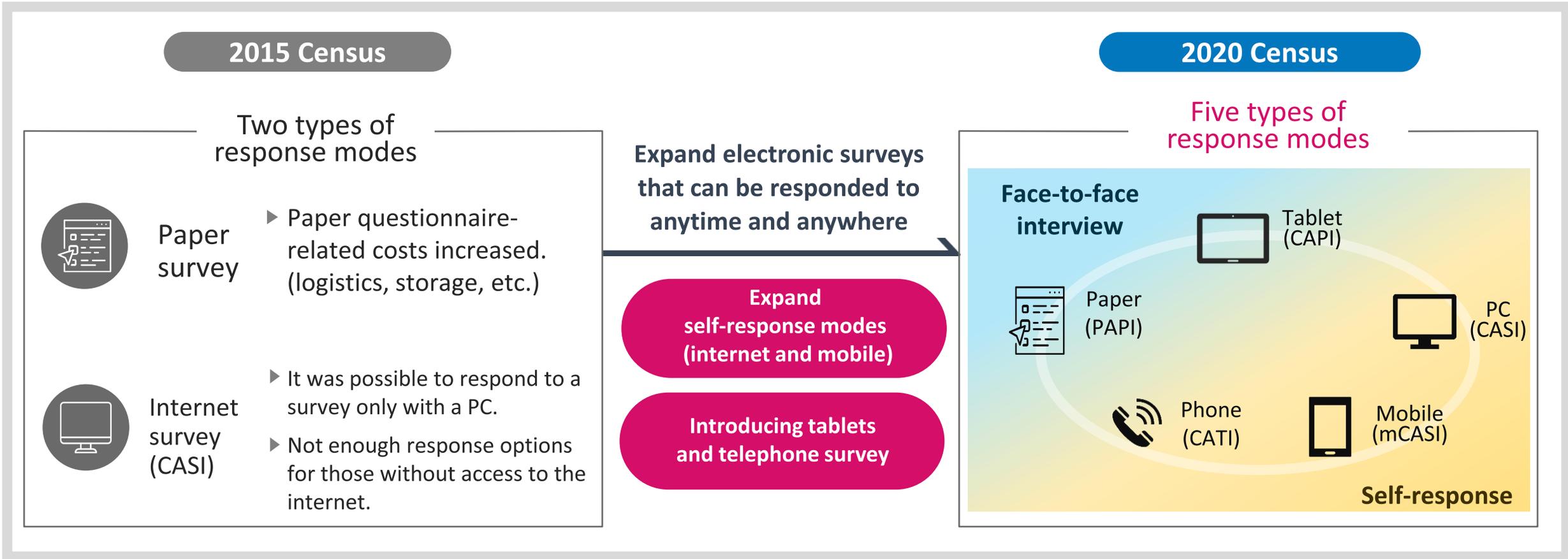
◻ **Faster data collection**: no need to collect and manually scann ICR paper questionnaires anymore due to using tablets

◻ **Reduced errors** by providing automated validation rules within tablets during data entry thereby allowing for data quality checks on the site (the number of errors per household in 2020 was 1.1, down 1.7 in 2015)

◻ Due to the reduced time needed for data processing, 2020 census data were released three months earlier than the previous paper-based census.

2015 Census

Collect paper questionnaires

Scan ICR questionnaires

Conduct the 1st internal inspection
(by regional offices of KOSTAT)

Conduct the 2nd internal inspection
(by KOSTAT headquarters)

Advancement in data processing and shortened the periods

Improved data quality

Shortened data processing periods by 3 months

2020 Census

Data entry on tablet PCs and perform basic inspection

Conduct the 1st internal inspection
(by regional offices of statistics)

Conduct the 2nd internal inspection
(by KOSTAT headquarters)

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❑ Introduced the first use of tablets/mobile/telephone response modes to foster a survey environment where people can respond anytime, anywhere, in a preferred way
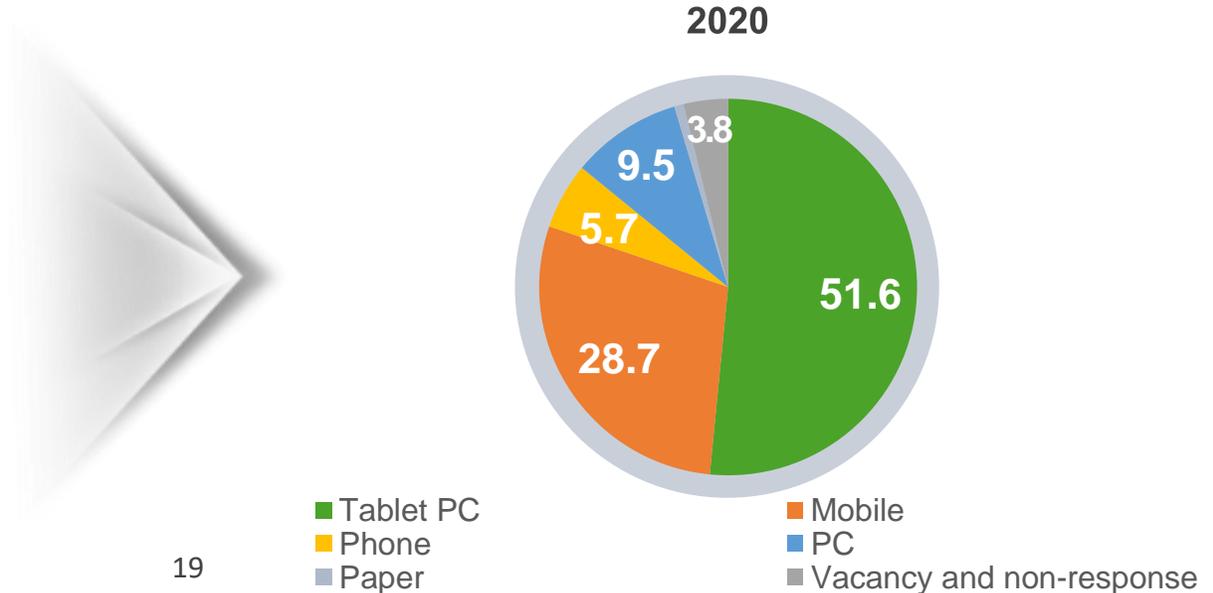
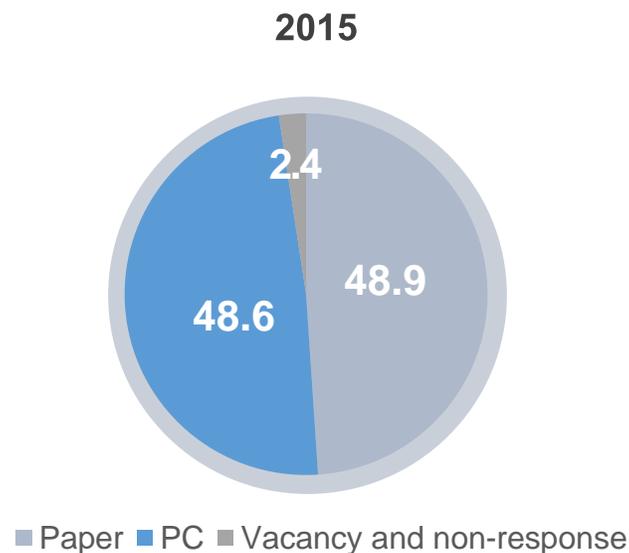**2015 Census**

2020 Census

Two types of response modes

Five types of response modes

Paper survey
▸ Paper questionnaire-related costs increased. (logistics, storage, etc.)

Internet survey (CASI)
▸ It was possible to respond to a survey only with a PC.
▸ Not enough response options for those without access to the internet.

Expand electronic surveys that can be responded to anytime and anywhere

Expand self-response modes (internet and mobile)

Introducing tablets and telephone survey

Face-to-face interview

Tablet (CAPI)

Paper (PAPI)

PC (CASI)

Phone (CATI)

Mobile (mCASI)

Self-response

8) Diversification of response modes

◻ For the first time, KOSTAT introduced telephone surveys for those with poor access to the internet or those who don't prefer face-to-face interviews.
- Providing the 'reserve preferred interview time' function on the website (census.go.kr) that allows respondents to answer over the phone at a preferred time

◻ Established an integrated system that allows respondents to continue to respond even with response mode changes.
- e.g. Desktop PC → Mobile → Tablet PC

◻ However, KOSTAT also used paper questionnaires (less than 1%) at elderly facilities that enumerators could not access due to the Covid-19 restriction.

Census response rate by response mode (%)

2015

2.4
48.9
48.6

■ Paper ■ PC ■ Vacancy and non-response

2020

3.8
9.5
5.7
51.6
28.7

■ Tablet PC   ■ Mobile
■ Phone   ■ PC
■ Paper   ■ Vacancy and non-response

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- ❑ Made better use of a variety of digital advertising by reflecting changes in people's media use

- ❑ Strengthened promotional activities to increase the response rate of non-contact self-response internet (mobile) surveys

- ❑ Emphasized the benefits that survey participation brings to the public

2015 Census

2020 Census

Focus on traditional media

Expansion of digital media/content

Key initiatives

Create an environment where people are willing to participate in the census

Traditional media		Digital media
TV, Newspaper, Radio		YouTube, influencer, webtoon, digital news, etc.

Digital advertising using multiple channels/contents

Encourage self-response via mobile

Message		Message
Emphasize government's data use for creating policies		about the importance and utility of the census

[Representatives of the people]

Tell us your opinion as a representative of the people.

- Maximized outreach mainly using TV and the internet with advertising exposures
- Surrounded every household with memorable messages at daily touchpoints

Daily touchpoints

- Apartment Buildings/Retail stores
- Transport modes
- Radio
- Cafes

TV advertising

Creating widespread awareness and driving mass participation in the Population and Housing Census and the Census of Agriculture, Forestry and Fisheries

Online advertising

Informing census programs and running participatory publicity campaigns

- Collaboration with other organizations
- Media campaign

Issue making

- Product placement in TV shows
- Social contribution activities
- Offline events

Collaboration with institutions and media

9) Diversification of publicity and promotion activities

TV advertising

Product placement in TV drama

Campaign song

Lecture

Collaboration with online creators
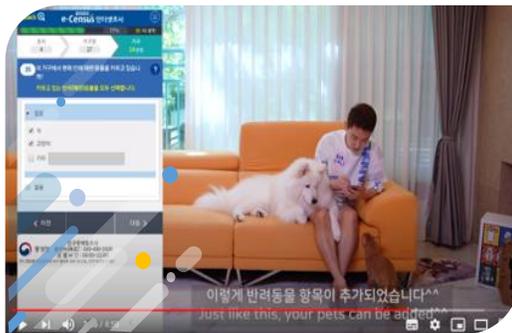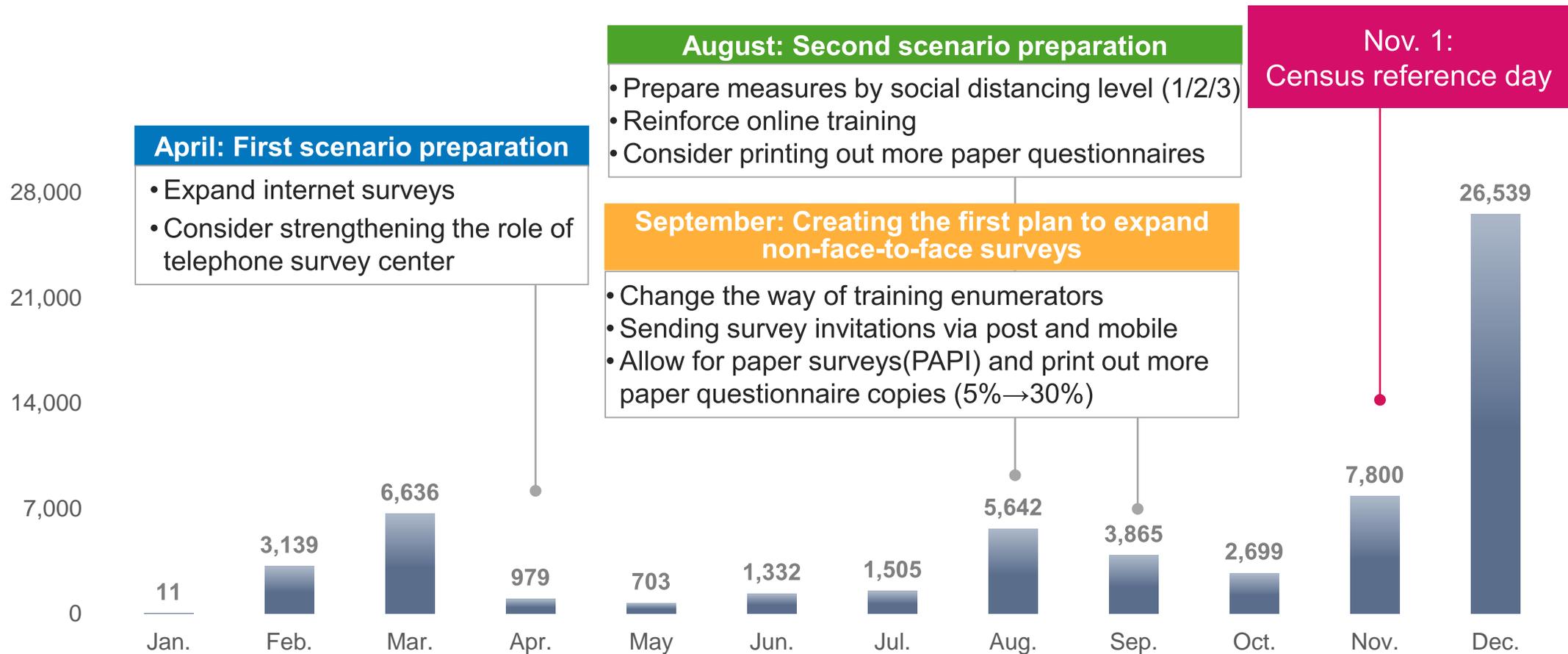
**Web toon**

Collaboration with artists

Volunteering

◻ Pandemic status and response measures for each field enumeration phase

Monthly confirmed cases in Korea (2020) and response strategies by census sample survey phase

August: Second scenario preparation
- Prepare measures by social distancing level (1/2/3)
- Reinforce online training
- Consider printing out more paper questionnaires

**Nov. 1:
Census reference day**

April: First scenario preparation
- Expand internet surveys
- Consider strengthening the role of telephone survey center

September: Creating the first plan to expand non-face-to-face surveys
- Change the way of training enumerators
- Sending survey invitations via post and mobile
- Allow for paper surveys(PAPI) and print out more paper questionnaire copies (5%→30%)

	28,000											26,539
21,000												
14,000												
7,000			6,636					5,642			7,800	
	11	3,139		979	703	1,332	1,505		3,865	2,699		
0	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

◻ Established step-by-step response plans while monitoring the pandemic status and adjusting the resource allocation

- Minimized visits and contacts to ensure the safety of respondents and enumerators.

- Non-response status was updated in real time to help enumerators to prevent visiting households that have already submitted responses through online.

- Minimized face-to-face enumerators group training and focused on online training.

- In the end, KOSTAT conducted census field surveys of 4 million households while ensuring the safety of respondents and related personnel.
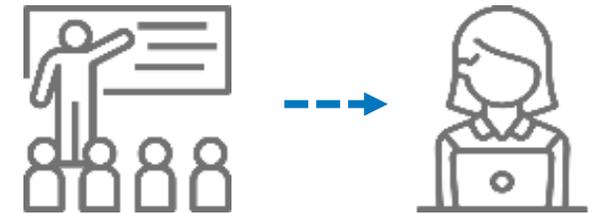
◻ KOSTAT conducted the field enumeration for the 2020 Census as scheduled, but internet self-response period was slightly extended (35 days → 40 days).

Impact of COVID-19 on the world 2020 census round (UNSD, '21. Mar.)

- 110 Countries were supposed to conduct the 2020 census in the years ending 0 and 1.
- Of these countries, 14 conducted the census as scheduled despite the COVID-19 pandemic.
- 71 countries (65%) postponed or stopped the census.
  39 countries (35%) plan to implement the census by the end of 2021, and most of them decided to extend census periods.

Did you postpone or extend the fieldwork?

	2020	2021
No	4	10
Yes to 2020	14	
Yes to 2021	18	12
Yes to 2022 or beyond	4	7

■ Censuses scheduled in 2020   ■ Censuses scheduled in 2021
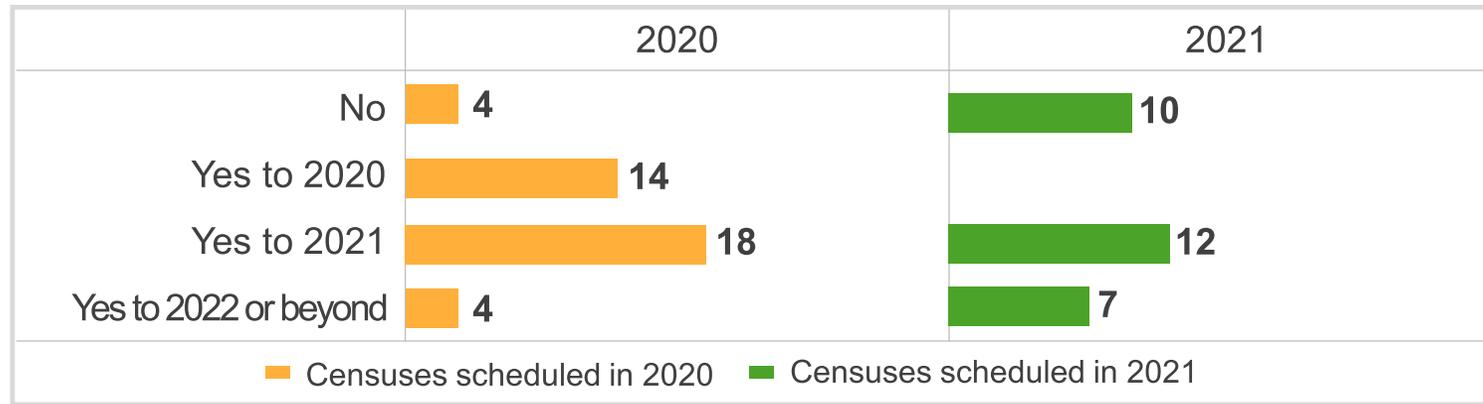
3 Achievements of 2020 Census

Change tomorrow with your story

- Drastically reduced survey staff and census field centers by reengineering the survey process based on ICT
- Reduced operational costs by digitizing paper questionnaires and maps

Reducing census costs by conducting a smart digital census

Fiscal effects

23.6 billion KRW saved

Significantly reducing costs of enumerators, ceusus field centers, and paper questionnaires from the previous census

- Reduction of staff working in census field centers

38.6%

43,988

40k

27,074

20k

2015   2020
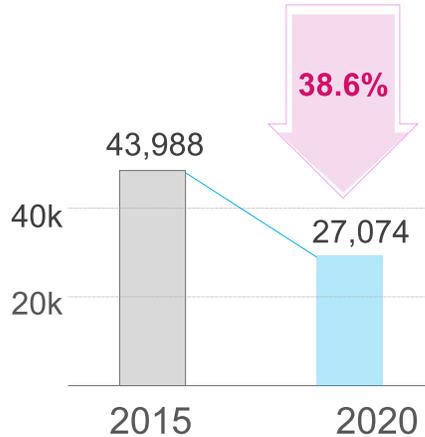
- Reduction of census field centers

92.8%

4k   3,500

2k

250

2015   2020
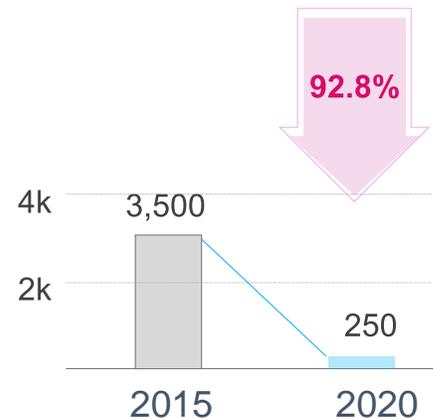
Fiscal effects
(total of 23.6 billion KRW saved)

Reduced labor costs
(26.9 billion KRW)

Reduced census field centers operating costs
(6.3 billion KRW)

Increased tablet PC purchases/ call center operating expenses
(9.6 billion KRW)

◘ Census budget trends

- 2015: Saved 74.7 billion KRW * compared to 2010 census thanks to the introduction of a register-based census
- 2020: Saved 11.2 billion KRW* compared to 2015 census thanks to the introduction of electronic survey and innovating of the field survey management system
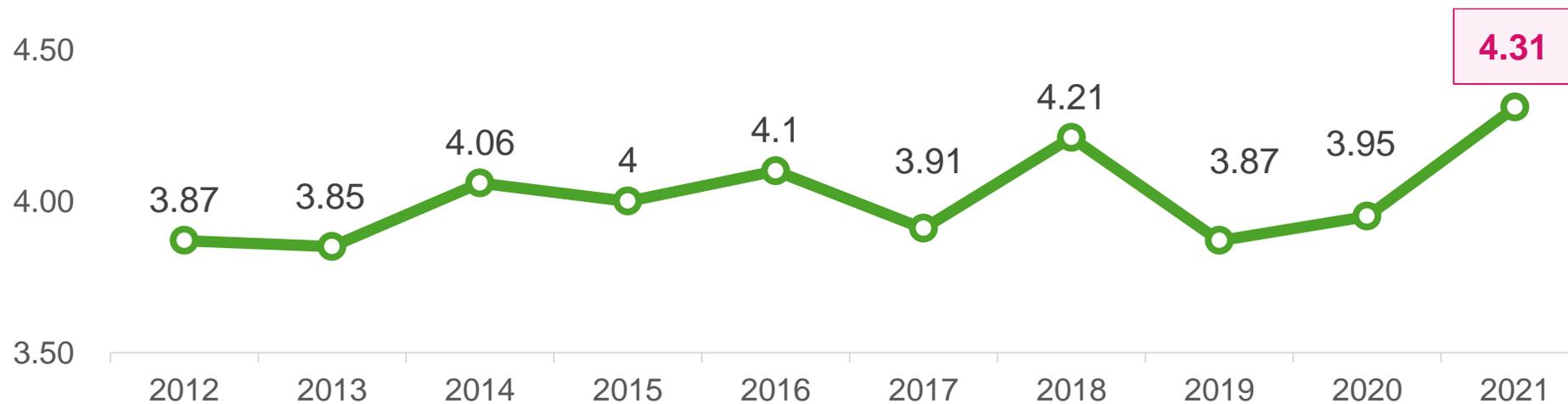 * Only for the sample survey

Census budget (100 million KRW)
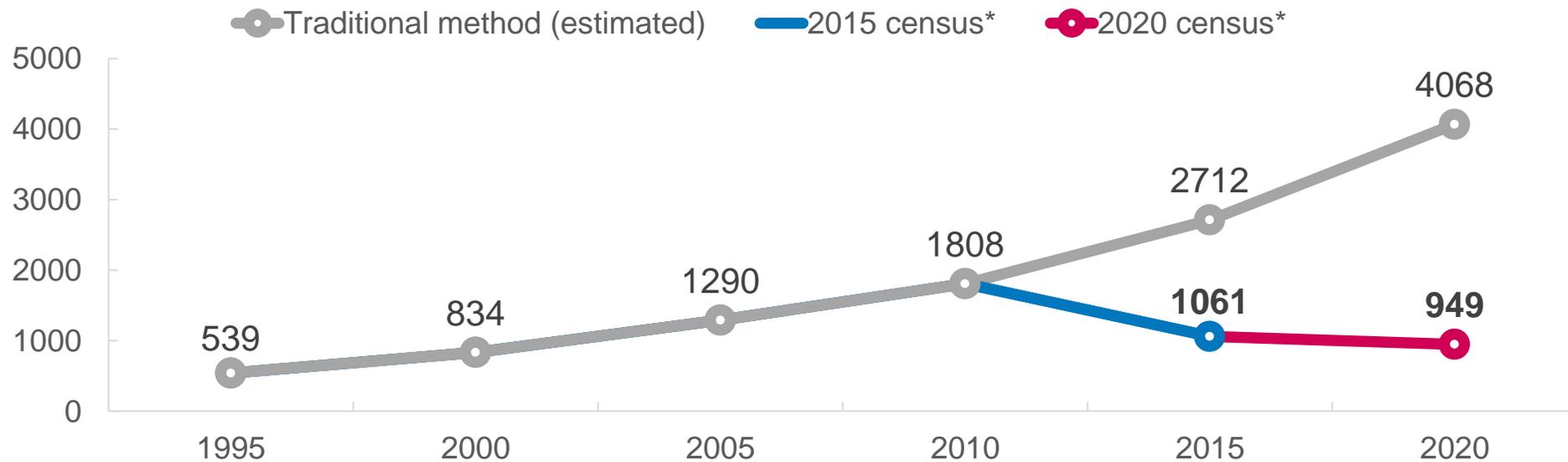
Traditional method (estimated) 2015 census* 2020 census*

539
834
1290
1808
2712
4068
1061
949

1995 2000 2005 2010 2015 2020

* Only for the sample survey

◘ Compared to the previous census cycle:

- Less census budget (106.1 billion → 94.9 billion KRW)
- More survey items (52 → 55)
- Faster dissemination (3 months earlier than before)
- Census data user satisfaction rate recorded the highest level over the last 10 years (4.31/5.0).

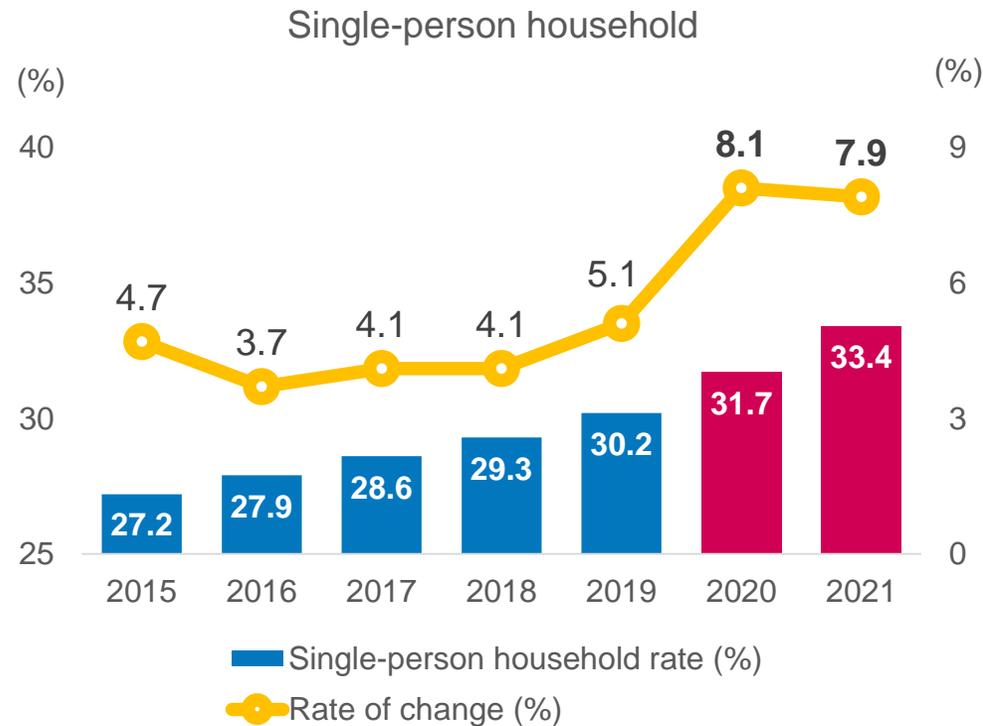**Census data user satisfaction rates over the last 10 years (score)**

4.50	**4.31**
	4.21
	4.1
	4.06
	4
	3.95
	3.91
4.00	3.87 3.85 3.87
3.50	

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

◻ Increase in the single-person household

- 31.7% among all general households in 2020 (up 8.1% from 2019)

Single-person household

(%)

(%)

* Source: KOSTAT, *Population and Housing Census*, each year.

◻ Decrease in the foreign population

- Impact of border closures due to COVID-19 (down 4.7% from 2019)

Foreign population

(10,000 peole)
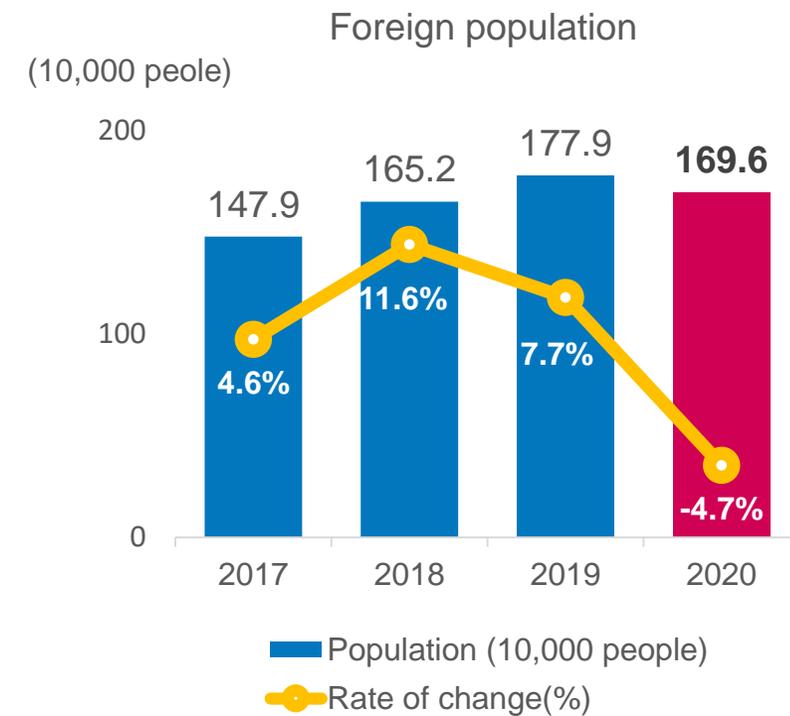
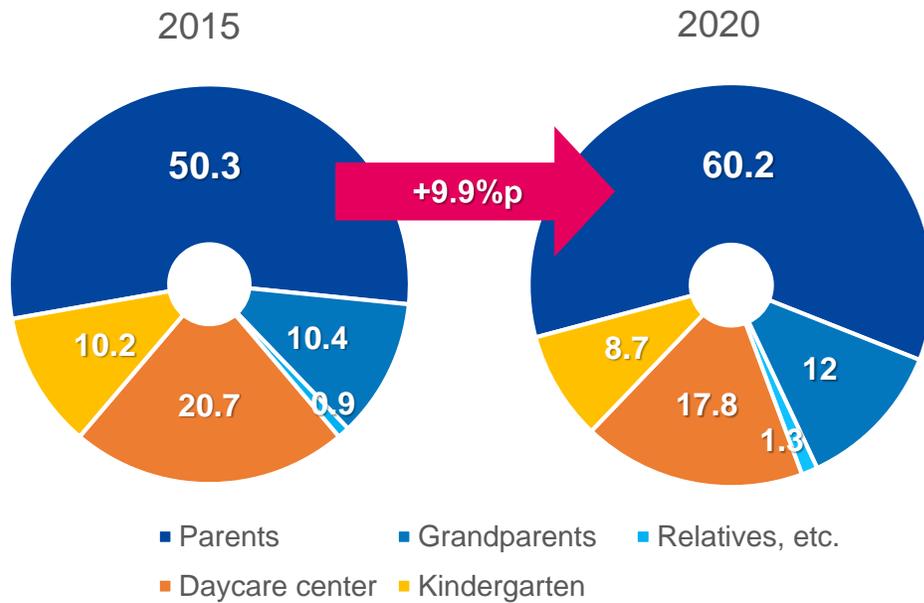* Source: KOSTAT, *Population and Housing Census*, each year.

3) Understanding pandemic-caused social changes through census results

◻ Daytime childcare

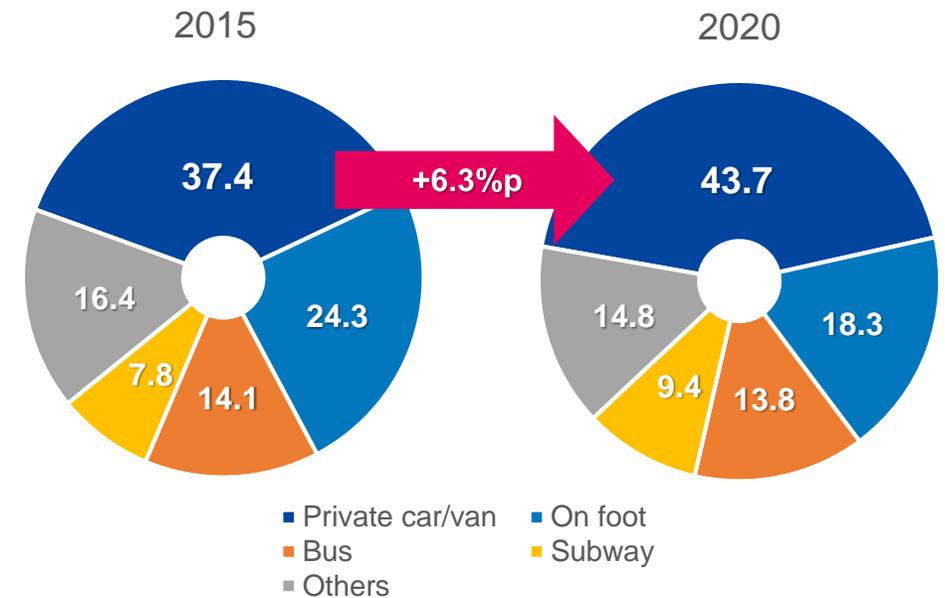- Increase in parental care during daytime (up 9.9%p from 2015)

Children by daytime childcare status (%)

2015	2020

2015: 50.3, 10.2, 20.7, 0.9, 10.4
+9.9%p
2020: 60.2, 8.7, 17.8, 1.3, 12

■ Parents   ■ Grandparents   ■ Relatives, etc.
■ Daycare center   ■ Kindergarten

◻ Commuters' transport modes choice

- Increase in the share of private cars/vans (up 6.3%p from 2015)

Commuters' transport mode choices (%)

2015	2020

2015: 37.4, 16.4, 7.8, 14.1, 24.3
+6.3%p
2020: 43.7, 14.8, 9.4, 13.8, 18.3

■ Private car/van   ■ On foot
■ Bus   ■ Subway
■ Others

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Provisional plans for 2025 Census

Comprehensive analyzing of the COVID-19 impact on census

- Analyzing changes in population and household characteristics caused by COVID-19 by using the register-based census results released every year

Building an address register with GIS

- Redesign address canvassing (5 years → 1 year, full field canvassing → selective field canvassing)
- Providing more complete and accurate new sample frame based on annual register-based census

Improving work efficiency using IT

- Artificial intelligence: industrial/occupational classification coding, call center, data providing chatbot, etc.
- Expanding the use of digital data such as GIS and GPS satellite images

Making it easier for the public to respond

- Establishing digital response first, non-response field follow-up second strategy
- Expanding response modes reflecting respondent's preference

Expanding use of administrative data and improving utility of census data

- Identifying new survey items that can be replace and supplemented by administrative data
- Promoting greater use of census data by linking of various dataset