



The Estimation of De Facto Population



SMART**CITY**

YuBok WON Manager, Information Planning Division, Statistics & Data Division

1. Urban Problems of Metropolises

Metropolises face growing demands for public services



The incoming population from outside of metropolises increases public service demands

http://www.huffingtonpost.kr/2014/11/20/story_n_6190024.html

About Seoul



- The Capital of the Republic of Korea
- Size : 605 km² (0.6% of the total land)
- Population : 10,130,000 (20% of Korean population)

Seoul, the Center of Korean Economy

Universities : 20% Hospitals : 27% Corporate tax : 43% Bank deposits : 50%

Seoul's Satellite Cities



The Population Change of Seoul

- The resident population is decreasing
- The economically active population is increasing



Daytime population increases \rightarrow Public service demand rises Daytime population = Resident pplt. + (Incoming pplt. - outgoing pplt.)



Public Service Demands of Seoul



Child-care facilities 6,368



Water supply 445mil. ton/day





Wastes 9,439ton/day



Created by Gan Khoon Lay from Noun Project

2. The Estimation of De Facto Population using Big Data



Advices of the UN Statistics Division



"Estimate the *Service Population*

when the resident population doesn't

represent the actual population

who benefits from the urban services."

What is De Facto Population?

All the individuals who exist in a specific area at a specific time



Residents, tourists, commuters, students and shoppers

→ increase public service demands



The conventional way of measuring floating population

• The use of analog tally counters to collect samples in 1,000 spots once a year Inaccurate, costly and limited usage of the data

Seoul, a smart city with world class ICT infrastructure





Smart phone usage: 91%



Speed of internet : 28.6Gbps



Public Wifi : 10,786AP





in 1996

in 2019

A New Way of Measuring De Facto Population

Use the public data of Seoul and LTE signal data of KT



Korea Telecom Corporation is one of the major telecom companys in Korea and it showcased 5G service in 2018 Pyeongchang Winter Olympic.

The Estimation of the number of Smart Phone Users

Count the number of LTE signals

from each mobile base station.





The modification of de facto population data

- KT mobile phone market share (30%)
- LTE subscriber ratio among cell phone users (90%)
- Percentage of switched-on mobile phones (93%)
- Children under 9 and the elderly aged over 80



The calculation of de facto population for each of the 19,500 zones in Seoul



The Difference between the Demographic Zones and Mobile Base Stations



The Multiple Regression Analysis to accurately adjust the difference



Measuring the De Facto Foreign Population in Seoul

• Long-term foreign visitors Foreigners using KT mobile service

• Short-term foreign visitors Foreigners using KT roaming service



3. De Facto Population Data (Oct. 2017~ Dec. 2017)

The Comparison between De Facto Population and Resident Population

- De facto population(11.5M) Resident Population(10.1M) = 1.4 million
- Max. de facto(12.3M) Min. de facto(9M) = 3.3 million



6,000,000

Seoul is still a young city !

The difference between de facto & resident population is *the largest for 20-30 age range*



Defacto Resident

The areas with the most de facto population in Seoul

Hongik Uni. Area (100,856)





Yeouido-dong (96,772)



Yeoksam-dong, Gangnam (117,706)

The areas with the most foreign tourists



4. The Utilization of **De Facto Population Data**

The Use Cases for the Public Sector

• Set the **metropolitan bus lines** and railways to better serve the commuters

that travel from and to nearby suburbs







• Use the age-specific de facto population data

to determine the location for **senior citizens' welfare facilities**





The Use Cases for the Private Sector

The best location for fast food restaurants



The best street to promote cosmetic products



The target marketing based on locations

Display advertising at the gate of the shopping mall where women in 20s frequently visit



The Disclosure of Daily De Facto Population Data

- Seoul Open Data Plaza (data.seoul.go.kr)
- The data by time, gender and age group
- Data processing period: 5days



The Categorization of de facto population data





Sharing Seoul's digital experiences with the world



Interested in making your city smarter? Please feel free to contact us.



Thank you 감사합니다.