BIG DATA FOR TOURISM RECOVERY:
THE CASE OF THE REPUBLIC OF KOREA
Joint Presentation by ADB and KT

RCI-POD Webinar #18
Won Hee Cho
Consultant, ERCD
1 Introduction to KT Tourism Analysis

2 Travel Intelligence Platform
   based on big data analysis

3 Business Case

4 Application (COVID-19)
   sample data analysis using KT BigSight
Raw Materials in Tourist Analysis

Every 5 minutes, KT can estimate changes in population with LTE signal between base stations and mobiles. It is powerful in capturing accurate movement patterns.

<table>
<thead>
<tr>
<th>Data</th>
<th>Data Generation</th>
<th>Data size</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE signal data</td>
<td>• Changes in base station</td>
<td>• 8,640 logs/month (avg of a person)</td>
<td>Logging regardless of user’s action</td>
</tr>
<tr>
<td></td>
<td>• Data usage (every 5 min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDR data (3G)</td>
<td>• Call in/out</td>
<td>• 120 logs/month (avg of a person)</td>
<td>No data without actual usage</td>
</tr>
<tr>
<td>Based on call/sms</td>
<td>• Sms in/out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Identifying Tourists

Entire Population
Snapshot population
Total number of users in BS
De facto population

Resident & Non-Resident
Analyzing signal cycle & resident region,
Analyzing staying time, geo-information, etc.

Pedestrian
Analyzing tourist’s movement

Tourist
Floating population moving with the purpose of tourism

Entire population
Resident population
Staying population in resident region (home/office)
Non-resident population
Floating, moving population in non-resident place

Pedestrian
Estimated population of walking

Tourist
Floating population moving with the purpose of tourism
Tourist Analysis

Domestic Tourists

*Tourists can be captured in base stations by applying statistical behavior of tourists.*

Criteria:

1. Does not reside in the city that includes specific tourist attraction
   - Residence (home or office): stays over 10 days and 4 hours at the area

2. Does not frequently or periodically visit the area
   - A person who visits a specific attraction point 3 times or less

3. Stays in the area for the duration of time enough for sightseeing or consumption
   - A person who visits a specific attraction point for 30 minutes or longer

Foreign Tourists

*Short-term visit foreigners can be identified from KT’s roaming data.*

Criteria:

1. Short-term visitors who use KT’s roaming service
   - Stays 15 days or less

2. Stays in the area for the duration of time enough for sightseeing or consumption
   - A person who visits a specific attraction point for 30 minutes or longer
Data Calibration

Apply statistical techniques to calculate overall parameters considering market share of telco and demographics.

**Domestic Tourist (95% accuracy)**

- **KT LTE user**
  - Market share: 3.32 (1 over KT market share)
  - Regional & Demographic:
    - area*gender*age
    - gender: M, F
    - age: 10–19, 20–29...
  - Mobile device on/off rate calibration: 1.072961 (1 over 0.932)
  - On: 1, Off: 0.932

**Final tourist**

**Foreign Tourist (75% accuracy)**

- **KT Roaming user**
  - Short-term visitor
    - Eliminate data over statistical threshold
  - Nationality
    - Roaming rate
    - Immigration statistics provided by government

**Final tourist**
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Travel Intelligence Platform (TrIP)
Platform that provides tourism statistics and tourism analysis using mobile and credit card data.

**TOURISM STATISTICS**

**Analysis Report**

**Tourist Report**
- Visitor data by gender/age
- Monthly/weekly visits
- Length of stay and revisit rate

**Tourist Attraction Report**
- No. of tourists per tourist attraction
- Top10 popular tourist attraction based on no. of visitors
- Top10 emerging tourist attractions

**Festival Report**
- No. of tourists during the festival

**TOURISM ANALYSIS**

**Top 5 Tourism Industry Area**

- **See** Optimized city tour
- **Eat** Popular restaurants by type
- **Buy** Consumption pattern analysis
- **Stay** More convenient accommodation and parking
- **Play** Festival, hands-on content development

**TOURISM CONSULTING**

**Co-work w. tourism specialist**

**Policy Consulting**
- Tourism/Festival policy consulting for gov.
- Suggest marketing strategy

**Consumer Spending Analysis**
- Analysis of consumer spending with various aspects
Tourist status

District Ranking

1. 명동
   서울특별시, 중구
   관광객수: 432,832명
   순위: 1위
   5위

2. 회현동
   서울특별시, 중구
   관광객수: 295,048명
   순위: 2위
   14위

3. 광화동
   서울특별시, 중구
   관광객수: 253,651명
   순위: 3위
   24위

4. 소공동
   서울특별시, 중구
   관광객수: 114,598명
   순위: 4위
   1위

Tourist Spot Ranking

1. 명동
   서울특별시 중구
   관광객수: 129,881명
   순위: 1위
   29위

2. 남대문시장
   서울특별시 중구
   관광객수: 105,216명
   순위: 2위
   59위

3. 청계천
   서울특별시 중구
   관광객수: 93,976명
   순위: 3위
   80위

4. 신당동 백복이 곶
   서울특별시 중구
   관광객수: 11,976명
   순위: 4위
   2위

Festival Ranking

1. 가을 서울거리예술축제 2020
   20.09.18 ~ 20.10.04 (17일)
   관광객수: 일평균 54,025명 (전체 98,439명)
   순위: 3위
   39위

2. 가을 KYMF 대한민국청소년미디어대전 2020
   20.11.14 ~ 20.11.16 (3일)
   관광객수: 일평균 25,506명 (전체 76,598명)
   순위: 21위
   372위

3. 가을 서울창업인연극축제 2020
   20.09.16 ~ 20.09.26 (11일)
   관광객수: 일평균 24,221명 (전체 266,429명)
   순위: 9위
   121위

4. 가을 한양도시문화제 2020
   20.10.09 ~ 20.10.10 (2일)
   관광객수: 일평균 11,976명 (전체 23,952명)
   순위: 1위
   1위

Main Page: Overall status of tourist and tourism competitiveness of different districts
**District Ranking**

1. **Seoul Metropolitan City - Jung**
   - Administrative area: Seoul Metropolitan City - Jung
   - Population: 432,832

2. **Cheongju City**
   - Administrative area: Cheongju City
   - Population: 295,048

3. **Gwangju City**
   - Administrative area: Gwangju City
   - Population: 253,651

4. **Busan**
   - Administrative area: Busan
   - Population: 1

**Tourist Spot Ranking**

1. **Yeouido Arts District**
   - Administrative area: Yeouido Arts District
   - Population: 129,881

2. **Namdaemun Market**
   - Administrative area: Namdaemun Market
   - Population: 105,216

3. **Changgyeonggung Palace**
   - Administrative area: Changgyeonggung Palace
   - Population: 93,976

4. **Nampodong Park**
   - Administrative area: Nampodong Park
   - Population: 1

**Festival Ranking**

1. **Seoul International Film Festival**
   - Administrative area: Seoul International Film Festival
   - Population: 54,025

2. **KYM 2020**
   - Administrative area: KYM 2020
   - Population: 35,261

3. **Seoul City Festival**
   - Administrative area: Seoul City Festival
   - Population: 24,221

**Main Page: Overall status of tourist and tourism competitiveness of different districts**
Tourist status

District Ranking

1. ** מגפה **
   - County: 서울특별시 > 중구
   - Performance: 432,832

2. ** קריית מרחץ **
   - County: 서울특별시 > 중구
   - Performance: 295,048

3. ** מצפה **
   - County: 서울특별시 > 중구
   - Performance: 253,651

4. ** שיקון **
   - County: 서울특별시 > 중구
   - Performance: 1

Tourist Spot Ranking

1. ** מגפה **
   - County: 서울특별시 > 중구
   - Performance: 129,881

2. ** נהר '**
   - County: 서울특별시 > 중구
   - Performance: 105,216

3. ** מתיאס '**
   - County: 서울특별시 > 중구
   - Performance: 93,976

4. ** נבר '**
   - County: 서울특별시 > 중구
   - Performance: 1

Festival Ranking

1. ** כיכר **
   - County: 서울특별시 > 중구
   - Performance: 54,025

2. ** דוכן '**
   - County: 서울특별시 > 중구
   - Performance: 25,506

3. ** תמחל **
   - County: 서울특별시 > 중구
   - Performance: 24,212

Click on the result
**Tourist Spot Information**

**MYEONGDONG**

- **Source:** City of Seoul, Korea
- **Website:** [http://www.junggu.seoul.kr/tour/](http://www.junggu.seoul.kr/tour/)
- **Location:** Myeongdong, Jung-gu, Seoul

### Domestic Tourist Analysis Results

<table>
<thead>
<tr>
<th>Non-Residents + Foreign Visitors</th>
<th>Resident Visitors</th>
<th>Non-Resident Visitors</th>
<th>Foreign Visitors</th>
<th>Overall Change in Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>129,881명</td>
<td>44,877명</td>
<td>129,507명</td>
<td>374명</td>
<td>68.17% year-on-year, 9.13% week-on-week</td>
</tr>
</tbody>
</table>

### Preferred Age Group

- **Preferred Time of Visit:** 14-18 years
- **Major Source of Inflow:** Seoul City > Seongbuk
- **Major Source of Outflow:** Seoul City > Jung-gu
Domestic Visitor Analysis Results

Area of Residency

<table>
<thead>
<tr>
<th>구분</th>
<th>광역시도</th>
<th>시군구</th>
<th>비율</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>서울특별시</td>
<td>성북구</td>
<td>4.82%</td>
</tr>
<tr>
<td>2</td>
<td>서울특별시</td>
<td>서대문구</td>
<td>4.70%</td>
</tr>
<tr>
<td>3</td>
<td>서울특별시</td>
<td>용산구</td>
<td>4.45%</td>
</tr>
<tr>
<td>4</td>
<td>서울특별시</td>
<td>마포구</td>
<td>3.95%</td>
</tr>
<tr>
<td>5</td>
<td>서울특별시</td>
<td>은평구</td>
<td>3.66%</td>
</tr>
<tr>
<td>6</td>
<td>서울특별시</td>
<td>종로구</td>
<td>3.53%</td>
</tr>
<tr>
<td>7</td>
<td>서울특별시</td>
<td>성동구</td>
<td>3.36%</td>
</tr>
<tr>
<td>8</td>
<td>경기도</td>
<td>성남시/분당구</td>
<td>3.11%</td>
</tr>
<tr>
<td>9</td>
<td>서울특별시</td>
<td>노원구</td>
<td>2.88%</td>
</tr>
<tr>
<td>10</td>
<td>서울특별시</td>
<td>동대문구</td>
<td>2.87%</td>
</tr>
<tr>
<td>11</td>
<td>기타</td>
<td></td>
<td>62.68%</td>
</tr>
<tr>
<td>합계</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Area of Next Destination

<table>
<thead>
<tr>
<th>구분</th>
<th>광역시도</th>
<th>시군구</th>
<th>비율</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>서울특별시</td>
<td>중구</td>
<td>34.12%</td>
</tr>
<tr>
<td>2</td>
<td>서울특별시</td>
<td>서대문구</td>
<td>6.04%</td>
</tr>
<tr>
<td>3</td>
<td>서울특별시</td>
<td>중구</td>
<td>5.73%</td>
</tr>
<tr>
<td>4</td>
<td>서울특별시</td>
<td>강남구</td>
<td>4.85%</td>
</tr>
<tr>
<td>5</td>
<td>서울특별시</td>
<td>마포구</td>
<td>3.11%</td>
</tr>
<tr>
<td>6</td>
<td>서울특별시</td>
<td>서초구</td>
<td>2.88%</td>
</tr>
<tr>
<td>7</td>
<td>서울특별시</td>
<td>읍산구</td>
<td>2.80%</td>
</tr>
<tr>
<td>8</td>
<td>서울특별시</td>
<td>영등포구</td>
<td>2.34%</td>
</tr>
<tr>
<td>9</td>
<td>서울특별시</td>
<td>송파구</td>
<td>1.91%</td>
</tr>
<tr>
<td>10</td>
<td>서울특별시</td>
<td>성동구</td>
<td>1.49%</td>
</tr>
<tr>
<td>11</td>
<td>기타</td>
<td></td>
<td>34.71%</td>
</tr>
<tr>
<td>합계</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
**Foreign Visitor Analysis Results**

### Nationality

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Inflow</th>
<th>Outflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myeongdong</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Area of Next Destination

<table>
<thead>
<tr>
<th>Area of Next Destination</th>
<th>Inflow</th>
<th>Outflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myeongdong</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Report**: Detailed analysis result (demographics, travel patterns, etc.)
GIS Analysis: Check tourist movements visually

1. Choose the point of interest & period

2. Click the result of inflow or outflow of domestic/foreign visitors.
1. Choose the point of interest & period

2. Click the result of inflow or outflow of domestic/foreign visitors.

[INFLOW] Where did domestic visitors come from to visit Myeongdong in October 2020?
1. Choose the point of interest & period
2. Click the result of inflow or outflow of domestic/foreign visitors.

[OUTFLOW] Where did domestic visitors go to after visiting Myeongdong?
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Past Projects

Central Government

• For 5 years, KT and Korea Tourism Organization (KTO) have been partnering to invigorate the tourism industry.
  o KT: provides industry analysis periodically
  o KTO: integrates the analysis to its tourism policies

Local Government Units

• Analyze patterns of domestic and foreign tourists in specific areas, and design strategies to promote tourism.
  o For example: adding new bus lines where tourists are highly concentrated and optimizing bus routes
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   sample data analysis using KT BigSight data
Republic of Korea’s Domestic Tourism Amid COVID-19
January 27 to November 15, 2020

Source: Korea Tourism Organization (accessed December 2020).

https://www.tourbiz.or.kr/biz/board/read?boardManagementNo=1&boardNo=1360&searchCategory=&page=1&searchType=&searchWord=&level=2&menuNo=18
Visitor and Expenditure Trends after COVID-19 Outbreak (y-o-y change, %)
January 27 to November 15, 2020
Visitor and Expenditure Trends after COVID-19 Outbreak (y-o-y change, %)
January 27 to November 15, 2020

Source: Korea Tourism Organization (accessed December 2020).
https://www.tourbiz.or.kr/biz/board/read?boardManagementNo=1&boardNo=1360&searchCategory=&page=1&searchType=&searchWord=&level=2&menuNo=18
### Spending Patterns Amid COVID-19

#### Spending of Residents and Non-Residents in Tourism-Related Industries (y-o-y change, %)
Credit Card Consumption (Jan 27-Nov 15, 2020)

<table>
<thead>
<tr>
<th>Accommodation</th>
<th>Public Transportation</th>
<th>Leisure</th>
<th>Major Tourism Businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxury Hotel</td>
<td>-55%</td>
<td>Golf Course</td>
<td>Souvenir Shops -81%</td>
</tr>
<tr>
<td>1-Star Hotel</td>
<td>-75%</td>
<td>Entertainment Businesses -35%</td>
<td></td>
</tr>
<tr>
<td>2-Star Hotel</td>
<td>-58%</td>
<td>Aquarium</td>
<td>Rent Car 62%</td>
</tr>
<tr>
<td>Condominium</td>
<td>-42%</td>
<td>Ski Resort</td>
<td>Duty Free -90%</td>
</tr>
<tr>
<td>Others</td>
<td>-29%</td>
<td>Sports Leisure Goods -17%</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>-49%</strong></td>
<td>Leisure Town</td>
<td>Travel Agency -95%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Transportation</th>
<th>Leisure</th>
<th>Major Tourism Businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express Bus</td>
<td>-55%</td>
<td>Souvenir Shops -81%</td>
</tr>
<tr>
<td>Ferry</td>
<td>-30%</td>
<td>Rent Car 62%</td>
</tr>
<tr>
<td>Railroad</td>
<td>-42%</td>
<td>Duty Free -90%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>-45%</strong></td>
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<td>Duty Free -90%</td>
</tr>
<tr>
<td>Ski Resort</td>
<td>Travel Agency -95%</td>
</tr>
<tr>
<td>Sports Leisure Goods -17%</td>
<td>Casino -87%</td>
</tr>
<tr>
<td>Leisure Town</td>
<td>Airline -73%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>-11%</strong></td>
</tr>
</tbody>
</table>

**Subtotal**

Source: Korea Tourism Organization (accessed December 2020).
https://www.tourbiz.or.kr/biz/board/read?boardManagementNo=1&boardNo=1360&searchCategory=&page=1&searchType=&searchWord=&level=2&menuNo=18
THANK YOU!

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Wonhee Cho: wcho.consultant@adb.org