

12th Strategy Workshop for the Future of Jeju Tourism

Jeju's Carrying Capacity for Sustainable Tourism

April 13, 2017

■ Presentation: Direction of the calculation of the carrying capacity of tourism in Jeju

○ Presenter: Jo Boo-Yeon (Business Department, Jeju National University)

- Along with the tourism in Jeju growing in its size, many people are wondering what would be the adequate carrying capacity of the region. Also, they are questioning the effectiveness of existing longitudinal estimation methods. Since 2011, the number of tourists to Jeju has drastically increased casting a doubt on the credibility of data used for the estimation. The estimation based on the past data can hardly allow for corrections on the over or under estimated figures and also is limited in terms of flexible response regarding future environmental changes.
- The issues incurred due to increasing travelers such as damages to tourism resources and the living environment of local residents have raised the number of unhappy residents. On top of this, solutions to the problems occurred due to the increasing long-term stay required of travelers. Under these circumstances, it became clearly necessary to analyze the available carrying capacity of tourism in Jeju.
- In response to scenarios for various environmental changes, we would like to utilize simulation-based decision-making methods. As we are witnessing the limitation of inference methods based on past data, we would like to move forward with the capacity-estimation research by setting a future forecast model based on causal relations.
- For the estimation, we will draw on the available carrying capacity which is acceptable by Jeju based on the simulations from the perspective of economy, using figures in relation to time and static figures. As we will draw scenarios on the possible environmental changes (for political, economic, social, and technological elements), policy responses to scenarios would be available.
- For this research, experts' council, a research team, and model development teams will select issues of changing environment, arrange them for research, secure necessary data, come up with scenarios, and then draw the final outcome through simulation modeling.
- Currently, regarding Jeju regions, available data is as follows;
 - Industrial activities: Agricultural, fisheries, and livestock industry, manufacturing industry,

commercial businesses, public projects, Regional Input-Output Table, Industrial Competitiveness Survey, etc.

- Economic Trends: Composite Indexes of Business Indicators, Business Survey Index, Market Business Survey Index, Gross Regional Domestic Product, etc.
- Population: Population per age and gender, population move, trend of population change, registered foreign population per nationalities, population trend per cities, etc.
- Environment/Climate: Garbage collection, amount of wastewater/day/person, air pollution, water pollution, general weather conditions, amount of rainfall, etc.
- Construction/Real estate: Composite price index, type of housing units and housing supply rate, construction data on infra-facilities, industrial indices, etc.
- Employment: Economically active population, number of employed persons
- Price: Consumer price, price of living, price of fresh foods, etc.
- Transportation: Registered car, current data on bicycle paths, flight transportation, number of registered ships, passenger ship transportation, cargo transportation, etc.
- Consumption: Amount of spending by credit card, sales index of large retail stores, Consumer Survey Index, etc.
- Utilities/Others: Population using water supply and sewerage, supply rate of water supply and drainage, amount of water use, amount of gas supply, Happiness Index, etc.
- This research is conducted as a first step to draw estimations on carrying capacity available for Jeju at a certain time, establish an agile decision-making system which allows preemptive responses based on the scenarios on the changing environment, and build a decision-making system based on simulations in the tourism sector. This research will be carried out in the direction that it will suggest static figures on the available tourism capacity in Jeju, move forward with the management system which can analyze the ripple effects of environmental changes, and identify and systemize available data at this point with the consideration of future construction and operation of tourism big data.

■ DISCUSSION

○ Master: Lee Jae-Hong (Director General of Jeju Tourism Organization)

- With the surging number of tourists, more and more people are interested in the available carrying capacity in Jeju. Considering Jeju's direction toward qualitative growth of its tourism, calculating its carrying capacity is a meaningful project. Given that high interests will be paid into the future outcome of the research, this workshop would be a significant opportunity to build a social consensus in relation to the process of carrying capacity estimation.

○ Kim Chang-Sik (President, Jeju Tourism Society)

- Issues of tourism capacity, or carrying capacity require understanding on the relationship between tourism demand and the environmental carrying capacity. Carrying capacity is an old agenda, but when we narrow down the scope to the tourism area, the purpose of calculation should be clear. The purpose of the research would be that the figure is needed as a tool to fortify management of tourism resources at a time when the resources must be preserved due to increasing tourists. Or, it should be to come up with a device that can provide compensation for the social cost which is incurred by increasing travelers. The research needs to be conducted with the specific prerequisite on the direction that the research would help travelers maintain their tourism activities and create sustainable and high value-added qualitative tourism.

○ Jung Dae-Yeon (Head of Jeju Climate Change Center)

- When there are pros and cons on each demand forecasting model, we need to conclude which model would be used to calculate the estimation. Looking back at my experiences, the calculated estimation can vary due to the configured proxy variables rather than the difference in applied model. Even when the proxy variables are set, depending on the value of the variables, the resulting figure may provide different results. In this regard, decisions on which value would be weighed is important.
- To solve the collinearity issues among independent variables, a causal path should be artificially set and then works should be proceeded. If no theory exists, by setting causal models based on experiences, elements directly or indirectly impact on the variables can be identified. The model of scenarios have to be configured through the research design process while considering relationships among diverse variables such as identifying the relation of the impact of mediator variables by using structural equation modeling.
- After setting up the scenario model, for interpretation of the results, additional analysis would be necessary not only using methods relying on experts' subject such as Delphi, or AHP, but also identifying the proxy variables' impact and their interrelation through clustering each content. And what also needs to be considered is that impact relations of qualitative variables should not be neglected.

○ Son Sang-Hun (Researcher, Jeju Research Institute)

- Carrying capacity is a function of supply. It is considered as an element which may decide the supply level of Jeju's internal variables like the infrastructure, water, garbage treatment capacity, transportation, etc. It should also be considered on how to calculate the carrying capacity based on the absolute concept (values which are required unconditionally), relative concept (feeling of tourists and residents such as

inconvenience, or congestion), and consensual concept (building a consensus between residents and tourists).

- Depending on what objective function was set, the direction of the results would also vary. Researchers should be careful when they arrange the various functions per object according to the analysis results. Taking transportation as an example, level of congestion may be quantified as service level (A-F rank) by extracting average delayed time per vehicle at intersections. Such an approach would also be able to be applied to the tourism sector.

○ Kim Tae-Yoon (Researcher, Jeju Research Institute)

- The fundamental reason why the calculation of carrying capacity became necessary first be determined whether the carrying capacity became an issue due to the conflict between increasing travelers and residents' economic benefits. The purpose and necessity of selection and management of the carrying capacity should be clear. If necessary, the scope of calculation (certain area, or areas applicable per stage of analysis) can be established.
- When the results are calculated based on the understanding of relationships per sectors which requires the calculation of carrying capacity, such outcomes would be useful when we coming up with ways to manage the area. Also within the province, a consensus should be built on the expected improvements attributable to this research's outcome. I expect to see the calculation of the carrying capacity which is conducted over time and with an incremental approach.

○ Shin Dong-il (Researcher, Jeju Research Institute)

- Direction on the background and purpose of the research should be clear. The decision should come first and whether the purpose is to increase the "size of the bowl" or to limit the incoming travelers only up to the "size of the bowl".
- As to the physical capacity, calculations may become easier by using existing data. But as to the social capacity, it would be hard to conduct a quantitative analysis. Currently with the decrease of Chinese tourists, Korean tourists become more satisfied. How would we be able to suggest alternative solutions to such cases of social conflict due to the carrying capacity issue? The direction on such logic needs to be clearly established.

○ Kim Eui-Keun (Tourism Business Professor, Jeju National University)

- The calculation is needed to manage the carrying capacity of tourism in Jeju. The agreement on the adequate level of carrying capacity should be made in order to build a consensus on the analysis scope and the results per sector.

- After classifying tourists by types such as travelers staying in accommodations (at a hotel, or at other facilities), or day-trippers, calculations on the carrying capacities for each type should be done. Residents working for tourism businesses may have different opinions about the adequate carrying capacity to that of other residents. The social agreement between employees of the tourism industry and other residents should be calculated through the linear fuzzy set theory and then should be used when researchers set the direction of the research.
- At first, which sectors require the calculation of carrying capacities need to be determined and then the calculation needs to be conducted incrementally.

○ Jang Seung-soo (Tourism Development Professor, Jeju National University)

- I think Jeju's data may support the estimation of long-term trends. But as to the social and psychological carrying capacities which are required by residents, no model would be able to be used to calculate the forecast of long-term trends.
- Only when the prerequisites of this research are clearly set, and after setting a hierarchy of various factors, the calculated outcome and the analysis results would be able to be meaningfully used. Furthermore, when diverse variables are extracted from the classified internal and external elements of models would help improve the quality of evaluation and would be useful for policy decisions on projects and the direction of post-research.
- By making clear decisions on the calculation of qualitative variables, researchers need to consider how the outcome may be used for the complementation of measured data. It would be difficult to cover all of the areas.

○ Shin Wang-Geun (Tourism Professor, Jeju National University)

- The research should only start after clearly identifying the 2030 Future Jeju Plans and related data. When the direction of the 2030 Jeju plan is included in the basis of the simulation method, the analysis outcome will be more useful.
- The forecast and value-focused decisions on the future of Jeju such as a region centered on natural resources or urban resource-driven city should be used as a base of model configuration.
- The biggest variable of future tourism is unexpected risk such as MERS, THADD, and other external factors. And I wonder whether and how such risks can be quantified and applied to the simulation models. I hope such applications do not deteriorate the credibility of the analysis results.

○ Moon Seong-Jong (Tourism Business Professor, Halla University)

- Cases of other island regions such as regions in the Mediterranean should be examined and reviews on the current acceptance of Jeju should be done prior to the research. Quantitative investigation needs to be done on the local community and the tourism areas. And then by setting priorities, the carrying capacities should be calculated in stages.

○ Jang Moon-Bong (Head of Tourism Policy team, Tourism Policy Department of Jeju Special Self-Governing Province)

- This research was suggested by the Culture and Tourism Committee at the Jeju Special Self-Governing Provincial Council. It was suggested that research on the future is needed at a time when tourists and residents are all uncomfortable due to the increasing tourists. Though this research should be carried out in stages and sectors, from the perspective of the working level, we are to start from this standing and then will move further considering various situations. I don't think we need to be worried about the results at this point. This research is a first attempt and that's the meaningful point. The research will be carried out as a continued project afterward.

○ Jo Boo-Yeon (Business Professor, Jeju National University)

- I agree with the concerns on various, possible problems due to this research. And as it is a long-term issue, time trends cannot be ignored. But for Jeju residents, the immediate problems they are facing every day are more critical than such long-term concerns. So, I think it would be desirable to consider this research as a way to preemptively prepare for the short-term policy reaction.
- As to the carrying capacity, I think that comparing it to a balloon would be more correct. It's not the issue of the size of the bowl and how to handle the bowl. I think this research would be one which contains our consideration of how flexibly we may respond to tourists and related policies.
- The results of this research are not just to calculate the aimed number. It is to forecast which outcome will be drawn in the longer term. So, it would be better to think of this research as an opportunity to internalize the region's capabilities for the first time.

- Jeju Tourism Organization is proactively suggesting various policy solutions to provide measures to solve pending issues in this regional society.
- We would like to come up with more reasonable and forward-looking alternative solutions that can be made based on the results of this workshop in order to contribute to the increased quality of life for Jeju residents and to the region's development.



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