



A Study on Forecasting Demand of Trail Riders

Dong Yeon Koo¹, Jungeun Song², Sang Yeol Han³



¹[dykoo@hanmail.net], ²[readjean@hanmail.net], ³[syhan@knu.ac.kr]

I. Purpose

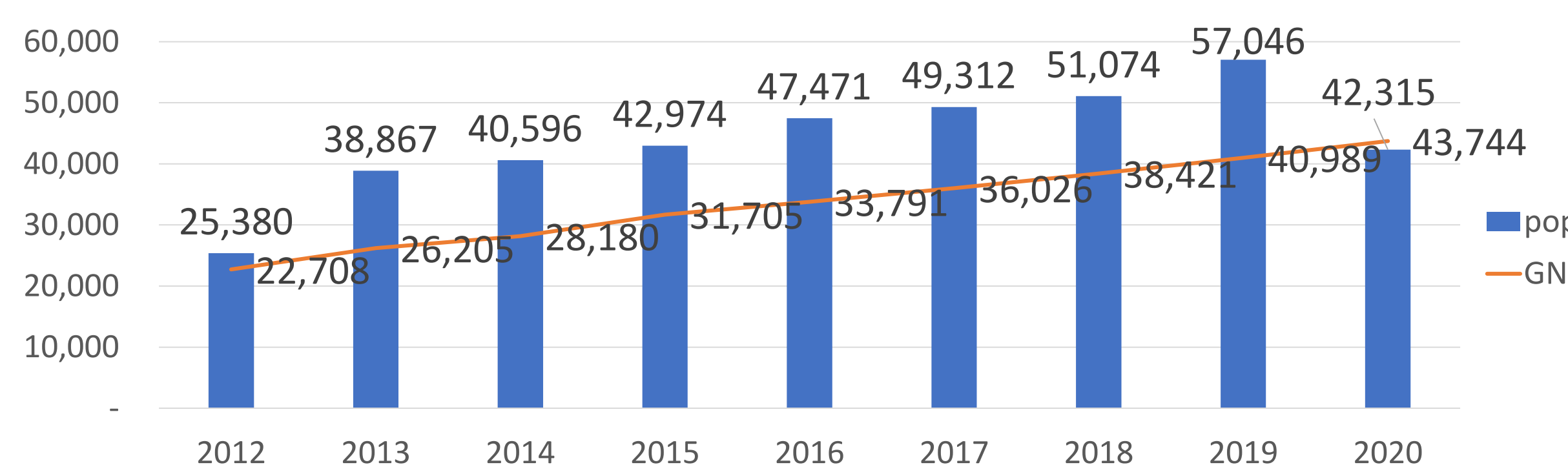
- ◆ As South Korea's per capita GNI amounted to around 31 thousand dollars in 2020, the nation's more stable economy has lifted the level of participation in leisure activities.
 - ✓ In other words, the increase in GNI has affected the level of leisure activities.
 - ✓ If the GNI surpasses the 20 thousand dollar mark, the number of individuals interested in horse riding will increase.
 - ✓ According to the 'Horse Industry Survey in 2020' published by the Korea Riding Association, the number of regular riders around 42 thousand.
- ◆ With the amount of interest in leisure activities increasing resulting from rising income, trail riding has become known as one leisure activity in forests.
 - ✓ As part of an effort to make trail riding more popular promote camping and horse riding trekking to expand its foundation. Thanks to an ever-diversifying scope of leisure activities in forests along with rising income, the breadth of forest leisure activities has expanded.
- ◆ Accordingly, estimate the demand for the trail horse riding population.
 - ✓ This study aims to forecast the population demand by the type of people enjoying horse riding.
 - ✓ Utilized the ARIMA model as well as the simple regression model to select an optimal model.
 - ✓ Predicted both conservative demand and optimistic demand by the type of trail riding population by applying rate of visit intention, rate of actual participation and the period of participation to the selected model.

II. Research

- ◆ **ARIMA model**
 - ✓ ARIMA model is function combining Auto-Regressive, Integrated and Moving Average and it goes through the process of stationarity, checking, identification and estimation of a model and diagnosis.
 - ✓ Whether the data is stationarity or not can be confirmed through Auto Correlation Function and Partial Auto Correlation Function graphs. If time-series data show non-stationarity, the data can be changed to stationary by differencing and the equation as follows
 - $(1 - \phi_1 B)(1 - B)Y_t = c + (1 - \theta_1 B)e_t$ (1) $\phi = AR, B=(\text{Backward shift operator}; BY_t=Y_t-1), (1-B)=1^{\text{st}} \text{ order differencing}, c=\text{constant}, e_t=\text{error}$
- ◆ **Simple Linear Regression Analysis**
 - ✓ Simple linear regression is a representative statistical method capable of predicting dependent variables with one independent variable.
 - ✓ This study inserts time as an independent variable, forecasting the future demand of the riding population. The equation is shown as follows
 - $Y = \beta_0 + \beta_1 X_1 + \varepsilon$ (2) $Y = \text{dependent variable}, \beta = \text{coefficient for the intercept}, X_1 = \text{independent variable}, \varepsilon = \text{error term}$
- ◆ **Combining Method**
 - ✓ Combining forecasting methods refer to a prediction approach considering 'rate of visit intention' estimated from a survey.
 - ✓ this study took into account variables including rate of visit intention, rate of actual visit and period of participation, and the equation is represented as follows
 - $Y_a = \sum_{i=1}^{\delta} P_i \times W_i \times G \times F_i$ (3) $Y = \text{conservative (optimistic) forecasting value}, P_i = \text{regular riders}, W_i = \text{rate of visit intention}, G = \text{rate of actual visit participation}, F_i = \text{participation period}$

III. Results and Discussion

- ◆ This study forecasted Korea's population of horse riders from 2023 to 2031 based on the ARIMA model and simple regression model.
 - ✓ Testing results of the ARIMA model show that the p-value was .010, indicating statistical significance at a 5% confidence level, while R² showed 0.754.
 - ✓ In the regression model, the p-value was <0.01 for its statistical significance, while R² indicated 0.762, presenting higher explanatory power than the ARIMA model. The closer R² is to 1, the higher its explanatory power.
 - ✓ This study selected a simple regression model as the most optimal model for predicting the number of people partaking in horse riding.



Year	ARIMA model	Regression model
2023	34,094	40,993
2024	41,571	30,879
2025	37,600	39,616
2026	40,500	40,736
2027	42,714	42,276
2028	46,956	45,189
2029	54,014	46,382
2030	55,315	47,523
2031	46,925	51,392
R ²	0.754	0.762

<Table2> Regular Horse Rider forecast by model

- ◆ 228 out of 320 positively responded as 'very willing to visit' as well as 'somewhat willing to visit'.
 - ✓ 47.1% of respondents in horse riding recreational forests and 41.6% of riding camping chose 'somewhat willing to visit'.
 - ✓ Moreover, 40.0% of respondents in riding centers responded 'very willing to visit'.
 - ✓ The rate of actual visit, which is calculated by applying the actual experience of visiting to the willingness to visit recorded that 0.214.

- ◆ Analyzed the participation period of horse riding for the next 5 years.

- ✓ The highest participate in riding for a long period of time (longer than 5 years) were respondents in riding centers with 62%, followed by those in riding recreational forests with 43.5%.
- ✓ The type of trail riding showing high participation within less than one year was those from riding camping with 39.3%.

Type	Rate of Visit Intention(%)					Rate of Actual Visit Participation	
	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Very	Little
Hores Recreation forest	34.1	47.1	16.5	2.4	0.0	0.214	0.211
Hores Camping	22.5	41.6	29.2	0.1	0.1	0.141	0.187
Horse Riding	40.0	33.8	25.0	1.3	0.0	0.251	0.152

<Table 3> Rate of Visit Intention and Rate of Actual Visit Participation

Type	Period of Participation					
	1Year	2Year	3Year	4Year	5Year	Over 5Year
Horse Recreation forest	1.294	1.059	1.106	1.012	1.094	1.435
Hores Camping	1.393	1.056	1.270	1.012	1.180	1.079
Horse Riding	1.188	1.000	1.000	1.025	1.063	1.625

<Table 4> Period of Participation

- ◆ As a consequence, as each year passes trail riding population exhibit an increasing trend.
 - ✓ From the conservative viewpoint, the riding population is expected to increase to 44,562 by 2031, while growing up to 83,186 from the optimistic perspective.

III. Conclusion

- ◆ This study offered forecasts on the population of trail riders both from the conservative and optimistic perspectives.
 - ✓ These results show that as income rises and time passes, the population of trail riders is expected to increase.
 - ✓ conservative prediction of increasing 30,000 ~ 41,000 riders, optimistic prediction of increasing 60,000 ~ 83,000 riders.
- ◆ Trail riding in the realm of forests has been insufficient and requires continued research.
 - ✓ such as oversupply potentially resulting from efforts for vitalizing trail riding as well as loss from excessive investment.