

Impact of the Introduction of a Mobile App-Based Social Scoring System in Rural Areas: Case Study of Aya Town, Miyazaki Prefecture

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1. Introduction

From 2019 to March 2022, Aya Town in Miyazaki Prefecture launched an initiative called AYA SCORE to visualize activities that contribute to rural development using information and communication technology. This project was implemented by the Aya Town Regional Settlement Promotion Council and Information Services International-Dentsu, Ltd. (ISID) as a model project called the Rural Area Revitalization Grant (Regional Revitalization Measures) Smart Settlement Conditions Strengthening Type under the Ministry of Agriculture, Forestry and Fisheries. In the AYA SCORE initiative, people involved with Aya Town, including residents, earned and accumulated scores (points) through *contributions to town activities* via a smartphone app. The target activities were composed of four types: interaction, mutual aid, agriculture support, and local production for local consumption. With the objective of encouraging behaviors that benefit the town and its people, participants could earn scores by engaging in the activities designated by Aya Town while having fun.

The background of this initiative includes the progression of declining birthrates and aging populations in rural areas along with the growing trend of *returning to rural areas* among young urban generations. To capitalize on this trend, promoting gradual migration and settlement while creating systems that enable people to move with peace of mind is necessary. AYA SCORE sets a medium- to long-term goal of not only promoting cooperative behavior through the scoring of mutual aid activities but also increasing the related population.

AYA SCORE does not allow users to exchange accumulated scores for products or purchases. Although the idea of using scores as a local currency is conceivable, it would eventually require budgetary provisions from the local government, which potentially limits the longevity of the project. Additionally, focusing on monetary rewards could become an end in itself, which leads to the risk of the loss of intrinsic motivation. The system was designed to prioritize the altruistic actions of residents, such that they contribute to the creation of a livable town, while aiming for urban residents to recognize Aya Town, which is known for organic farming, as a region with vibrant community activities.

2. Effectiveness Verification of AYA SCORE

As part of this demonstration project, the Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries (PRIMAFF) and ISID jointly endeavored to verify the effectiveness of the introduction of AYA SCORE using subjective well-being and social capital (SC) as evaluation indicators. This article introduces an overview of the survey conducted on town residents by Aya Town, PRIMAFF, and ISID for effectiveness verification. For a detailed analysis content, please refer to Sasaki et al. (2022).

(1) Hypothesis Setting

This study viewed the AYA SCORE system, which is the first *social score* introduced in a rural area of Japan, as an *intervention* to enhance SC and subjective well-being, and attempted to empirically measure its effects using various statistical and econometric methods. Specifically, we hypothesized that the users of AYA SCORE would improve *bonding-type* (e.g., community-based activities and degree of neighborhood interaction) and *bridging-type* (e.g., friendships outside of school and workplace and participation in volunteer/nonprofit organization/civic activities) SC through the four activities that contribute to Aya Town. Moreover, subjective well-being would improve through SC.

(2) Survey Implementation

From July 29 to August 21, 2020, approximately six months after the introduction of AYA SCORE, a questionnaire survey was conducted by mail on 2,000 residents, which covers approximately half of the households in Aya Town. A total of 653 responses were received (response rate: 31.8%). Additionally, AYA SCORE users could respond to the survey through the app, which produced 9 responses and brought the total number of responses to 662. After excluding incomplete responses, the total sample size used for analysis was 537.

3. Analysis Results

(1) Descriptive Statistics of the Survey

First, the study organized the descriptive statistics of the main variables, which distinguished the users and nonusers of AYA SCORE. Although the number of AYA SCORE users was limited to 26, a comparison between the two groups revealed that users exhibited higher levels of subjective well-being and SC. Subjective well-being (evaluated on a scale of 0 to 10) obtained an overall average of 6.67. Specifically, the averages of users and nonusers were 7.73 and 6.62, respectively. The level of Aya Town is significantly higher than the average values previously estimated for Japan. Additionally, the levels of bonding- and bridging-type SC were significantly higher for AYA SCORE users, while the overall SC levels were higher compared with those obtained from previous national surveys.

Examining the characteristics of AYA SCORE users, the study found that people with high levels of IT literacy and who use the Internet for work, hobbies, and daily communication tended to use AYA SCORE, given that it is a smartphone app. The study observed no differences in terms of years of residence in Aya Town or level of education.

(2) Regression and Matching Analyses

We then estimated the extent to which the dependent variables (subjective well-being and SC) could be explained by the explanatory variables using regression analysis. Although the study observed statistical significance in the results of the regression analysis, evaluating the impact of AYA SCORE use on the subjective well-being and SC of residents was necessary to consider the issue of selection (sample) bias. Therefore, although the number of AYA SCORE users was limited at the time of the survey, we conducted propensity score matching (PSM) to complement the regression analysis. PSM is a method based on the idea of the reduction of bias by pairing similar individuals (matching) to verify effects. The covariates used were gender, age, annual income, and frequency of Internet use. The study also adjusted for the selection bias of people with high levels of IT literacy using AYA SCORE.

Analysis of the estimation results of the average treatment effect revealed that subjective well-being was approximately 0.87 to 1.1 points higher for AYA SCORE users. The study also confirmed positive intervention effects for SC. However, a significant limitation of this study is that it was unable to take postintervention measurements. Initially, we planned to conduct the same survey at the end of the project; however, project-related, large-scale surveys were postponed due to the impact of the COVID-19 pandemic. Given the limited number of users and the fact that data were collected at only one time point, the precision of the analysis is limited.

4. Conclusion and Future Prospects

This study intended to evaluate the effects of the AYA SCORE project, which ultimately aimed to promote migration and settlement, using multiple proxy variables. The results of analysis confirmed the positive effects of the use of AYA SCORE on SC and subjective well-being through multiple matching analyses. However, this study used a binary dummy variable for AYA SCORE to capture the effect of app usage; in reality, however, the frequency of app usage greatly varies among users. Ideally, using the frequency of use as the dependent variable would be more desirable instead of the presence or absence of AYA SCORE use. However, the study encountered a system-related challenge in that the log data of the score acquisition records stored in the system were not linked to the data obtained from the mail survey.

After a three-year project period, the AYA SCORE initiative concluded in March 2022. A truly regrettable aspect is that many of the specific rural activities planned for this project could not be implemented due to the COVID-19 pandemic. However, we are hopeful that room remains open for the demonstration of similar concepts in other rural areas with similar interests, which positions the AYA SCORE example as a prototype. The underlying reason is that we believe that the token economy in which the connections and gratitude of people are visualized through digital technologies, such as blockchain (which AYA SCORE aimed for), seemingly particularly exhibit high compatibility with rural areas. We propose that creating systems that target societies that value connections between people who create new value in rural areas or that revisualize and share such value is becoming possible today through the utilization of digital technology.

[References]

- Sasaki, H., Hirabara, M., Matsuyama, H., Morita, H., and Suzuki, T. (2022). Impact of a Mobile App “Social Score” System Introduction in a Rural Area: Causal Analysis Using Social Capital and Subjective Well-Being in Aya Town of Miyazaki. *Journal of Rural Economics* 94(1): 49-54.
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