Analysis of Regional Well-being and Development of Its Indicators

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Introduction

During the Setouchi Triennale (Setouchi Kokusai Geijutsu-sai), many people visited the Setouchi region in Japan and abroad. The economic effect of an event is measured using an input-output analysis, and an event that attracts several overseas visitors has a large multiplier effect. The local economy is revitalized when visitors stay overnight or purchase regional goods. Therefore, organizing events with special characteristics can be one of the ways to revitalize a region. However, this temporal economic activity has only a short-term effect.

However, there are certain events which are expected to have long-term effects. For example, a marathon event in a region is not only a way for participants to run on the day of the event but also a way for them to develop a running habit which has long-term positive effects on health. The active participation of many residents can improve their overall health conditions. Similarly, the Setouchi Triennale also increases the richness of residents' cultural lives by accumulating artwork in the area and increasing their interest in culture.

Long-term effects include health, culture, and social connections and are not limited to economic effects. They enrich people's lives and lead to the construction of prosperous local communities in a broad sense. However, such effects are not always estimated by objective values but are perceived by people through their subjective senses. Well-being refers to the level of holistic life satisfaction. People consider various factors in their lives when they answer questions about their life satisfaction level, therefore a comprehensive measurement of well-being is difficult.

To measure well-being, it is essential to understand its constituent elements. When do people feel that they are living satisfactorily? Uzawa (2000) states that a prosperous society is one in which all people make full use of their innate and acquired qualities and abilities, engage in work that allows them to realize their dreams and aspirations to the fullest, and earn an income

commensurate with their private and public social contributions. It is a society in which people can have happy and stable families and live a life of high cultural standards with different social contacts as possible. (Hirofumi Uzawa, Social Common Capital, Iwanami Shinsho, 2000). This is consistent with the concept of well-being analyzed in this study.

The key to measuring well-being is the concept of social capital, or common social capital. The natural environment and other natural resources are essential to enrich people's lives; however, they are neither privately owned nor traded in the market. For people's well-being, it is important to understand goods and capital that are not traded in the market. In this study, we review the concept of holistic well-being in Section 1 and discuss the concepts of common social capital and resource allocation.

In Section 2, we review our understanding of well-being by examining the concepts and indicators put forth by the Organisation for Economic Co-operation and Development (OECD). Well-being is the subjective evaluation by each individual. When life satisfaction is assessed, the responses differ across countries, regions, and people, as people have different criteria for judging their lives. We captured the characteristics of well-being by comparing and observing the indicators of the different groups.

In Section 3, we present an analysis of the factors that influence the well-being of Japanese people using Japan's statistics. Well-being differs not only by region, but also by gender, and age. As economic conditions are considered to be basic life satisfaction factors, it is necessary to consider the impact of other factors on well-being under different economic conditions.

1. Well-being and Social Common Capital

Well-being is the level of satisfaction or happiness with life, which depends on economic wealth (income, assets, etc.) and health, social and natural environment (culture, safety, weather, politics, etc.), and interaction (family structure, relationships with people around, community interaction and activities, etc.).

The main indicator of economic activity in a country or region is the Gross Domestic Product (GDP), and the standard of living is indicated by GDP per capita. GDP does not include activities or situations that are not traded in an economic market; therefore, it may diverge from the actual wealth of a country or region in terms of well-being. Regional and individual well-being are indicators of non-tradable activities.

There is a phenomenon in which the average level of well-being does not increase when

economic wealth (GDP per capita) rises above a certain level; this is known as the Easterlin Paradox. (Easterlin (1974)). The average level of well-being at the country level is not necessarily higher in rich countries than in poor ones. This also means that there are differences in the well-being levels among countries with similar economic levels.

Social capital is a key concept. In contrast to the usual capital, social capital includes the infrastructure of life related to the intrinsic values of nature, culture, and social connections. Most of them produced by social capital are not traded in the market; therefore, they are not included in the GDP. However, they are essential to daily life and have a significant impact on an individual's well-being.

As social capital is not traded in the market, the distribution of social capital services is not optimal. A typical example is environmental problems. When a company produces with the aim of profit maximization, it considers demand and costs. However, the environmental damage caused by production, especially to the well-being of the local population, is not considered in the profit maximization problem.

Additionally, several factors, such as economics, health, nature, culture, and social connections, will have trade-off relationships. For example, in the overwork problem, firms increase their products and workers tend to increase their income. If they are optimized, then there is no problem, but sometimes this induces dissatisfactory combinations of working hours and wages for workers. If work time becomes excessive, workers' well-being may decline, even as income increases.

Economic analysis is useful for examining such allocations and tradeoff issues. In this study, we investigate social common capital, which Uzawa (2000) emphasizes, since the problem concerns whether private ownership is involved.

Privately owned capital is private capital used for production and consumption by the owner. In addition to tangible capital, such as factories, production machinery, and automobiles, intangible capital also exists, such as skills and knowledge. Social capital, as opposed to private capital, is social infrastructure that is not privately owned. Capital accumulates mainly through investments by the government sector, such as roads, bridges, and harbors. Government administrative systems, such as education, healthcare, public security, justice, and public administration are called institutional capital. Social common capital is the sum of social, institutional, and natural capital, such as the environment. Social capital includes private ownership capital, as personal interaction is a private social connection.

In an analysis of production that incorporates common social capital, capital is divided into

private and social capital. The relationship between productivity (marginal productivity) and investment costs determines the optimal supply of private capital. Social capital is used by many economic agents; therefore, the cost burden does not necessarily coincide with users. Therefore, the accumulation of social capital requires measurement of a socially optimal quantity.

On the consumption side of social capital, we examined people's satisfaction with the services that arise from capital. The marginal utility of services from social capital (e.g., parks and safety) is called the marginal benefit. Optimal allocation cannot be achieved naturally, because individuals do not bear the investment costs directly,. The valuation of services from social capital also differs depending on attributes such as age and gender. Younger and older people associate different levels of importance on factors and have different views on life. Therefore, an optimal provision by the government is necessary. Alternatively, for activities with negative impacts, efforts should be made to reduce the burden on the environment using environmental taxes and other measures.

The accumulation of common social capital is costly. The costs are financed by taxes and not all are borne by the beneficiaries. The issue of cost can also be viewed in terms of the scarcity of resources. A choice can be made between using scarce land resources as a place for factory construction or preserving the natural environment.

The wellbeing of an individual, country, or region can be measured using a combination of objective and subjective indicators. However, when objective indicators such as production and consumption increase, the underlying social common capital, such as the destruction of nature, may not be maintained. Given these trade-offs, it is not ideal for social wealth to increase all indicators. The OECD Better Life Index covers 11 areas, including housing, health, and safety. It does not compile a comprehensive index or a country specific ranking of these indicators.

2. Comparative Analysis: Subjective and Objective Indices

2.1 Different Indicators and Coverage in Surveys

In the analysis of well-being and the development of indicators, the aim of this study was how to capture subjective indicators. Well-being, which measures life satisfaction, is a subjective indicator and has different characteristics from objective indicators, such as income, working hours, and years of education. These objective indicators can be measured as they are quantifiable. However, evaluations such as trust among people and their social networks are subjective indicators that vary across people.

It is important to measure the overall well-being of a country or a region. Bhutan proposed Gross National Happiness (GNH) as an alternative to Gross National Income (GNI). The World Happiness Report in Helliwell, Layard and Sachs eds. (2012) was published by the United Nations' Sustainable Development Solutions Network, which examined country rankings. Other reports include the Human Development Index by the United Nations and the Better Life Index by the OECD.

These surveys measure individuals' levels of life satisfaction using questionnaires. However, different surveys use different methods, questions, or numbers of steps for evaluation. This makes it difficult to conduct inter-regional or time-series analyses. Suzuki and Tanabe (2016) provide a detailed discussion of the differences in results due to the choice of statistics and indicators in their survey, pointing out that there is a large variation in subjective well-being among prefectures across surveys. Additionally, Krueger and Schkade (2008) pointed out that answers to subjective questionnaires are likely to depend on feelings at the time of the survey response.

The OECD provides guidelines for creating a well-being index, for instance, OECD Guidelines on Measuring Subjective Well-Being (OECD, 2013). The OECD Guidelines classify questions on subjective well-being into three types depending on the scope, such as the point in time and the subject: *life evaluation*, which is an evaluation of an individual's life; *affect*, which is the degree of emotional satisfaction at a certain point in time; and *subjectivity*, which is the degree of satisfaction at a certain point in time. The third is eudaimonia, or Aristotelism, which asks about the psychological meaning and purpose of life. An example of eudaimonia is the feeling of positivity, optimism, calmness, or loneliness.

The well-being survey by the OECD is summarized in "How's Life? Measuring Well-Being" and various indicators can be found on the OECD website as the OECD Better Life Index (http://www.oecdbetterlifeindex.org/). The OECD also reports on the well-being of regional areas (https://www.oecdregionalwellbeing.org).

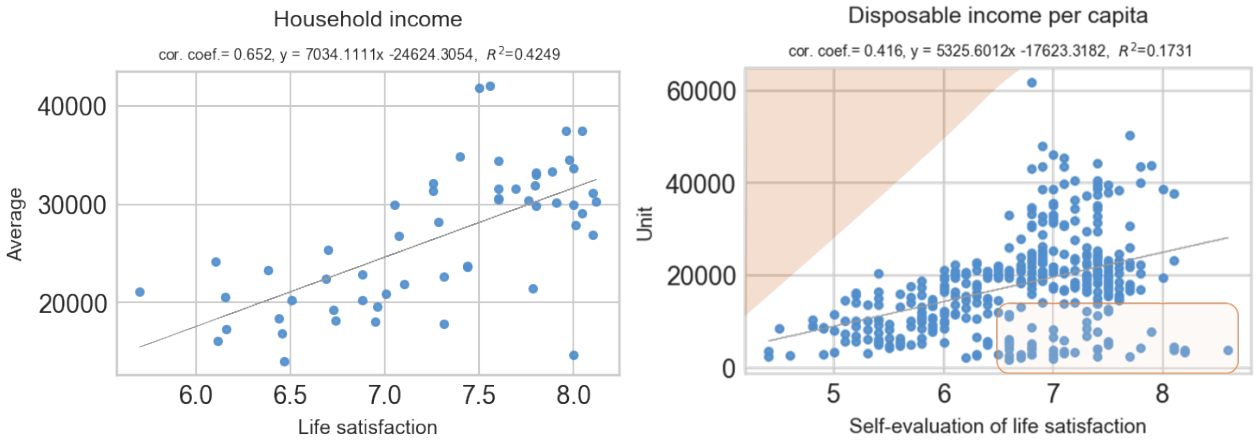
The left panel of Figure 1 shows the results of surveys conducted in 44 OECD countries from 2010 to 2018. The figure shows disposable income (USD in 2015 PPPs per capita) on the vertical axis, and life satisfaction (0–10) on the horizontal axis. The sample periods of the statistics are 2013 and 2018, although some countries (Austria, Mexico, and New Zealand) reported those for 2014. The sample size was 60 and the mean life satisfaction score was 7.25. This figure indicates a relatively strong correlation between income and life satisfaction at the national level.

However, when we look at the values of regional well-being, the results differ at the country

level. Figure 1 shows disposable income per capita (USD at 2010 PPPs per capita) on the vertical axis and self-evaluation of life satisfaction on the horizontal axis. Statistics were obtained from the 2014 survey and covered 392 of the 430 regions. The mean life satisfaction score was 6.66.

Unlike the figure at the country level, there is an asymmetry in the distribution at the regional level. There were no data for the upper-left region. Almost no regions had high income levels and low life satisfaction. However, there are several points in the lower-right region. There are regions where the average satisfaction level is high, even among low-income individuals. Such asymmetry cannot be found in country-level averages, but becomes visible when we deal with detailed regional data.

Figure 1 Comparison of country and regional surveys



Source: OECD Well-being Statistics

Note: The left figure at the country level shows the USD for 2015 PPPs per capita, while the right figure shows the USD for 2010 PPPs per capita. The horizontal axis indicates the level of life satisfaction on a scale from 0 to 10 (11 levels).

2.2 Characteristics of Subjective Indicators

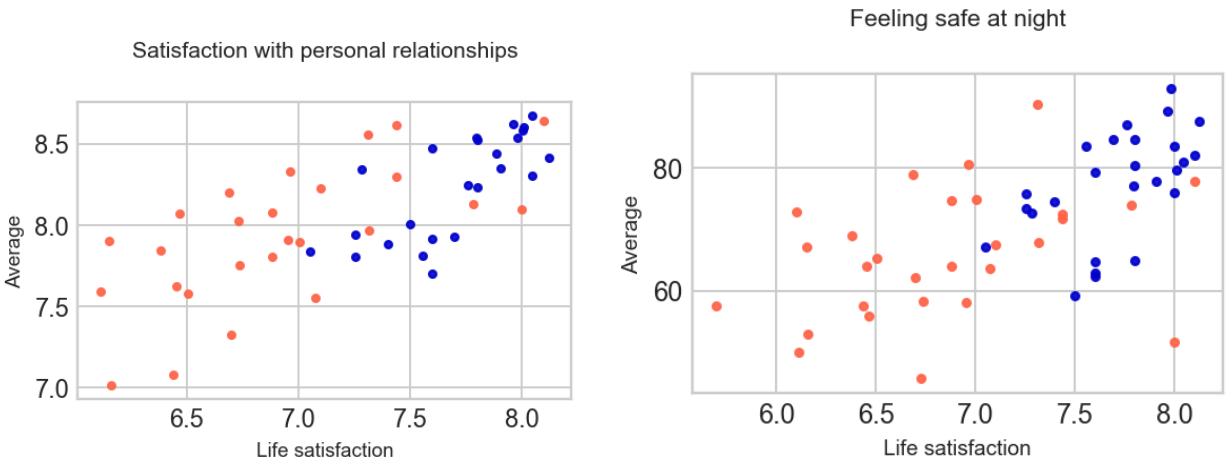
In this section, we examine the relationship between the subjective indicators. Figure 1 shows the relationship between the objective income indicator and the subjective life satisfaction indicator. Figure 2 (left-side) illustrates the relationship between life satisfaction and satisfaction with personal relationships.

When the points in the figure are divided into high-income and low-income categories, the blue high-income countries tend to be in the upper-right region and the red low-income countries tend to be in the lower left. Here, high income is defined as above average, and low income is defined as below average. This figure shows that a higher income may lead to higher subjective indicators.

The right panel of Figure 2 shows the percentage of people who felt safe at night (%). This is a

subjective evaluation. As shown in the left figure, the values for high-income countries are in the upper-right region.

Figure 2　Relationships between subjective indicators: Country level



Source: OECD Well-being Statistics

Note: The vertical axis of the left figure shows the level of satisfaction with personal relationships (0–10 on an 11-point scale), and the vertical axis of the right figure shows the percentage (%) of people who felt safe walking at night.

Further, we assess the situation at the regional level using OECD regional well-being statistics. The left panel of Figure 3 shows the relationship between the percentage of people who had someone they could consult when they had a problem (%), and their life satisfaction levels. Here, the points are divided into four quadrants and color-coded based on the level of disposable income per capita: Qu1H is the highest-income region, Qu4L is the lowest-income region, and Q2 and Q3 are middle-income regions.

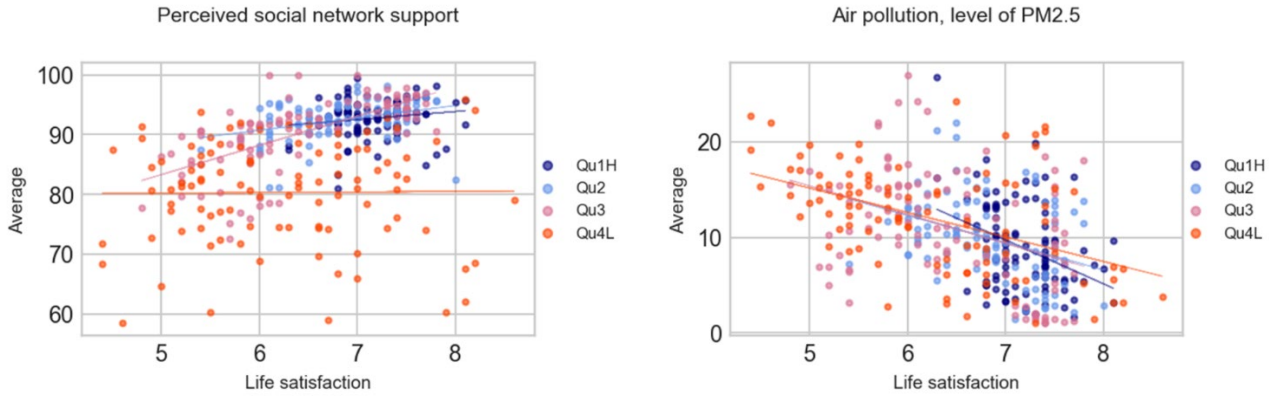
In the left panel of Figure 3, the points for the high-income regions are plotted in the upper right region. However, the points in low-income areas were scattered. As shown in Figure 1, there were areas with high life satisfaction, including those with low social network support. This asymmetry also exists in other indicators. As expected, a high income level affects life satisfaction, but it also suggests that there are factors that increase well-being regardless of the income level.

Regional well-being statistics include an index of the natural environment measured by PM2.5. A similar scatterplot is shown on the right side. Interestingly, the natural environment was correlated with life satisfaction, even in low-income areas of Qu4L. The natural environment is related to life satisfaction without being affected by the income level.

We examine the characteristics of the subjective indicators by comparing OECD country data

with regional data. It is suggested that subjective indicators are affected by economic conditions such as income. However, some indicators, such as the natural environment, affect people's well-being independent of income level.

Figure 3 Relationships between subjective indicators: Regional level



Source: OECD Well-being Statistics

Note: The vertical axis of the left figure shows the percentage (%) of people who answered yes to the question of whether they have someone they can consult (perceived social network support), and the vertical axis of the right figure shows the PM2.5, level (micrograms (μg) per cubic meter) in the region.

3. Data Analysis: Religion, Age and Economy

In this section, we explain Tsuri's (2022) main results. Although overall well-being is influenced by economic conditions, it also depends on social capital such as social connections, culture, and the natural environment. Therefore, we analyzed the extent to which these factors affect well-being. Specifically, we clarified the relationship between objective indicators of consumption and income, and subjective indicators of life satisfaction.

The main results of the analysis are as follows. The relationship between well-being and prefectural characteristics is examined to develop an index of regional well-being. However, the results show that regional differences are not caused by regional characteristics, but by age structure. Overall, in Japan, differences in age structure and income levels lead to differences in life satisfaction by prefecture. Nevertheless, differences in environmental factors, such as weather, may impact well-being.

Significant differences were found in the factors influencing well-being. Social factors (social connections or support) positively influenced well-being in all generations, but the strength of their influence differed by generation and gender. For those aged 60 years and above, well-being

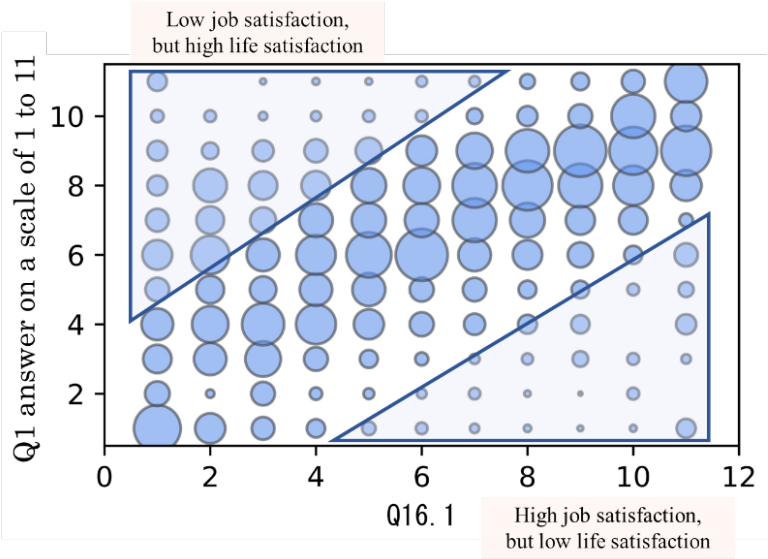
increased with work time (i.e., less work). The economic situation is also important for older generations, but due to budget constraints, income level influences well-being more than consumption.

We analyzed the relationships between a survey of subjective indicators and objective economic statistics. Subjective indicators such as life satisfaction were obtained from the 2019 and 2020 surveys of the Well-Being Survey and Quality of Life (WSQL) by the Cabinet Office, Japan, a large-scale survey in Japan. Individual data (approximately 15,000) from this survey were combined with other economic statistics by prefecture (47 prefectures) and age group (14 classes).

Figure 4 shows the relationship between life satisfaction (Q1) and job satisfaction (Q16.1). The question is asked on an 11-point scale, with 0 being "not at all satisfied" and 10 being "very satisfied.

Interestingly, the asymmetry in Figure 4 is found, as in the OECD Regional well-being. When job satisfaction was high, Q1 was less likely to be low. However, Q1 may be high even when job satisfaction is low. A subjective measure of job satisfaction can complement the objective measure of income levels. That is, a high income can be satisfied with a low satisfaction, but not vice versa.

Figure 4 Relationships between job satisfaction and life satisfaction: Individual data



Source: The Cabinet Office, Japan, *Well-being Survey and Quality of Life, 2019* and 2020
Note: Q16.1 asks, "How satisfied do you feel about your job?" The original answer is 0–10. Q1 asked, "Overall, how satisfied are you with your current life?" Q1 was answered on a scale of 1 to 11.

Statistics on income and consumption were obtained from the 2019 National Survey of Family Income and Expenditure (NSFIE) 2019 by the Ministry of Internal Affairs and Communications. The NSFIE is a large-scale survey for which individual data are available. Since household

statistics are for households, it is necessary to estimate and obtain the intra-household allocations of individuals to family members. We estimate the values for each age group independently from publicly available prefectural statistics.

We adopted the relative income hypothesis by Clark, Frijters and Shields (2008). Oshio and Urakawa (2012) examined the relative hypothesis in Japan and obtained results consistent with it. In this study, the consumption expenditure/disposable income ratio was used as the main explanatory variable. The utility-maximization problem in economics concerns the utility obtained from consumption, where income is a budget constraint.

The results of the analysis are presented at the beginning of this section (see Tsuri (2022) for detailed analysis). Table 1 summarizes the various indicators that affect well-being, based on the analysis results. In addition to age and region, social capital and common social capital are classified in this table. Additionally, there are several y overlapping items between social common capital and social capital, as well as between social capital and private capital. Therefore, the classification in this table is conceptual.

The elements classified as private capital in Table 1 correspond to consumption and investment issues, which are the subjects of analysis. Subjective life satisfaction is not the same, even at the same income level, because different countries have different economic systems (e.g., capitalism), labor systems, and practices. In addition, these factors differ depending on the age and working conditions.

Table 1　Factors in well-being analysis

<table>
<tr><th colspan="2" rowspan="2">Factors</th><th colspan="3">Time or Age</th><th rowspan="2">Exogenous factors</th></tr>
<tr><th>Old or Young</th><th>Present or Woking</th><th>Future or Retired</th></tr>
<tr><td rowspan="3">Private Capital</td><td rowspan="3">Economy</td><td colspan="2">Consumption</td><td></td><td rowspan="3">Capitalism
Labor Systems
and Practices</td></tr>
<tr><td colspan="2">Income (Capital, Labor)</td><td rowspan="2">Withdrawal of savings</td></tr>
<tr><td colspan="2">Capital, Savings, Investment</td></tr>
<tr><td rowspan="2">Social common capital</td><td rowspan="3">Human capital
Health, and Insurance
Social system</td><td colspan="2">Education,</td><td></td><td rowspan="4">Education System
Insurance system
Politics and Administration
Region, Climate</td></tr>
<tr><td colspan="3">Health insurance, Pension insurance</td></tr>
<tr><td>Social capital</td><td colspan="3">Children's benefit, Education, Job training</td></tr>
<tr><td></td><td>Environment
Culture</td><td colspan="3">Natural Environment, Living Environment
Sports, Music, Arts, Social connections</td></tr>
</table>

4. Concluding Remarks

Although social common capital and social capital are almost synonymous, it is appropriate to

distinguish them from private capital. Public sector institutional factors (institutional capital), such as social security, education, and political systems, affect people's lives. Local cultural capital and the natural environment, which are not privately owned, are also important factors influencing regional well-being.

The level of regional well-being is based on economic conditions such as income and consumption, but also depends on other social common capital or social capital. Among these, nature, social connections, and cultural and social environments directly affect well-being, regardless of economic factors, as they are related to the living environment. The subjective life satisfaction responses differed according to age. There were differences in the social environments of each generation.

The economic impacts differ between those who benefit from them and those who do not. Some people did not appreciate visitors from other regions. However, the Setouchi Triennale, for example, can contribute to the accumulation of social capital not only during the festival but also in the long term. Not only does it contribute to the building of diverse cultural capital in the region but also promotes people's interactions and connections in the community. Social capital also contributes to well-being. This leads to the maintenance of the natural environment. The analysis in this study indicates that regional well-being can be improved by the long-term accumulation of social capital.

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