



ARTICLE



<https://doi.org/10.1057/s41599-021-01011-5>

OPEN

Opposition in Japan to the Olympics during the COVID-19 pandemic

Takumi Kato ¹ 

Little is known about the responses of citizens toward sporting mega-events held during a period of extended disasters, such as the 2020 Olympics held during the COVID-19 pandemic. This study aims to clarify the factors affecting citizens' attitudes by testing the following hypotheses: the perception of high cost, the burden on medical institutions, and high risk of infectious disease spread negatively affect attitudes, while the perception of pandemic countermeasures, economic benefits, and athletes positively affect attitudes. Based on an online survey of 800 citizens before the 2020 Olympics, the hypotheses were tested using logistic regression models with the extracted factors as the explanatory variables and the attitude toward the Olympics as the objective variable. The test results confirm the factors lined by the hypotheses, except for the perception of high cost. The fear of a healthcare system collapse from the medical burden of dealing with an outbreak has an especially strong negative effect on the attitude toward the Olympics. These results have important implications for city governments and municipalities and suggest that they should not underestimate citizens' perceptions and attitudes when organizing mega-events and formulating proper communication. Further, the results may offer insights for the smooth strategic planning of large-scale events during unprecedented disasters.

¹Saitama University, 255 Shimo-Okubo, Sakura-ku, Saitama 338-8570, Japan. email: takumikato@mail.saitama-u.ac.jp

Introduction

The Olympics and Paralympics (hereinafter called the Olympics) are sporting mega-events that are held once in four years and involve large-scale collaboration among international and local governments, as well as private corporations in the host country. For host countries, the Olympics is an opportunity to improve their urban functions (Agha et al., 2012; Essex and Chalkley, 1998; Ogura, 2018), achieve economic benefits (Chong and Hui, 2013; Ferreira, 1998; Rose and Spiegel, 2011; Vierhaus, 2019), and strengthen the “city brand” (Berkowitz et al., 2007; Bondonio and Guala, 2011; Gries et al., 2010; Panagiotopoulou, 2012).

After winning its bid in 2013, Tokyo became the first city in Asia to host the Olympics twice (BBC, 2013). Its purpose to hold it the second time was to recover from the economic shock of the Great East Japan Earthquake and Fukushima nuclear accident in 2011 (Duignan, 2021; Ichii, 2019), as well as to continue branding Japan as one of the most technologically advanced countries in the world (Kassens-Noor and Fukushige, 2018). The positive attitude toward Tokyo’s second hosting changed after the 2019 outbreak of coronavirus diseases (COVID-19). Once the World Health Organization declared COVID-19 a pandemic on March 11, 2020 (Time, 2020), the Olympics had to be postponed to 2021 (The Tokyo Organising Committee of the Olympic and Paralympic Games, 2020).

It has been over a year since the pandemic, and while there are signs of recovery, the disease continues to spread globally through its various mutated strains. Furthermore, the economy, mainly in the United States and China, is ready to recover (The World Bank, 2021). Even in the perception of cautious corporate executives, the pandemic, especially in developed countries, is not expected to radically change much (McKinsey and Company, 2021). However, the vaccination campaign in Japan has been delayed compared to other developed countries. By July 11, 2021, about 2 weeks before the opening of the Olympics, only 18% of the country’s population had been fully vaccinated (BBC, 2021). Considering the increasing number of infected people and the heavy burden on medical institutions, the Japanese government issued a fourth emergency declaration in Tokyo from July 11 to August 22, a period that included the full duration of the Olympics (NHK, 2021). The International Olympic Committee (IOC) has stated that

Despite all care taken, risks and impacts may not be fully eliminated, and therefore you agree to attend the Olympic and Paralympic Games at your own risk (International Olympic Committee [IOC], 2021).

Consequently, citizens began to take a negative attitude toward the event. According to Ipsos’ (2021) poll, 48% of respondents in the US, 58% in France, 59% in China, and 78% in Japan are opposed to the event.

The Olympics is an expensive mega-event, which makes careful strategy and communication crucial to obtain the support of the public even under normal circumstances (Waite, 2001). The needs of citizens must be understood and limited public resources should be allocated appropriately (Wang and Bao, 2018). While the literature discusses factors influencing citizens’ attitudes toward the Olympics (Boykoff and Gaffney, 2020; Lu et al., 2019; Prayag et al., 2013; Sato et al., 2020; Zhang and Zhao, 2009), little is known about hosting such events during a global crisis such as a pandemic. The postponement of the Olympics itself is unprecedented (Ivanović, 2020). Therefore, this study makes a novel contribution by clarifying the factors that influence attitudes toward hosting a mega-event during a catastrophe. The results herein should provide useful suggestions for organizers and

governments to ensure strategic planning and efficient communication with citizens.

Literature review and hypothesis

Olympic effects. Despite the expenses of hosting the Olympics, countries vie for this opportunity because of its purported economic, cultural, and social benefits, such as an increased awareness of health and well-being through sports (Weed et al., 2015). The number of medals that a country earns in the Olympics is also said to reflect the economic scale of the country (Choi et al., 2019). In fact, the “host effect” often ensures that the host wins more medals than its economic scale would otherwise allow (Contreras and Corvalan, 2014). The Olympics, being a multinational event, is also an opportunity to improve national policy and diplomacy.

The literature identifies three concrete effects of the Olympics:

- *Strategic development of urban functions:* The Olympics is a major catalyst for the evolution of cities and urban development strategies (Essex and Chalkley, 1998). The IOC requires cities bidding for the Olympics to develop legacy strategies that generate sustainable assets after the event (Agha et al., 2012). Hence, host countries are required to have the ability to implement the Olympic legacy more strategically (Hoff et al., 2020). Recently, the Committee has stressed the need to ensure the event is environment-friendly, especially in the transportation and building maintenance (Long et al., 2018). For example, as part of its preparations for the 2008 Olympics, Beijing successfully reduced the number of deaths and outpatients by reducing air pollution through environmental clean-up activities (Brajer and Mead, 2003; Schleicher et al., 2011; Yang et al., 2010). Other examples are becoming more foreigner-friendly (Lund, 2015) and implementing urban designs to make services accessible to persons with disabilities (Ogura, 2018).
- *Economy:* The Olympics attracts tourists and businesses worldwide (Ferreira, 1998). It has been shown that from 8 years before the event to 16 years after it, the arrival of foreign tourists to a host country increases significantly (Chong and Hui, 2013; Vierhaus, 2019). Sponsorship of the Olympics also stimulates the export industry, and not because of the hosting of the event itself; once a country is settled to host the Olympics, information about the country is better disseminated around the world (Rose and Spiegel, 2011).
- *City brand:* In any mega-event, the host country is expected to promote its “brand,” which includes its industrial and cultural history (Kassens-Noor and Fukushige, 2018; Panagiotopoulou, 2012). For example, Turin is said to have transformed into an internationally recognized “cultural city” once it hosted the 2006 Winter Olympics (Bondonio and Guala, 2011). The 2008 Beijing Olympics also allowed China to promote its brand globally (Berkowitz et al., 2007). Gries et al. (2010) goes as far as arguing that current US anxieties about the growth of China can be attributed to the 2008 Olympics when global interests were exposed to more information about China. Simultaneously, regional companies also benefit from the exposure and opportunities to disseminate brand information to the world. Yazdanparast and Bayar (2020) state that Olympics sponsorship increases brand value over time, while Edwards (2016) holds that such events increase a sense of “inner branding,” which, in turn, increases

employees' pride in the organization and corporate social responsibility (Edwards, 2016).

Factors of citizens' attitude toward the Olympics. While the Olympics can benefit urban development, it is difficult to make the local population fully agree to host the event (Waitt, 2001). National and local governments encounter citizen dissatisfaction when they develop policies and communications that are at odds with the needs and expectations of citizens (Boykoff and Gaffney, 2020; Zhang and Zhao, 2009). Therefore, understanding the factors that influence citizens' attitudes at an early stage is important. At such times, more attention should be paid to factors that affect dissatisfaction rather than satisfaction because the negative effect of dissatisfaction on governments and public services is greater than the positive effect of the same degree of satisfaction (Olsen, 2015).

The most evident negative aspect of hosting the Olympics is the expenditure. For instance, the 2020 Tokyo Olympics is expected to be the most expensive in history, reaching a whopping cost of US \$15.4 billion, including an unprecedented deferral cost of US\$2.8 billion (Boykoff and Gaffney, 2020; Lies, 2021). On account of such high costs, and respecting the results of referenda, cities have been known to withdraw from the bidding process (Bason and Grix, 2018). Thus, Hypothesis 1 is derived as follows:

H1: Perception of high cost influences the negative attitude toward hosting the Olympics.

Infectious diseases are a threat to all people. It has long been argued that the Olympics, which generates large-scale population influxes, increases the risk of infectious diseases, especially of those that are rare in the country (McNulty et al., 2003; Nakamura et al., 2018). The severity of the COVID-19 pandemic has caused great uncertainty and debate about the Olympics (Gold and Gold, 2021), particularly among medical institutions, which will be expected to bear the brunt of outbreaks. To minimize the effects of COVID-19, the burden on medical institutions should be reduced (Miller et al., 2020), which forced the Japanese government to issue its fourth emergency declaration in Tokyo (NHK, 2021). Thus, Hypotheses 2 and 3 are derived as follows:

H2: Perception of a high risk of infectious diseases influences the negative attitude toward hosting the Olympics.

H3: Perception of concerns about the burden on medical institutions influences the negative attitude toward hosting the Olympics.

On the other hand, the economic effects mentioned in the section "Olympic effects", which are identified from previous studies, can also be factors that foster a positive attitude (Chong and Hui, 2013; Ferreira, 1998; Rose and Spiegel, 2011; Vierhaus, 2019). Further, the economic effects as perceived by citizens may also influence their attitude toward the Olympics (Prayag et al., 2013). However, cancelling the Olympics is expected to have adverse economic consequences (Hoang et al., 2020). Thus, Hypothesis 4 is derived as follows:

H4: Perception of economic effects influences the positive attitude towards hosting the Olympics.

Since the beginning of the pandemic, scientists and doctors have accumulated greater scientific knowledge about COVID-19; both the dangers and countermeasures are a matter of public debate (Ludvigsen and Parnell, 2021; Mann et al., 2020; Parnell et al., 2020; Wong et al., 2020). Even among Japanese citizens, governments have been inundated with applications for PCR tests

and vaccination (Japan Times, 2020b; Mainichi, 2021a), and expectations for these measures have increased. Thus, Hypothesis 5 is derived as follows:

H5: Perception of countermeasures for COVID-19 influences the positive attitude towards hosting the Olympics.

Another positive factor is the expectation related to Olympians. The postponement of the 2020 Tokyo Olympics has already meant retirement and a permanent loss of opportunity for some athletes (Taku and Arai, 2020). If the Olympics is cancelled, players who have prepared for years in advance will be deprived of an opportunity to participate in a historic event. Thus, Hypothesis 6 is derived as follows:

H6: Perception of athletes influences the positive attitude toward hosting the Olympics.

These six hypotheses are tested to determine the factors that influence the opposition to hosting a mega-event. These factors have previously not been clarified in the context of a pandemic. There already exist studies on the risk of infection in the Olympics from the perspective of medical professionals (Gold and Gold, 2021; McNulty et al., 2003; Miller et al., 2020; Nakamura et al., 2018). Through this study, the same attitude is shown from the perspective of citizens.

Method

Survey. This study uses a discontent survey for COVID-19, provided by Insight Tech Ltd. via the IDR Dataset Service of the National Institute of Informatics (Insight Tech Ltd., 2021). An online survey was conducted in Japan on January 10, 2021. The valid response data of 800 participants—200 each from the age groups of the 20s, 30s, 40s, and 50s—were used for the analysis to avoid age group biases. This eliminates the risk of overestimating or underestimating the opinions of a particular age group. The main questions included 10 items that collected information on (1) gender, (2) age, (3) marital status, (4) number of children, (5) annual income, (6) residential area, (7) impressions of the press regarding COVID-19, (8) prediction for the end of COVID-19, (9) attitude toward the Tokyo Olympics 2020, and (10) reason for (9). Items (1)–(6) are questions about the respondents' attributes. The distributions are listed in Table 1. Items (7) and (8) are psychological state questions that could affect attitudes toward the Olympics. Item (9) is the objective variable of this study and determined support or opposition. Finally, the open-ended question in (10) was used to extract the factors of attitude toward the Olympics. By not presenting options for item (10), an evaluation that was not biased or limited by the researcher's hypothesis was obtained.

Factor extraction. To extract the factors from the reasons for the attitude toward the 2020 Tokyo Olympics, natural language processing was used. As shown in Table 2, seven factors and five words in this category were defined based on the frequency of their appearance in the data. The first factor was related to the cost of hosting the Olympics (H1). The second and third factors were related to infectious diseases (H2). The fourth was related to medical institutions (H3), the fifth to economic effects (H4), the sixth to COVID-19 countermeasures (H5), and the seventh to athletes (H6). Five of the most frequent nouns and adjectives related to each factor were set as words. When any of these registered words were detected in the text, the mentioned flag (0/1) of the corresponding factor was added. Therefore, if multiple words belonging to the same factor were mentioned multiple times in one text, the flag remained 1 (i.e., the number of occurrences was counted as 1). As shown in Table 2, the most frequent factor was

Table 1 Distribution of respondent attributes.

Item	Breakdown	Number of respondents	Item	Breakdown	Number of respondents
Gender	Male	357	Annual income (million yen)	Tohoku	38
	Female	443		Kanto	301
Age	20s	200		Chubu	142
	30s	200		Kinki	185
	40s	200		Chugoku	34
	50s	200		Shikoku	14
				Kyusyu	55
Marriage status	Married	458		Up to ¥2m	123
	Unmarried	342		¥2m–¥4m	174
Number of children	Zero	431		¥4m–¥6m	228
	One	148		¥6m–¥8m	127
	Two	171		¥8m–¥10m	74
	Three or more	50	¥10m and above	74	
Residential areas	Hokkaido	31			

Table 2 Factor definitions and number of people mentioning each factor.

Factor	Word 1	Word 2	Word 3	Word 4	Word 5	Number of people mentioned
F1_Cost	Cost	Budget	Tax	Money	Investment	34
F2_Infection	Infection	Pandemic	Corona	Virus	COVID-19	357
F3_Movement	Movement	Traffic	Foreigner	Tourist	Sightseeing	70
F4_MedicalFacility	Medical institution	Medical staff	Treatment	Medical Collapse	Life	42
F5_Economy	Economy	Economic effect	Revitalization	Economic Blow	Economic Loss	36
F6_Countermeasures	Countermeasures	PCR	Inspection	Quarantine	Vaccine	44
F7_Athlete	Athlete	Sport	Training	Practice	Effort	29

Table 3 Variable list and statistics.

No.	Variable	Description	Mean	SE
1	Opposition	Dummy of opposition to hosting the Olympics	0.803	0.014
2	Female	Dummy of female	0.554	0.018
3	Age	Age (1: 20s, 2: 30s, 3: 40s, 4: 50s)	2.500	0.040
4	Married	Dummy of married	0.573	0.018
5	Children	Number of children (0: Zero, 1: One, 2: Two, 3: Three or more)	0.800	0.035
6	Income	Annual income (1: up to ¥2m, 2: ¥2–4m, 3: ¥4–6m, 4: ¥6–8m, 5: ¥8–10m, 6: 10m and above)	3.096	0.052
7	Tokyo	Dummy of Living in Tokyo	0.154	0.013
8	ExcessiveInformation	Dummy of aversion to media over-information	3.238	0.037
9	Prediction	Expected period until the end of corona (1: end of March, 2: end of April, ..., 10: end of December, 11: next year, 12: never end)	10.078	0.099
10	F1_Cost	Factor mention dummy of F1_Cost	0.043	0.007
11	F2_Infection	Factor mention dummy of F2_Infection	0.446	0.018
12	F3_Movement	Factor mention dummy of F3_Movement	0.088	0.010
13	F4_MedicalFacility	Factor mention dummy of F4_MedicalFacility	0.053	0.008
14	F5_Economy	Factor mention dummy of F5_Economy	0.045	0.007
15	F6_Countermeasures	Factor mention dummy of F6_Countermeasures	0.055	0.008
16	F7_Athlete	Factor mention dummy of F7_Athlete	0.036	0.007

SE standard error.

F2_Infection, which was detected in 357 out of 800 responses. McCab, the Japanese open-source software, was used for morphological analysis, and CaboCha was used for parsing.

Hypothesis verification. The hypotheses were verified by logistic regression models in which the objective variable was a dummy of opposition to hosting the Olympics (No. 1 in Table 3); the control variables were the attribute and psychological variables (Nos. 2–9), and the explanatory variables comprised the factor mentioning the dummies (Nos. 10–16). Note that when 800 (the number of respondents) is multiplied by the mean of the factor dummies in Table 3, this equals the total number in Table 2. Accordingly, three models were built: Model 1 with all variables adopted, Model 2 with variable

selection by the stepwise method, and Model 3 with all variables adopted after the objective variables were balanced. As shown in Table 3, the objective variable of this study—the dummy of opposition to hosting the Olympics—is unbalanced, with an average of 0.803. In other words, the number of positive respondents (opposition) is 642 and the number of negative respondents (proposition) is 158. Hence, the data of 300 respondents randomly sampled from each of the 150 respondents were used in Model 3. Then, based on McFadden’s pseudo- R^2 /adjusted McFadden’s pseudo- R^2 , the hypotheses were tested from the results of the most suitable model. These indices have values from 0 to 1, although a value from 0.2 to 0.4 implies an excellent fit (Hensher and Stopher, 1979).

Results

The opposition ratio to hosting the Olympics was 80.3%, as shown in Table 3. This result is quite close to the 78% reported by (2021). By age groups, the following results were obtained: 20s: 82.0%, 30s: 82.5%, 40s: 76.5%, and 50s: 80.0%. Specifically, negative attitudes can be confirmed in all age groups. Figure 1 shows the results by region; no significant difference exists between the Kanto region, which includes Tokyo, and other regions. The number of respondents in each region is listed in Table 1. Basically, before the event was held, no bias was observed in a specific region, and Japan, in general, has a similar attitude toward the Olympics.

Table 4 shows the correlation of the factors extracted from the reasons for the attitude toward the 2020 Tokyo Olympics. The factor most correlated with opposition was F2_Infection, followed by F3_Movement, and F4_MedicalFacility. A positive correlation exists between F2_Infection and F4_MedicalFacility, where both tend to be mentioned together. However, this simple correlation is difficult to confirm.

Table 5 presents the results of the logistic regression model. When the conformity indices were confirmed, they exceeded the standard value in all models, indicating the validity of the models. Among them, McFadden’s pseudo- R^2 showed the highest value of 0.314 in Model 3 using balanced data. Hence, the subsequent discussions are focused on Model 3. The estimated values were almost the same in all models, and the hypothesis verification results did not fluctuate.

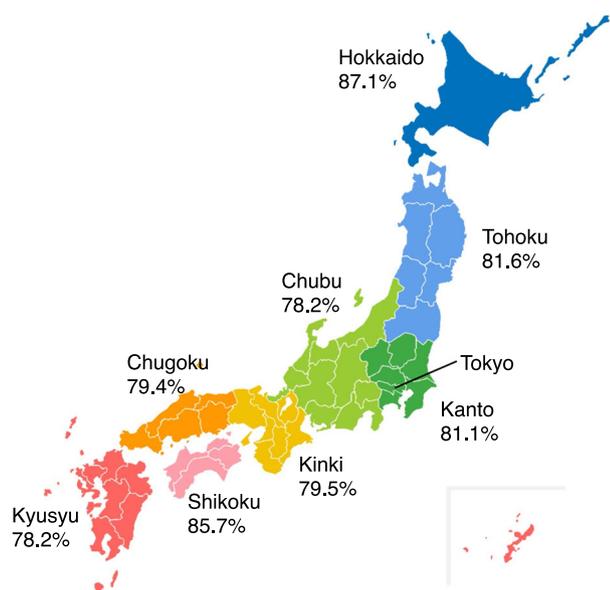


Fig. 1 Opposition rate for holding the Olympic Games by region.

The results of each hypothesis were confirmed. Hypothesis H1 was rejected because F1_Cost was not significant at the 5% level. F2_Infection and F3_Movement, factors related to perception of infectious spread, were significant, and H2 was thus supported. Since F4_MedicalFacility, F5_Economy, F6_Countermeasures, and F7_Athlete were all significantly estimated in the direction (positive/negative) of the hypotheses, it was concluded that H3, H4, H5, and H6 were supported. Basically, all hypotheses other than H1 were supported.

Discussions

In this study, the factors that influence the attitude toward hosting the Olympics were clarified. In particular, factors that have a negative effect—perception of high cost, high risk of infectious diseases, and concern about the burden on medical institutions—as well as a positive effect—perception of COVID-19 countermeasures, economic effects, and athletes—were examined.

The factor with the greatest influence was F4_MedicalFacility, with an odds ratio of 20.728. Thus, it is possible to conclude that respondents felt that the potential collapse of the healthcare system if the Olympics proved to be a super-spreader event was reason enough to oppose the event. Respondents who were asked about their negative attitudes expressed stronger negative effects than those who made direct statements about infection. Regarding factors of infection, it was also found that the odds ratio with F3_Movement was as high as F2_Infection.

In contrast, F1_Cost had no significant effects. The cost of hosting the Olympics continues to rise, and the event has been criticized for putting cities at great risk (Asahi, 2020; Bason and Grix, 2018). The issue of the Olympics’ increasingly luxurious budget has been a sore point among critics for a long. For example, as shown in Fig. 2, the new national stadium for the Olympics came under criticism by citizens, which forced the organizers to simplify the design (Guardian, 2015). The added burden of ensuring COVID-19 countermeasures has also increased the cost of hosting the event (Boykoff and Gaffney, 2020; Lies, 2021). However, the results herein show that cost is not a major factor in the negative attitude toward the Olympics; instead, the effect of medical treatment and infection was found to be stronger. Sato et al. (2020) show that public opinion about the Olympics is mixed; some citizens feel that the event should continue, given the large upfront investments already made. Thus the “pros” and “cons” of hosting the event may have cancelled out.

Another positive and significant factor was the economic effect. Most discussions on the economic benefits of the Olympics take a professional economic perspective (Hoang et al. 2020; Chong and Hui, 2013; Ferreira, 1998; Prayag et al. 2013; Rose and Spiegel, 2011; Vierhaus, 2019). The results of this study confirm that even citizens tend to have a positive attitude toward the Olympics in this regard. Although many reports exist on the adverse side

Table 4 Correlation matrix.

No.	Variable	1	2	3	4	5	6	7
1	Opposition							
2	F1_Cost	-0.004						
3	F2_Infection	0.300***	-0.040					
4	F3_Movement	0.120***	-0.021	0.025				
5	F4_MedicalFacility	0.103**	0.117***	0.014	0.026			
6	F5_Economy	-0.180***	0.044	-0.025	-0.046	0.030		
7	F6_Countermeasures	-0.046	-0.051	0.015	0.003	0.066	-0.026	
8	F7_Athlete	-0.072*	-0.041	-0.053	-0.036	0.044	-0.042	0.012

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Table 5 Results of the logistic regression model.

Variable	Model 1			Model 2			Model 3		
	Odds ratio	SE	p-value	Odds ratio	SE	p-value	Odds ratio	SE	p-value
(Intercept)	1.195	0.610	0.770	1.279	0.533	0.644	0.226	0.920	0.106
Female	1.930	0.219	0.003 **	1.907	0.211	0.002 **	2.799	0.317	0.001 **
Age	1.036	0.109	0.745				1.163	0.153	0.324
Married	1.027	0.276	0.923				0.747	0.401	0.468
Children	0.800	0.135	0.097	0.816	0.102	0.045 *	0.825	0.195	0.041 *
Income	0.990	0.076	0.900				1.085	0.115	0.476
Tokyo	1.304	0.311	0.394				0.945	0.464	0.902
ExcessiveInformation	0.700	0.107	0.001 **	0.697	0.106	0.001 **	0.696	0.152	0.017 *
Prediction	1.221	0.033	0.000 ***	1.217	0.033	0.000 ***	1.173	0.048	0.001 **
F1_Cost	0.939	0.495	0.898				0.811	0.746	0.779
F2_Infection	7.029	0.262	0.000 ***	6.870	0.260	0.000 ***	7.658	0.344	0.000 ***
F3_Movement	4.823	0.631	0.013 *	4.767	0.628	0.013 *	9.373	0.748	0.003 **
F4_MedicalFacility	18.761	1.063	0.006 **	18.178	1.057	0.006 **	20.728	1.272	0.017 *
F5_Economy	0.182	0.457	0.000 ***	0.177	0.450	0.000 ***	0.120	0.860	0.014 *
F6_Countermeasures	0.391	0.419	0.025 *	0.403	0.410	0.027 *	0.172	0.700	0.012 *
F7_Athlete	0.335	0.465	0.018 *	0.345	0.460	0.021 *	0.306	0.757	0.018 *
AIC	633.028			618.548			323.307		
McFadden's pseudo-R ²	0.252			0.250			0.314		
Adjusted McFadden's pseudo-R ²	0.201			0.220			0.218		

SE standard error.
 ***p < 0.001; **p < 0.01; *p < 0.05.



Fig. 2 Initial design proposal (upper) and construction after design change (lower) at the national stadium (Japan Times, 2015).

effects of vaccines (Asahi, 2021; Blum, 2021; Reed, 2021), about 90% of citizens in Japan want vaccination (Japan Times, 2021). Hence, the perception of COVID-19 countermeasures, such as vaccination, has normally a positive effect.

For the attributes of citizens, it was found that women are more likely to oppose the event than men, while those with more children were more likely to support the event. This result was gleaned from the reason for the attitude, that is, “I want to show

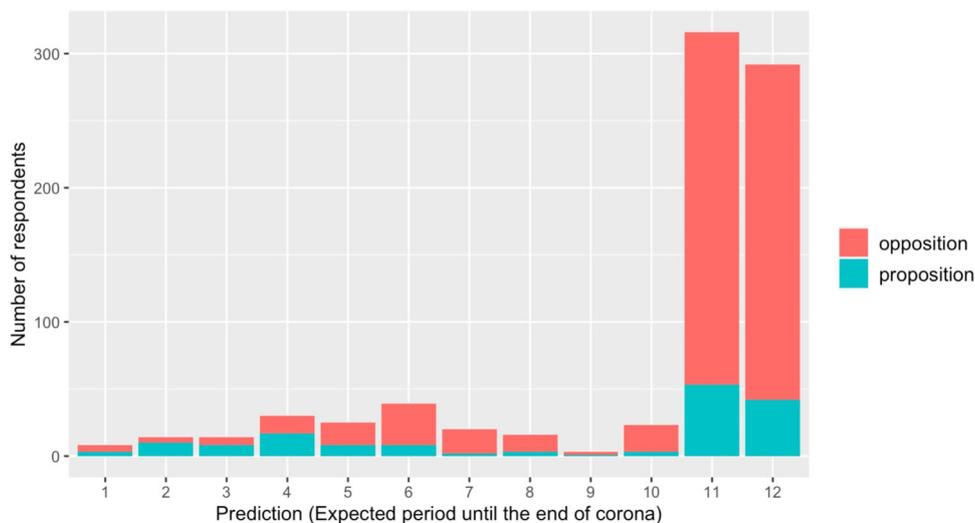


Fig. 3 Attitude toward the Olympics by the answer of the expected period until the end of COVID-19.

my children the Olympics held in our country, which is likely to never happen again in their life.” Basically, the factor of family composition is considered to have a greater influence than that of age group. Among the psychological factors, ExcessiveInformation shows a negative effect; that is, those who feel that the media coverage of COVID-19 is excessive are likely to support the event. It is already known that the media influences the attitude and changes in attitude of citizens (Lu et al., 2019). However, it is presumed that consumers were not affected as the media expected—which was to over-incite anxiety—and that they adopted a negative view of the attitude of the media. In addition, the variable Prediction showed a positive and significant result against opposition to the event, and it was found that respondents with an already-pessimistic outlook of the pandemic tended to oppose the Olympics. As shown in Fig. 3, the data of all 800 respondents show that as many as 36.5% of the respondents believed the pandemic would “never end.”

As noted previously, the factors that influence the support or opposition to the Olympics have never been clarified from the perspective of citizens. This lack of data manifests as a limitation in the strategic planning of governments and municipalities, which often prioritizes “experts” over “laypeople.”

The verification presented in this study confirmed all but one hypothesis, namely, the perception of high cost. These results help us understand the attitudes of citizens toward the target event, the corresponding factors, and the importance of formulating an appropriate communication strategy. If these aspects are neglected, it is possible that the benefits of hosting the Olympics would be reduced. National and local governments must remember that collaboration with citizens is essential for the success of place branding.

Implications and limitations

The results of this study have two major implications. First, governments and municipalities should not underestimate citizens’ attitudes when planning mega-events. Despite the long history of product and service branding, place/destination branding is a recent concept (Anholt, 2008; Blain et al., 2005). Collaboration with citizens is essential for the success of place branding. However, although citizens are not passive beneficiaries, co-producers, of public services and policies, their priority has been underestimated (Braun et al., 2013). As indicated in this study, the 2020 Olympics reflects this neglect, especially before the event. Indeed, 80.3% were opposed to the Olympics, which forced the organizers to hold the event

without spectators (NBC Sports, 2021). However, note that the 2021 Nippon (Japan) Professional Baseball Organization season was held and an average of 8967 spectators per game were recorded by July 14, 2021 (NPB, 2021). One of the reasons for this contradiction is that it was not possible to understand the factors behind the attitudes of citizens. The backlash from citizens is unavoidable when there is a disagreement between the organizers of the mega-event and the public (Zhang and Zhao, 2009).

Second, simple indicators/declarations should be designed by identifying important factors. In management, indicators should not be complicated, and simplification is one of the top priorities (Ashkenas, 2007). Thus, as shown in this study, designing indicators and declarations by first considering the factors that lead to negative attitudes of citizens, in addition to scientific effectiveness, is necessary. The results revealed that, during a pandemic, concerns about medical collapse have a major influence on negative factors. COVID-19 is far more curable than other infectious diseases, such as SARS and MERS, but only if appropriate medical treatment is received; this fact is more likely to be considered by people (Acko, 2021). Therefore, it is important to dispel concerns about the strength of medical institutions by transparently sharing information on hospital capacity and the future outlook of medical institutions. In reality, the indicators and declarations pertaining to COVID-19 were shared haphazardly, causing confusion among citizens, such as conflicting information in the Tokyo alert (Japan Times, 2020a), emergency declaration (NHK, 2021), quasi-emergency measures (Mainichi, 2021b), and the prefecture’s own emergency declaration (Nikkei Asia, 2020). Quantitatively evaluated grounds are indispensable for the design of effective communication.

Despite these implications, the study had some limitations. First, it dealt only with the current pandemic and did not consider other external events. Second, the coverage of the age group is limited to people in their 20s–50s. Third, the study was limited to the Japanese context and may not be generalizable to larger populations. These are future research topics that may enrich the literature in the discipline.

Data availability

Data in this study was provided by Insight Tech Ltd. via IDR Dataset Service of the National Institute of Informatics (Insight Tech Ltd., 2021). All data analyzed are included in the paper.

Received: 24 August 2021; Accepted: 30 November 2021;

Published online: 16 December 2021

References

- Acko (2021) Difference between COVID-19, SARS and MERS. <https://www.acko.com/health-insurance/difference-between-covid-19-sars-and-mers>. Accessed 1 Aug 2021
- Agha N, Fairley S, Gibson H (2012) Considering legacy as a multi-dimensional construct: the legacy of the Olympic Games. *Sport Manage Rev* 15(1):125–139. <https://doi.org/10.1016/j.smr.2011.08.004>
- Anholt S (2008) Place branding: is it marketing, or isn't it? *Place Brand Public Dipl* 4(1):1–6. <https://doi.org/10.1057/palgrave.pb.6000088>
- Asahi (2020) Oxford study: Tokyo Olympics are most costly Summer Games. The Asahi Shimbun Company. <https://www.asahi.com/ajw/articles/13696963>. Accessed 1 Aug 2021
- Asahi (2021) Panel: 40 million vaccine doses cause 290 severe allergic reactions. <https://www.asahi.com/ajw/articles/14390346>. Accessed 1 Aug 2021
- Ashkenas R (2007) Simplicity-minded management *Harv Bus Rev* 85(12):101–109
- Bason T, Grix J (2018) Planning to fail? Leveraging the Olympic bid. *Mark Intell Plan* 36(1):138–151. <https://doi.org/10.1108/MP-06-2017-0106>
- BBC (2013) Olympics 2020: Tokyo wins race to host Games. <https://www.bbc.com/sport/olympics/24002795>. Accessed 1 Aug 2021
- BBC (2021) Tokyo 2020: does Japan have Covid under control? <https://www.bbc.com/news/57556978>. Accessed 1 Aug 2021
- Berkowitz P, Gjermano G, Gomez L et al. (2007) Brand China: using the 2008 Olympic Games to enhance China's image. *Place Brand Public Dipl* 3(2):164–178. <https://doi.org/10.1057/palgrave.pb.6000059>
- Blain C, Levy SE, Ritchie JB (2005) Destination branding: insights and practices from destination management organizations. *J Travel Res* 43(4):328–338. <https://doi.org/10.1177/0047287505274646>
- Blum B (2021) Concerns over common side effects shouldn't scare you from getting COVID-19 vaccines, doctor says. *CBC News*. <https://www.cbc.ca/news/health/covid-vaccine-side-effects-1.6010153>. Accessed 1 Aug 2021
- Bondonio P, Guala C (2011) Gran Torino? The 2006 Olympic Winter Games and the tourism revival of an ancient city. *Pol J Sport Tour* 16(4):303–321. <https://doi.org/10.1080/14775085.2011.635015>
- Boykoff J, Gaffney C (2020) The Tokyo 2020 Games and the end of Olympic history. *Capital Nat Soc* 31(2):1–19. <https://doi.org/10.1080/10455752.2020.1738053>
- Brajer V, Mead RW (2003) Blue skies in Beijing? Looking at the Olympic effect. *J Environ Dev* 12(2):239–263. <https://doi.org/10.1177/1070496503012002005>
- Braun E, Kavartzis M, Zenker S (2013) My city–my brand: the different roles of residents in place branding. *J Place Manag Dev* 6(1):18–28. <https://doi.org/10.1108/17538331311306087>
- Choi H, Woo H, Kim JH et al. (2019) Gravity model for dyadic Olympic competition. *Physica A* 513:447–455
- Chong TTL, Hui PH (2013) The Olympic Games and the improvement of economic well being. *Appl Res Qual Life* 8(1):1–14. <https://doi.org/10.1007/s11482-012-9176-8>
- Contreras JL, Corvalan A (2014) Olympic Games: no legacy for sports. *Econ Lett* 122(2):268–271. <https://doi.org/10.1016/j.econlet.2013.12.006>
- Duignan MB (2021) Leveraging Tokyo 2020 to re-image Japan and the Olympic city, post-Fukushima. *J Dest Mark Manage* 19:100486. <https://doi.org/10.1016/j.jdmm.2020.100486>
- Edwards MR (2016) The Olympic effect: employee reactions to their employer's sponsorship of a high-profile global sporting event. *Hum Resour Manag J* 55(4):721–740. <https://doi.org/10.1002/hrm.21702>
- Essex S, Chalkley B (1998) Olympic Games: catalyst of urban change. *Leis Stud* 17(3):187–206. <https://doi.org/10.1080/026143698375123>
- Ferreira RR (1998) The location effect: how some Atlanta clubs won the "Olympic ring". *Cornell Hotel Restaur* 39(5):50–58
- Gold JR, Gold MM (2021) Olympic legacies and the sustainability agenda. *Nat Sustain* 4(4):290–291. <https://doi.org/10.1038/s41893-021-00711-9>
- Gries PH, Crowson HM, Sandel T (2010) The Olympic effect on American attitudes towards China: beyond personality, ideology, and media exposure. *J Contemp China* 19(64):213–231. <https://doi.org/10.1080/10670560903444181>
- Guardian (2015) Cost of Tokyo's new stadium for 2020 Olympics rises to more than £1.3bn. <https://www.theguardian.com/sport/2015/jun/29/tokyo-2020-olympics-stadium-cost>. Accessed 1 Aug 2021
- Hensher D, Stopher P (1979) Behavioural travel modeling. *Croom Helm, London*
- Hoang VT, Al-Tawfiq JA, Gautret P (2020) The Tokyo Olympic Games and the risk of COVID-19. *Curr Trop Med Rep* 7:126–132. <https://doi.org/10.1007/s40475-020-00217-y>
- Hoff KJ, Leopkey B, Byun J (2020) Organizing committees for the Olympic Games and satellite host local organizing committees: examining their relationships and impact on legacy creation. *Manag Sport Leis* 1–22. <https://doi.org/10.1080/23750472.2020.1856710>
- Ichii Y (2019) "Creative Reconstruction" and the 2020 Tokyo Olympic Games: how does the 2020 Tokyo Olympic Games influence Japan's neoliberal social reform? *Int J Jpn Sociol* 28(1):96–109. <https://doi.org/10.1111/ijjs.12102>
- Insight Tech Ltd. (2021) Discontent questionnaire data on COVID-19. Informatics Research Data Repository, National Institute of informatics (dataset). <https://doi.org/10.32130/idr.7.3>
- International Olympic Committee (2021) The playbook: Athletes and officials: your guide to a safe and successful games. https://stillmedab.olympic.org/media/Document%20Library/OlympicOrg/Games/Summer-Games/Games-Tokyo-2020-Olympic-Games/Playbooks/The-Playbook-Athletes-and-Officials.pdf#_ga=2.200379881.67210996.1614758205-427755438.1611150146. Accessed 1 Aug 2021
- Ipsos (2021) Tokyo Olympics draw muted interest. <https://www.ipsos.com/en-us/news-polls/tokyo-olympics-draw-muted-interest>. Accessed 1 Aug 2021
- Ivanović D (2020) Olympic Games postponed for the first time in history? UNICEF. <https://www.unicef.org/montenegro/en/stories/olympic-games-postponed-first-time-history>. Accessed 1 Aug 2021
- Japan Times (2015) Rebuffed architect Hadid probing 'similarities' in original, new Olympic stadium designs. <https://www.japantimes.co.jp/news/2015/12/24/national/london-architects-probe-similarities-japans-new-olympic-stadium-design>. Accessed 1 Aug 2021
- Japan Times (2020a) Coronavirus spike prompts Tokyo alert, but how useful is new alarm? <https://www.japantimes.co.jp/news/2020/06/03/national/coronavirus-tokyo-alert-system>. Accessed 1 Aug 2021
- Japan Times (2020b) Japan's private PCR test centers flooded with reservations. <https://www.japantimes.co.jp/news/2020/12/27/national/science-health/japans-private-covid-19-pcr-test-centers-reservations>. Accessed 1 Aug 2021
- Japan Times (2021) 11% of Japanese shy away from COVID-19 vaccines, poll shows. <https://www.japantimes.co.jp/news/2021/07/05/national/vaccine-hesitancy-japan>. Accessed 1 Aug 2021
- Kassens-Noor E, Fukushige T (2018) Olympic technologies: Tokyo 2020 and beyond: the urban technology metropolis. *J Urban Technol* 25(3):83–104. <https://doi.org/10.1080/10630732.2016.1157949>
- Lies E (2021) Factbox: money, money, money: the cost of Tokyo's pandemic-delayed Olympics. *Reuters*. <https://www.reuters.com/business/media-telecom/money-money-money-cost-tokyos-pandemic-delayed-olympics-2021-06-10>. Accessed 1 Aug 2021
- Long X, Chen B, Park B (2018) Effect of 2008's Beijing Olympic Games on environmental efficiency of 268 China's cities. *J Clean Prod* 172:1423–1432
- Lu Q, Mihalik BJ, Heere B et al. (2019) Media effect on resident attitudes toward an Olympic bid. *Tour Manag Perspect* 29:66–75
- Ludvigsen JAL, Parnell D (2021) Redesigning the Games? The 2020 Olympic Games, playbooks and new sports event risk management tools. *Manag Sport Leis* 1–13. <https://doi.org/10.1080/23750472.2021.1928538>
- Lund E (2015) 9 ways Tokyo could become more foreigner-friendly in time for 2020 Olympics. *Japan Today*. <https://japantoday.com/category/features/lifestyle/9-ways-tokyo-could-become-more-foreigner-friendly-in-time-for-2020-olympics>. Accessed 1 Aug 2021
- Mainichi (2021a) Japan city flooded with inquiries after COVID-19 vaccine voucher lacks specific info. <https://mainichi.jp/english/articles/20210412/p2a/00m/0na/004000c>. Accessed 1 Aug 2021
- Mainichi (2021b) Osaka may relax alcohol serving rules if COVID-19 quasi-emergency continues. <https://mainichi.jp/english/articles/20210708/p2a/00m/0na/002000c>. Accessed 1 Aug 2021
- Mann RH, Clift BC, Boykoff J et al. (2020) Athletes as community; athletes in community: Covid-19, sporting mega-events and athlete health protection. *Br J Sports Med* 54:1071–1072. <https://doi.org/10.1136/bjsports-2020-102433>
- McKinsey & Company (2021) The coronavirus effect on global economic sentiment. <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-coronavirus-effect-on-global-economic-sentiment#>. Accessed 1 Aug 2021
- McNulty AM, Rohrsheim R, Donovan B (2003) Demand for sexual health services during the Olympic Games: both sides of the Sherman effect. *Int J STD AIDS* 14(5):307–308. <https://doi.org/10.1258/095646203321605495>
- Miller IF, Becker AD, Grenfell BT et al. (2020) Disease and healthcare burden of COVID-19 in the United States. *Nat Med* 26(8):1212–1217. <https://doi.org/10.1038/s41591-020-0952-y>
- Nakamura S, Wada K, Yanagisawa N et al. (2018) Health risks and precautions for visitors to the Tokyo 2020 Olympic and Paralympic Games. *Travel Med Infect Dis* 22:3–7. <https://doi.org/10.1016/j.tmaid.2018.01.005>
- NBC Sports (2021) Tokyo Olympics venues added to no spectators list. <https://olympics.nbcsports.com/2021/07/10/tokyo-olympics-spectators-venues/>. Accessed 1 Aug 2021

- NHK (2021) Tokyo enters 4th coronavirus state of emergency. https://www3.nhk.or.jp/nhkworld/en/news/20210712_02. Accessed 1 Aug 2021
- Nikkei Asia (2020) Japan's Aichi Prefecture declares its own coronavirus emergency. <https://asia.nikkei.com/Spotlight/Coronavirus/Japan-s-Aichi-Prefecture-declares-its-own-coronavirus-emergency>. Accessed 1 Aug 2021
- NPB (2021) Statistical data. Nippon Professional Baseball Organization. <https://npb.jp/statistics/2021/attendance.html>. Accessed 1 Aug 2021
- Ogura K (2018) Visions on the legacy of the Tokyo 2020 Paralympic Games. In: Brittain I, Beacom A (eds) *The Palgrave handbook of paralympic studies*. Palgrave Macmillan, London, pp. 579–601
- Olsen AL (2015) Citizen (dis) satisfaction: an experimental equivalence framing study. *Public Adm Rev* 75(3):469–478. <https://doi.org/10.1111/puar.12337>
- Panagiotopoulou R (2012) Nation branding and the Olympic games: new media images for Greece and China. *Int J Hist Sport* 29(16):2337–2348. <https://doi.org/10.1080/09523367.2012.744527>
- Parnell D, Widdop P, Bond A et al (2020) COVID-19, networks and sport. *Manag Sport Leis* 1–7. <https://doi.org/10.1080/23750472.2020.1750100>
- Prayag G, Hosany S, Nunkoo R et al. (2013) London residents' support for the 2012 Olympic Games: the mediating effect of overall attitude. *Tour Manag* 36:629–640. <https://doi.org/10.1016/j.tourman.2012.08.003>
- Reed J (2021) Covid vaccines: mixing increases reports of mild side-effects. BBC. <https://www.bbc.com/news/health-57075503>. Accessed 1 Aug 2021
- Rose AK, Spiegel MM (2011) The Olympic effect. *Econ J* 121(553):652–677. <https://doi.org/10.1111/j.1468-0297.2010.02407.x>
- Sato S, Oshimi D, Bizen Y et al (2020) The COVID-19 outbreak and public perceptions of sport events in Japan. *Manag Sport Leis* 1–6. <https://doi.org/10.1080/23750472.2020.1773301>
- Schleicher N, Norra S, Dietze V et al. (2011) The effect of mitigation measures on size distributed mass concentrations of atmospheric particles and black carbon concentrations during the Olympic Summer Games 2008 in Beijing. *Sci Total Environ* 412:185–193
- Taku K, Arai H (2020) Impact of COVID-19 on athletes and coaches, and their values in Japan: repercussions of postponing the Tokyo 2020 Olympic and Paralympic games. *J Loss Trauma* 25(8):623–630. <https://doi.org/10.1080/15325024.2020.1777762>
- The Tokyo Organising Committee of the Olympic and Paralympic Games (2020) Olympic Games postponed to 2021. <https://olympics.com/tokyo-2020/en/news/joint-statement-from-international-olympic-committee-and-tokyo2020>. Accessed 1 Aug 2021
- The World Bank (2021) The global economy: On track for strong but uneven growth as COVID-19 still weighs. <https://www.worldbank.org/en/news/feature/2021/06/08/the-global-economy-on-track-for-strong-but-uneven-growth-as-covid-19-still-weighs>. Accessed 1 Aug 2021
- Time (2020) World Health Organization declares COVID-19 a 'Pandemic.' Here's what that means. <https://time.com/5791661/who-coronavirus-pandemic-declaration>. Accessed 1 Aug 2021
- Vierhaus C (2019) The international tourism effect of hosting the Olympic Games and the FIFA World Cup. *Tour Econ* 25(7):1009–1028. <https://doi.org/10.1177/1354816618814329>
- Waitt G (2001) The Olympic spirit and civic boosterism: the Sydney 2000 Olympics. *Tour Geogr* 3(3):249–278. <https://doi.org/10.1080/14616680110055402>
- Wang M, Bao HX (2018) Mega-event effects on the housing market: evidence from the Beijing 2008 Olympic Games. *Cities* 72:207–216. <https://doi.org/10.1016/j.cities.2017.07.014>
- Weed M, Coren E, Fiore J et al. (2015) The Olympic Games and raising sport participation: a systematic review of evidence and an interrogation of policy for a demonstration effect. *Eur Sport Manag Q* 15(2):195–226. <https://doi.org/10.1080/16184742.2014.998695>
- Wong AYY, Ling SKK, Louie LHT et al. (2020) Impact of the COVID-19 pandemic on sports and exercise. *Asia-Pac J Sports Med Arthrosc Rehabil Technol* 22:39–44. <https://doi.org/10.1016/j.asmart.2020.07.006>
- Yang T, Wang Z, Zhang B et al. (2010) Evaluation of the effect of air pollution control during the Beijing 2008 Olympic Games using Lidar data. *Sci Bull* 55(13):1311–1316. <https://doi.org/10.1007/s11434-010-0081-y>
- Yazdanparast A, Bayar O (2020) Olympic sponsorships and brand value: an empirical analysis. *J Advert* 50(2):139–159. <https://doi.org/10.1080/00913367.2020.1856737>
- Zhang L, Zhao SX (2009) City branding and the Olympic effect: a case study of Beijing. *Cities* 26(5):245–254. <https://doi.org/10.1016/j.cities.2009.05.002>

Competing interests

The author declares no competing interests.

Ethical approval

Based on Saitama University's ethics review process, an exemption was granted from requiring ethical approval because the study does not collect personal information and does not impose a physical or mental burden on respondents.

Informed consent

All study participants provided informed consent.

Additional information

Correspondence and requests for materials should be addressed to Takumi Kato.

Reprints and permission information is available at <http://www.nature.com/reprints>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2021