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Communication

Effects of social participation and the emergence of voluntary social interactions on household power-saving practices in post-disaster Kanagawa, Japan

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ABSTRACT

An online social survey was conducted to reveal household electricity-saving behaviour and its relationship with participation in social group activities, as well as face-to-face and online social interactions, i.e., information sources used and information dissemination through personal networks, in a disaster-affected region of Kanagawa, Japan, during the summer of 2011. The study confirms the positive contribution of respondents' participation in social group activities to the number of power-saving practices conducted. It also reveals the emergence of voluntary social face-to-face and/or online interactions for power-saving. The study suggests it would be useful to provide effective information to proactive individuals who are closely engaged in power-saving in households and who are proactively disseminating power-saving information practices to others. Such individuals include (1) women who have school-children and who are proactively engaging in the social interactions of their children's schools, other parents, neighbours, as well as their own parents and relatives; and (2) men and women who are using various kinds of online interaction tools and are also engaged in face-to-face social interactions.

1. Background

On 11 March, 2011, a large-scale earthquake and tsunami in Japan caused an accident at the Fukushima Daiichi nuclear power plant, resulting in a reduction in electricity supply. This called for strengthened energy efficiency and reduced electricity use in all sectors of society in the affected areas, including Tokyo, during the summer of that year. Many citizens tried to save energy at the household level, in tandem with industries, businesses and governments. While the government, public organisations and mass-media disseminated relevant information on how to prepare and manage electricity in households, citizens themselves had to obtain the information from various sources and change their behaviour. As Aoyagi (2008) indicates, a social interaction where an individual exchanges views and information on environmental topics would increase the individual's engagement in pro-environment behaviour. Moreover, such communication can occur on the Internet nowadays, and an individual can proactively disseminate or share such ideas through social media based on information technology (IT).

In terms of climate change mitigation, the working group on communication and marketing for the sub-committee of a mid-to-long-term roadmap under the Japanese governmental council on global environment reported that information exchange through the Internet community and non-profit organisation (NPO) activities enhanced climate change mitigation actions, while workplace and neighbourhood association networks did not have a stronger effect on behaviours than others (Communication–Marketing WG, 2010). Social media based on IT has been innovatively used to cope with relief and reconstruction after the Great East Japan disaster in 2011. Various spontaneous and voluntary networks of individuals and corporate have linked together to invent, operate and manage relief or reconstruction projects (Konpyuta Tekunoroji Henshubu, 2011). The use of online social interactions might also have resulted in effective electricity management by post-disaster households.

The study of enabling factors for transition to climate smart development in Asian cities found that trigger events such as disasters or large political, economic or social events are one of the drivers for climate change mitigation and adaptation, in addition to networks and partnerships, access to resources and markets, and co-benefits (Schroeder et al., 2012). This kind of trigger effect might have happened with household energy management practices after the disaster in Japan.

The recent study of electricity-saving during the summer of 2011 by individuals who resided in the area affected by power

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supply restriction in Japan, revealed that electricity-saving practices were widespread during that period. The study also pointed out different ways of engaging in electricity-saving practices with various degrees of consciousness towards saving electricity (Fujiwara, 2011). However, the emergence of voluntary social interactions in electricity management was not analysed. Another study on electricity saving measures at residential sector in the summer of 2011 did not investigate social interactions either (Nishio and Ofuji, 2012). A study of the emergence of voluntary social interactions may lead to findings such that local governments could utilise the various existing local social interactions depending on different patterns of behaviours by residents, to promote effective facilitation of household electricity management.

2. Experiences outside of Japan

The effects of social interactions on power-saving practices have also been studied outside of Japan. Like Aoyagi (2008) for the Japanese case, the study of the spread of energy conservation devices in US buildings stresses the importance of social interactions, in particular the transmission of vivid and personal information from credible sources and trusted others (Coltrane et al., 1986). On the other hand, the study of determinants for household electricity saving behaviour in Beijing, China, reports that social interactions and knowledge of others' behaviour in electricity saving were not significant in Beijing (Wang et al., 2011). Since Wang et al. (2011) use a five-scale self-declared evaluation on the significance of "influence from friends' electricity saving behaviour" and "community activities of electricity-saving" to measure social interactions, the relationship between actual social interactions and actual power-saving behaviour could be different.

In a wider context, emergence of social interactions after disasters is also observed outside of Japan. Such examples include voluntary initial recovery activities in the field right after Hurricane Katrina hit New Orleans in the US in 2005 where governmental/organisational support was not readily available (Solnit, 2009). Solnit also reports spontaneous emergence of altruistic social interactions for the cases of responses to the San Francisco earthquake of 1906 and the September 11 attacks in 2001. Likewise, social media based on IT has recently been used in disaster recovery from tornados and floods in the US (Williams et al., 2012). Truly voluntary actions through online interactions are also used to mobilise the needed resources for recovery in the US.

Indeed, social interactions can have global effect on recovery from large-scale disasters recently (Podobnik, 2012). Global Disaster Relief on Facebook is working as a collaboration platform for individuals, non-profit organisations, governments and industry to raise awareness and mobilise resources for the needed. More than 500,000 individuals are engaging in the platform to support the relief efforts. Another online social medium, Twitter, has become an enabler for immediate and intense reaction to a disaster, too (Podobnik, 2012). Tokyo Electric Power Company (TEPCO) has created a Twitter account for its nuclear power plants to inform the state of radiation leakage and power blackouts not only for Japanese residents but globally after earthquake and tsunami on 11 March, 2011. Almost 200,000 individuals followed this account within a day.

3. Objectives

This paper aims to explore whether the voluntary social face-to-face and online interactions emerged for household electricity management practices after the disaster in Japan in 2011. The paper made use of an Internet social survey for married adults residing in Kanagawa Prefecture, the adjacent prefecture to Tokyo metropolitan government. The study investigates whether it is the case that the more the respondent is engaged in social group activities, the more they are committed to power-saving practices at the household. The study also examines whether individuals who share and disseminate relevant information on household electricity management through their social interactions are more engaged in management than others. It also reveals what kinds of social interactions were used for the purpose of residential power-saving. Implications can then be drawn for local governments and other organisations towards effective information dissemination.

4. Method

4.1. Survey design

The Internet-based social survey was conducted from 27 January to 1 February, 2012 for 1000 married adults over 20 years old who lived in Kanagawa Prefecture. The respondents were those who had registered for the survey panel provided by a private online survey company, Lifemedia. The call for participating in the survey was maintained until the effective responses reached 1000 out of around 25,000 individuals in Kanagawa Prefecture, registering for the survey company (approximate response rate among respondents registered in the panel is around 4%). The sample size of this survey is 1000. There is no missing data since there is no option of "Do not know," and the respondents have to answer all questions to receive the rewards. This was not a random survey based on citizen registry, and hence the sample cannot be treated as representative of the married adult population of Kanagawa Prefecture. The target population was limited to individuals who are married since the probability that the household members are in residence in the daytime on weekdays would increase chances to see the actual behaviour including the peak demand time the Japanese government specifically requested to reduce electricity consumption.

Out of the 1000 effective respondents, 59% were female. Respondents who were in their 20s, 30s, 40s, 50s, 60s and 70s comprise 4%, 26%, 34%, 20%, 13%, and 3%, respectively. As a reference of population statistics, 49% of citizens in their 20s–70s who resided in Kanagawa Prefecture as of January 2011 (including those who were not married) were female. Moreover, citizens who were in 20s, 30s, 40s, 50s, 60s and 70s comprised 15%, 20%, 20%, 15%, 17%, and 12%, respectively (Kanagawa Prefectural Government, 2012).

The survey asked whether a respondent knew about and actually conducted 45 specified measures of household electricity management before and after the disaster, in particular during the summer (July–September) of 2011 when the national government's order to reduce electricity use was enacted for industry users that used more than 500 kW of the electricity. The power-saving measures listed in the questionnaire included those mainly for management of refrigerators, television (TV) sets, and air conditioners as well as other appliances (Katayama and Onogawa, 2012). The survey also asked about a five-level degree of satisfaction in terms of electricity management at home. The data was obtained on channels of information acquisition (see Table 1 for details) and dissemination (see Table 2 for details) on electricity management at the household level, the use of social media based on IT, and the state of participation in societal group activities (see Table 3 for details). Other general individual