The Role and Effects of Mass and Social Media in Post-Disaster Recovery

- A Case Study of the Great East Japan Earthquake

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person except that which appears in the citations and acknowledgements. Nor does it contain material which to a substantial extent I have submitted for the qualification for any other degree of another university or other institution of higher learning.

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Abstract

The aim of this thesis is to investigate the effects of the use of mass and social media in post-disaster recovery using the Great East Japan Earthquake as case study. In particular, it takes into consideration the complex media environment of a highly mediated society such as Japan alongside the requirements of post-disaster recovery. Through the integration of key theories in media studies and empirical analyses with original survey data, the findings have extended the knowledge of media effects in post-disaster recovery, and have some important implications for researchers, NGOs and government authorities that are working on post-disaster recovery.

On the 11th March, 2011, the north-east coast of Japan was hit by one of the strongest earthquakes in recently history - the Great East Japan Earthquake. It has claimed more than 15,000 lives and cost more than 16.9 trillion yen of damages, and the recovery period is estimated to take at least 10 years. On top of the unprecedented scale of the damage, another very remarkable aspect of the disaster is the role Information Communications Technology (ICT) and media had played. After the disaster, when the traditional telephone network was paralysed, enabled by ICT such as mobile and Internet communications, social media provided the critical communication platform for many people, and they had mediated the experience of the disaster across the world like never seen before, as Slater et al. (2012a) vividly depict '*the generation of information and images occurred at such a fast pace that social media not only represented, but also directly mediated our experience of the disaster more than any other event today*' (Slater et al., 2012a, p. 94). The critical role social media played after the disaster had changed the way many people perceived them, and many people began to embrace social media as an important alternative information source as well as the communication platform to express their opinion and concern (Slater et al., 2012b). At the same time, while social media had attracted most people's attention, surveys (e.g., MIC, 2011a) found that mass media, in particular television was still regarded as the most trusted and reliable information source. In fact, a study by Tanaka et al. (2012) has found that television had exerted a great influence on people, that the number of volunteers and donations went into the disaster area were directly related to the frequency of the disaster reports being shown on television.

In a crisis situation, because of the high level of uncertainties, people's dependency on media tends to increase and the influences from media are often intensified (Lowrey, 2004). Indeed, a study by Mitomo et al. (2012) after the disaster has found that information from both mass and social media had motivated many people to carry out post-disaster activities even though they were not in the disaster area. Now, more than three years have passed since the disaster, most of the infrastructure destroyed are restored and life for most people have returned to normal. However, for those that are still living in the disaster area, the road of recovery is still very long. One must then wonder, as both mass and social

media had played such an important role after the disaster, as time passes, what can they contribute to post-disaster recovery in the long run? In particular, what are the effects (if any) of mass and social media in post-disaster recovery and how do they work? Especially in a highly mediated society such as Japan, whereas media are ubiquitous in daily lives and information comes and goes in rapid pace. Although this question might sound fairly straight forward, however, currently no direct answer can be found because of two main reasons. First, large scale nature disasters (fortunately) do not occur too often, and at the same time, the media environment is changing in a rapid pace. Therefore, suitable case studies are few and far between. Although social media were also active in other recent major disasters (e.g., 2008 China Sichuan Earthquake and the 2010 Haiti Earthquake), their media environments were very different. In fact, it can be said that the Great East Japan Earthquake is the first time in history that such a large scale natural disaster struck such a highly mediated society. Moreover, although many studies are being carried out on the Great East Japan Earthquake, currently most of them are mainly focusing on infrastructure and technology aspects or on the immediate response and rescue phase. As a result, currently there is a knowledge gap between the use of mass and social media and post-disaster recovery. With this background in mind, this thesis sets off to investigate the abovementioned research question. The aim is that by filling this knowledge gap to derive some practical implications that can contribute to both post-disaster recovery and academia.

Acknowledging the fact that mass and social media were highly intertwined in the case of the Great East Japan Earthquake, the first challenge of this thesis is how to evaluate their effects, especially considering that they are very different by nature. For instance, while mass media are a vertical network of one way communication which usually represents the official source, social media are a horizontal network of interactive communication which often serves as the alternative source. In reality however, their differentiation is not as clearly cut, as could be seen during the Great East Japan Earthquake, the shocking footages of the tsunami from mass media were being shared over social media again and again, at the same time, user generated content such as frontline reports from the disaster area originated from social media were also reported by mass media. Therefore, it will be counterintuitive to separate and analyse their effects independently. Instead, a more holistic perspective is called for, and it is in this aspect that traditional media theories reach their limitation. In order to address this challenge, a theoretical framework is developed to incorporate the theories from the two widely adopted but often rivalry perspectives in media studies - the active audience and passive audience perspective (Biocca, 1988) to analyse the effects of mass and social media in post-disaster recovery. Social capital is selected as the proxy to represent the capacity for post-disaster recovery because studies on the recovery process of previous disasters have found that it is one of the most critical elements for post-disaster recovery (e.g., Aldrich, 2012a). Based on this framework, a three-part empirical analysis is constructed. The first two parts are the core analysis to investigate media's effects on social capital and on people's perceptions of the

disaster using theories from the active and passive audience perspectives respectively. The findings of both parts have pointed to the importance of the interactivity between mass and social media, thus the third part of the analysis – the extended analysis is established after core analysis to further investigate the interactive use of the two media under the convergence of mass and social media.

The first two parts of the analysis employ the same data set collected from an original Internet survey conducted in March 2013 with approximately 2,000 samples from the three prefectures (Iwate, Miyagi and Fukushima) that were hit directly by the disaster. Although they have taken a different perspective, the findings from both parts have shown a consistent pattern that the use of mass and social media can create positive effects for post-disaster recovery. For instance, using the communication mediation model from the active audience perspective, the first part of the analysis finds that the use of both media can encourage people to participate in civic activities online. In turn these online civic participations can effectively mediate the effects from the media to the development of social capital elements that are crucial for post-disaster recovery such as bonding trust, bridging networks and civic participation. At the same time, based on the cultivation theory from the passive audience perspective, the second part of the analysis shows that the media can cultivate people's perceptions of the disaster which can increase their intention to participate in activities related to post-disaster recovery such as volunteering and making donations. Furthermore, both parts of the analysis have revealed an important finding that both mass and social media can interact with one another and moderate each other's effect. For instance, while the use of mass media can encourage social media users to participation more in civic activities online, the use of social media can also regulate the effect of mass media on people's perceptions of the disaster. This finding leads to the questioning of how exactly do the two media interact with each other in practice and has led to the creation of the third part of the analysis to look into the effects of the convergence and interactivity between mass and social media. The third part of the analysis uses a different data set collected from another Internet survey conducted in March 2014 with approximately 2,000 people from the same three prefectures plus the Kanto area. The results have shown that between the two regions, there is no significant difference on media usage, in particular, under the converging of mass and social media - known as 'simultaneous multi-screening', many people now watch television and access social media (using their smartphone) at same time. It is found that such interactivity links up the two media simultaneously and offers many potential to increase people's general knowledge of social issues, if they are motivated by the information from television to react online. In other words, information from mass media can lead to immediate action on social media in real time. That being said, the effect is found to be quite mild, it appears that in terms of social issues and current affairs, current television programmes are not a strong catalyst to trigger people to take action online.

In summary, this three-part analysis has shown that mass and social media can create positive effects on social capital which is an important element for post-disaster recovery. These effects are created by online civic participation and people's perceptions of the disaster that can be strengthened by the interactivity between mass and social media. For instance, while mass media can cultivate people's perceptions of the disaster, social media provide the platform for them to interact online, together the usage both media interactively can increase people's motivation to continue to support the recovery. These findings have important implications for post-disaster recovery. First, for the NGOs and local communities that are working on post-disaster recovery, they can utilise mass and social media coherently can tackle one of the main challenges of the recovery – the aging and shrinking population in the disaster area by developing social capital through the promotion of civic participation online. At the same time, for government authorities and policy makers, they can consider establishing the corresponding policies and guidelines to support these NGOs and local communities on the utilisation of ICT and media for post-disaster recovery. Furthermore, knowledge on how the two media can influence the public's perceptions of the disaster will be crucial for government authorities and policy makers to promote their policy changes related to the recovery top down, as well as for NGOs and local communities to lobby for policy changes bottom up. In summary, using the Great East Japan Earthquake as case study, this thesis has developed a theoretical framework and provided the empirical evidence of the role and effects of mass and social media in post-disaster recovery that can contribute to the recovery, as well as to academia by extending the knowledge, and establishing the foundation for future studies in this area.

List of Acronyms and Abbreviations

AMOS - Analysis of Moment Structures

BBC - British Broadcasting Corporation

BBS - Bulletin Board System

CFA - Confirmatory Factor Analysis

EFA - Exploratory Factor Analysis

ICT - Information Communications Technology

JCER - Japan Center for Economic Research

JST - Japan Science and Technology Agency

METI - Ministry of Economy, Trade and Industry of Japan

MIC - Ministry of Internal Affairs and Communications of Japan

MOFA - Ministry of Foreign Affairs of Japan

NGO – Non Government Organisation

NHK - Nippon Hōsō Kyōkai (Japan Broadcasting Corporation)

SEM - Structural Equation Modelling

SNS – Social Network sites

SPSS - Statistical Package for the Social Sciences

UNISDR - United Nations Office for Disaster Risk Reduction

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Chapter 1 Introduction – the Problem and Context

On the 11th of March, 2011, the north-east coast of Japan was hit by one of the strongest natural disasters in recent history - the Great East Japan Earthquake[1]. The M9.0 undersea earthquake, subsequent tsunami and Fukushima nuclear power plant accident have claimed more than 15,000 lives and cost 16.9 trillion yen in damages, the recovery period is expected to last at least 10 years (Reconstruction Agency, 2013). On top of the unprecedented scale of the damage, another very remarkable aspect of this disaster is the critical role Information Communications Technology (ICT) and in particular social media had played, as Slater et al. (2012a) vividly depict:

> *'[T]he generation of information and images occurred at such a fast pace that social media not only represented, but also directly mediated our experience of the disaster more than any other event today. If Vietnam was the first war fully experienced through television, 3/11 was the first disaster fully experienced through social media'* (Slater et al., 2012a, p. 94).

Right after the disaster, when the traditional telephony network was paralysed due to infrastructure damages and network congestions (MIC, 2011a), enabled by the Internet and mobile communications, social media (e.g., Facebook, Twitter and YouTube) provided the critical communication platform for many people in Japan and across the world to determine the well-being of their family and friends, to gain situational awareness and to obtain and share critical information (Sternberg, 2011; Wallop, 2011). In the aftermath, social media continued to serve as the major communication platform for many organisations and individuals for a wide range of purposes such as to collect and disseminate information, to pledge for help and gain emotional support, to organise relief actions and rally for support, as well as to question, critique and even protest against the government and authorities (Aizu, 2011; Slater et al., 2012b; Appleby, 2013; Endo, 2013). One of the main reasons that social media could have played such an important role was the high level of ICT diffusion in Japan, for example, at the time of the disaster in 2011, the country's Internet penetration rate was 79%, and the mobile phone penetration rate had reached 94% with one third of them were smartphones with Internet connectivity (MIC, 2012), furthermore, there were more than 36 million social media users (Impress Japan, 2012).

The critical role social media played during the disaster had changed the way many people perceived them. Surveys (e.g., IMJ Mobile, 2011; MIC, 2011b) have shown that around 10%-20% of the people in Japan had started to use or had increased the utilisation of social media after the disaster, at the same time, the number of social media users had

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[1] Hereafter referred to as 'the disaster' or 'the event'.

grown by 143% to 50 million by the end of 2012[2] (Impress Japan, 2012; ICT Research & Consulting, 2014). Realising the growing importance of social media, after the disaster, many government authorities had also began to utilise them to communicate with the public (Yoshimura & Inoue, 2012). That being said, while social media had attracted most of people's attention, mass media, in particular television still served as the main source of information, for example, NHK – the national channel as well as other commercial channels had provided 24 hours non-stop live coverage of the event in the following days after the disaster (Tanaka, 2012). Indeed, despite the fact that the general usage of television has been on a continuous declining trend in recent years (NHK, 2013), after the disaster, surveys have showed that traditional mass media, in particular television was still the most used, trusted and reliable information source (e.g., Kimura, 2011; MIC, 2011a). In addition, Tanaka et al. (2012) have found that television still can exert a great influence to the public, for instance, the number of volunteers and donations went into the disaster area were actually directly related to the frequency of the disaster reports being shown on television.

Nonetheless, both media had their own limitations, for instance, social media were plagued with rumours and false information especially during times of crisis with high uncertainties, and some believed that information from social media were much less trustworthy than mass media (Endo, 2013; Hagar, 2013). On the other hand, some had turned to social media as they felt the information from mass media were too slow and were controlled by the government (Slater et al., 2012b). Therefore, the dynamic of the media environment after the disaster had become very complicated. Indeed, in the case of a crisis event such as a major natural disaster, because of the high level of uncertainty associated with the situation, people's dependency on the media tends to increase and they will utilise all possible information source (Dutta-Bergman, 2004; Lowrey, 2004), and hence, the effects of media are often intensified. For example, after the Great East Japan Earthquake, a study by Mitomo et al. (2012) has demonstrated that the vividness and abundance of the information from both mass and social media had effectively conveyed the sense of reality of the disaster to those that were not in the disaster area and subsequently motivated them to take different post-disaster actions such as information collection, preparation for the aftermath, and altruistic actions.

The above observations have led to the question – knowing that both mass and social media had played such an influential role after the disaster, over time, as the dust settles, what can they do to contribute to the post-disaster recovery in the long run? In particular, what are the effects (if any) of mass and social media in post-disaster recovery and how do they work? Especially in a highly mediated society such as Japan, whereas

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[2] This is to illustrate the rapid growth of social media in Japan; experience from the disaster was only one of the many reasons for this growth.

media are ubiquitous in daily life[3], information comes and goes in an accelerating pace, and people are often overwhelmed by information from different media sources. As Tanaka et al. (2012) point out, although influential, the media's effects are also very short-lasting, as time passes after the disaster, when the media's attentions were diverted to other issues, people's awareness and support towards the disaster were also cooled down accordingly.

Although this question might sound straight forward, however, currently no direct answer could be found because of two main reasons. First, large scale nature disasters (fortunately) do not occur too often, and at the same time, ICT, in particular social media are advancing in such a rapid pace. Therefore, suitable case studies are few and far between. For instance, although social media were also active in recent disasters such as the 2008 Sichuan Earthquake in China and the 2010 Haiti Earthquake[4] (Otani et al., 2012; Tse et al., 2013; Zook et al., 2010; Yates & Paquette, 2011), however, the scale and complexity of the disaster, the media environment including the level of information openness and the level of media diffusion as well as utilisation were very different compare with the Great East Japan Earthquake. As a matter of fact, the Great East Japan Earthquake can be said is the first time in history that such a large scale natural disaster struck such a highly mediated society. Second, although many studies are being carried out on the Great East Japan Earthquake, but until now, most of the available literatures on the use of ICT are mainly focusing on the infrastructure and technology aspects, or on the applications in immediate rescue and relief phase. Therefore, currently there is a knowledge gap between the use of mass and social media and their application in the long term post-disaster recovery, especially with consideration the complex media environment.

1.1 Research Question, Objective and Contribution

With this background in mind, in order to answer the question of what can mass and social media contribute to post-disaster recovery, the research question of this thesis is set to investigate 'what are the effects (if any) of mass and social media in post-disaster recovery and how do they work?' In particular, with consideration of the complex media environment of a highly mediated society – in this case in Japan – alongside the requirements of post-disaster recovery. In order to answer this research question, the research objectives of this thesis are:

1. Review existing literature to identify the key requirements for post-disaster recovery and how they could be related to mass and social media.

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[3] For example, in 2011, the mobile phone penetration rate in Japan was 94.5% with 29.3% of subscribers were using smartphones, 79.1% of the Japanese population had access to the Internet and 33.6% of households had TV sets capable of connecting to the Internet (MIC, 2012). Furthermore, almost 25% of the total population was connected to social media by the end of 2012 (Impress Japan, 2012).
[4] Indeed, the 2010 Haiti Earthquake was the first time for the U.S. Government to rely extensively on social media to coordinate knowledge and action between cooperating response agencies (Yates & Paquette, 2011).

2. Develop a theoretical framework to link up the effects of mass and social media with the requirements for post-disaster recovery with testable propositions.

3. Apply the framework to conduct in-depth empirical analysis using data from the Great East Japan Earthquake to identify the effects of mass and social media in post-disaster recovery and the underlying mechanisms.

4. Derive practical implications of the findings on post-disaster recovery and to extend the knowledge in this area.

The framework of this thesis is summarised in Figure 1-1.

Motivation	Both mass and social media played important role after the disaster, as time passes, what can they contribute to post-disaster recovery?
Research Question	What are the effects of mass and social media in post-disaster recovery and how do they work?
Challenge	Lack of existing literature because of fast changing pace of media environment and infrequent occurrence of large scale natural disaster
Thesis Objectives	1. Literature review to identify Key requirements for recovery and media effects in a highly mediated society
	2. Theoretical framework
	3. Empirical analysis - to identify media's effects in post-disaster recovery and underlying mechanisms
	4. Implications for academia and post-disaster recovery

Figure 1-1 Thesis Framework

The contribution of this thesis is twofold. First is for post-disaster recovery, by empirically demonstrating the effects of mass and social media in post-disaster recovery and the underlying mechanism, the findings will have practical implications for the government authorities, NGOs and local communities that are working on post-disaster recovery, in particular on how to apply both media to support the recovery. Second is for academia, the findings will fill the knowledge gap between mass and social media and post-disaster recovery, as well as to extend the literature on media studies, in particular on the dynamics between mass and social media in modern society. These will have important implications for NGOs and authorities working to support the recovery, as well as scholars and media

practitioners to gain further understandings on the effects of the media. Furthermore, although the framework is established based on the Great East Japan Earthquake as the case study, nonetheless, as the theoretical framework is developed based on established media theories and hence, with modifications, it can also be applied in other environments in the future.

1.2 Arrangement of the Thesis

This thesis is organised as follows; this chapter establishes the problem and context of the thesis including the research question, objectives and contributions. Chapter 2 provides the in-depth literature review on the background and key concepts to establish the base of this thesis, in particular on the requirements of post-disaster recovery and their linkages with media. Chapter 3 reviews the key theories in media studies and develops the theoretical framework and establishes the empirical analysis to link up the effects of media and requirements of post-disaster recovery, followed by chapter 4 which describes the main data collection and analysis methods being applied. Chapter 5, 6 and 7 present the details of the three-part empirical analysis carried out based on the theoretical framework. Chapter 8 puts the pieces together by summing up the key findings to derive the implications as well as discusses the limitations and future works. Finally, chapter 9 concludes the whole thesis by reviewing and consolidating the findings.

1.3 Working Definitions

Before moving forward it would be beneficial to clarify the definition of the key concepts being applied in this thesis, in particular social media, mass media and post-disaster recovery and resilience.

1.3.1 Social Media

In this thesis, social media are referred as '*a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content*' (Kaplan & Haenlein, 2010, p. 61). Whereas Web 2.0 refers to the concept of Internet platforms and applications that allow the users to create and share their own content (O'Reilly, 2005). In general, social media include the following four main types of application.

1. Social network sites (SNS) – are '*online services that allow users to create an individual profile, connect with other users - usually people known offline - and navigate through these networks of contacts*' (Boyd & Ellison, 2007). The most widely used social media in Japan are Facebook, Twitter, LINE and Mixi (MIC, 2011a).
2. Personal homepage and blogs – blog is an extension of web log, '*a mixture in unique proportions of links, commentary, and personal thoughts and essays*' (Blood, 2000).

3. Forum and BBS (Bulletin Board System) – 'Internet service which allows users to share information, messages, and files over the Internet' (Gurdeep & Mukesh, 2001, p. 765), they were one of the main form of user interactivities in the 1990s.

4. Video sharing sites – websites that '*allow content suppliers to upload video effortlessly, automatically converting from many different formats, and to tag uploaded videos with keywords. Users can easily share videos by mailing links to them, or embedding them on web pages or in blogs*' (Cheng et al., 2007, p. 2). The most widely used video sharing sites in Japan are YouTube and Niconico (MIC, 2011a).

1.3.2 Mass Media

Mass media (or mass communications) are referred as an '*institutionalized form of public message production and dissemination*' (Watson & Hill, 2012, p. 165). The most widely used mass media in Japan are television, radio, magazine and newspaper as well as official Internet homepages and portal sites (e.g., online newspaper, Yahoo).

1.3.3 Post-Disaster Recovery and Resilience

Often being confused with the rescue and relief phase which focuses on immediate responses after the disaster, post-disaster recovery refers to the longer term reconstruction and restoration process. According to Lindell (2013), it can be defined with three distinct but interrelated meanings.

'First, [post-disaster recovery] is a goal that involves the restoration of normal community activities that were disrupted by disaster impacts…Second, it is a phase in the emergency management cycle that begins with stabilization of the disaster conditions (the end of the emergency response phase) and ends when the community has returned to its normal routines. Third, it is a process by which the community achieves the goal of returning to normal routines' (Lindell, 2013, p. 812).

The scope of post-disaster recovery covers a wide range of issues from economic, demographic, infrastructure to transportation (Aldrich, 2012a). This thesis follows the definition put forward by Aldrich (2012a) from a social science perspective, that post-disaster recovery is '*the process of repopulation by survivors – who may have fled or been evacuated – and the new residents along with the gradual resumption of normal daily routines for those occupants*' (Aldrich, 2012a, p. 5).

Another term that is closely associated with and sometimes even interchangeable with post-disaster recovery is disaster resilience. It has become a widely applied concept in disaster management (Mayunga, 2007) especially after the adoption of the 'Hyogo Framework for Action 2005-2015' by the United Nations in 2005 (UNISDR, 2007). In short, disaster resilience can be defined as the capacity for post-disaster recovery, in terms of its relationship with media, Longstaff (2005) has clearly pointed out that a reliable source of information is one of the most important assets of a resilient system in times of crisis. This

thesis follows the definition also put forward by Aldrich (2012a) that disaster resilience *'is a neighbourhood's capacity to weather crises such as disasters and engage in effective and efficient recovery through coordinated efforts and cooperative activities'* (Aldrich, 2012a, p. 7).

Chapter 2 Background and Literature Review

This chapter covers the background of the Great East Japan Earthquake and the key concepts of post-disaster recovery that are being applied in this thesis.

2.1 The Great East Japan Earthquake – an Unprecedented Challenge

The Great East Japan Earthquake (or sometimes simply called 3.11) refers to the triple disaster triggered by the magnitude 9.0 undersea earthquake that occurred at 14:36 JST on the 11th March 2011. The epic centre was approximately 130km east southeast off the Oshika Peninsula in the north east coast of Japan (Figure 2-1). It is the most power earthquake in record that hit Japan and the fourth most powerful earthquakes in the world since the modern record-keeping began in early 1900s.
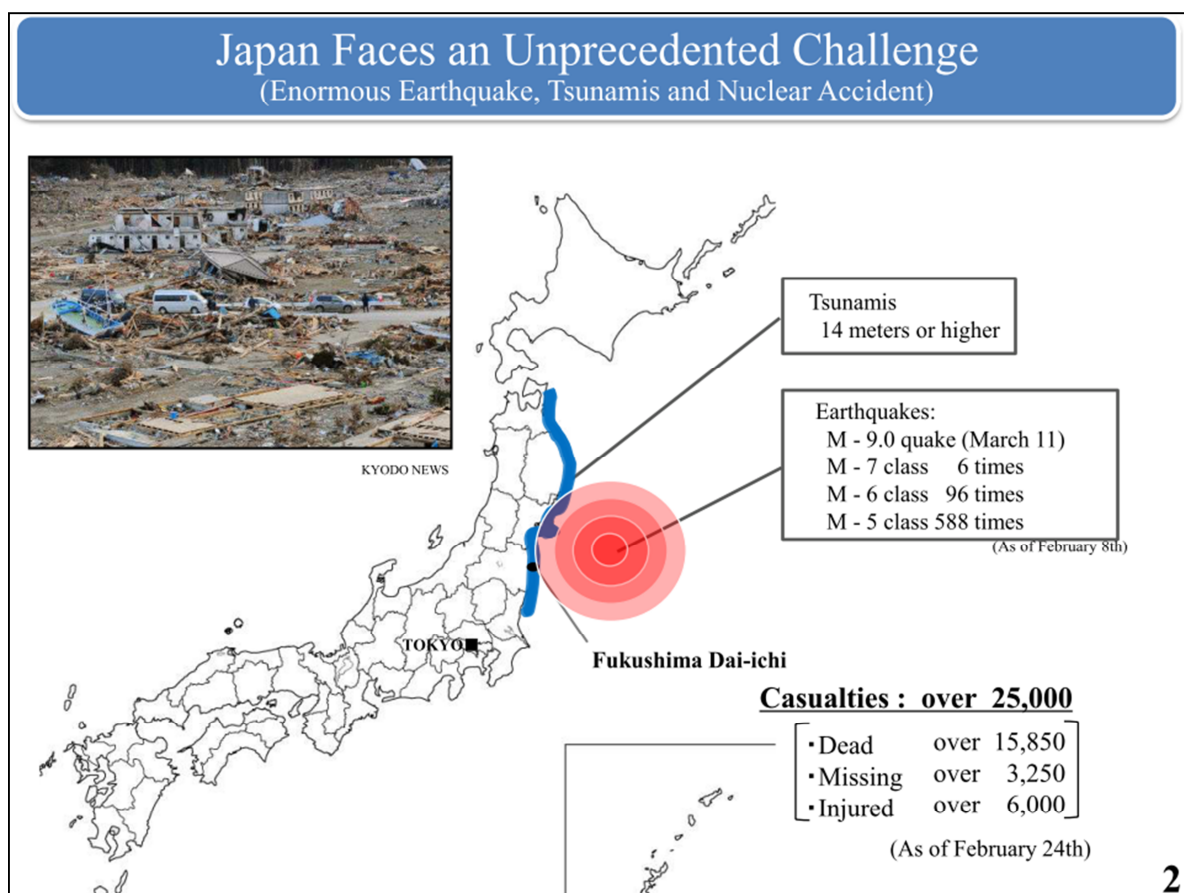
Figure 2-1 'Japan Faces an Unprecedented Challenge'. Source: (METI, 2012b p. 2)

The earthquake trigged a massive tsunami that estimated to have risen up to 38 meters at the highest point. The tsunami struck the east coast of the Tohoku region, mainly along the coastal area of the Iwate, Miyagi and Fukushima prefectures. The destruction of the tsunami stretched 700km along the coastline and covered more than 561 square km. In addition, the tsunami had also the Fukushima Daiichi nuclear power plant accident, the tsunami struck the facility directly and caused the meltdown of three of plant's six nuclear

reactors, made it one of the most severe nuclear power plant accidents in world's history. After the main earthquake, there were more than 600 aftershocks with magnitude 5 or above in the following days and weeks. The earthquake and aftershocks, the subsequent tsunami and the Fukushima nuclear power plant accident are collectively known as the triple disaster of the Great East Japan Earthquake. According to the latest information from the Japanese Government, the disaster had claimed more than 15,880 lives with 2,694 still officially reported as missing and injured 6,135 (Reconstruction Agency, 2013).

The tsunami had destroyed almost all social and economic infrastructures in the coastal area of Iwate, Miyagi and Fukushima, more than 100,000 buildings including hospitals and schools were fully destroyed and another 470,000 buildings were half-destroyed or partially damaged. Almost all seaports along the north east coastline were washed away, the Sendai airport (the major airport in the area) was flooded, and most of the roads, highways and railways were also fully or partially destroyed. In addition, most of the information and communications infrastructure in the area were also destroyed or interrupted due to electrical blackouts and network congestion. In total, the disaster had cost at least 16.9 trillion yen (approximately 135 billion US dollars in 2011) of damages. The recovery period was estimated to last at least 10 years and the recovery budget from the government was estimated to be at least 23 trillion yen. Beyond the Tohoku area, the earthquake and aftershocks also shook the Kanto area including the capital Tokyo up to seismic scale of 5 upper, disrupted transportations and communications for the following days and weeks. The disaster not only shocked Japan, it had also created profound impacts to the world's economy as the destructions had severely disrupted the supply chain of many industries such as electronics and automobiles. The total economic cost was estimated up to 235 billion US dollars, made it the costliest natural disaster in world history. After the disaster, 163 countries and regions as well as 43 international organisations across the world had sent aid to Japan including rescue teams, volunteers, relief supplies and donations. The total value of the received donations and suppliers was more than 17.5 billion yen (JST, 2011; MIC, 2011a; METI, 2012b; MOFA, 2013; Reconstruction Agency, 2014b; Japanese Red Cross Society, 2014).

2.1.1 Impact of the Disaster

The Great East Japan Earthquake had created many profound impacts to Japan politically, economically to socially.

Political impact – one of the most significant impacts to the Japanese political arena after the Great East Japan Earthquake was the change of the ruling party. As many people in Japan were enraged and disappointed by the way the government (the Democratic Party of Japan (DPJ), the ruling party at that time of the disaster) handled the disaster, as a result, the prime minister, Naoto Kan had to resign 2 months after the disaster and subsequently stepped down in August 2011 due to pressure from the public and the oppositions. In the

following 46th General Election held on the 16th December 2012, the Democratic Party of Japan (DPJ) had suffered a landslide defeat to the opposition party – the Liberal Democratic Party (LDP). Many believe that one of the main reasons of the Democratic Party of Japan's defect was their incapability to response to the disaster and in particular the Fukushima nuclear power plant accident (Kingston, 2012; Harada, 2013; Samuels, 2013).

Economic impact – disruption to the supply chain caused by damages of the transportation infrastructure and electricity shortage because of the Fukushima nuclear power plant accident had created substantial economic impact to Japanese economy after the disaster. The Fukushima nuclear power plant accident had raised the country's concerns of the safety of nuclear power and resulted in the shutdown of all nuclear power plants in Japan, by July 2012, only one of the country's 54 commercial reactors could resumed operation because of strong public opposition (Ryall, 2012). The shutdown of the nuclear power plants had caused electricity shortage across the country and subsequently increased the imports of thermal energy resources such as crude oil and liquid natural gas that had created great pressure on the country's trade account balance (METI, 2012a). In addition, a report by JCER (2012) has estimated that Japan has to pay at least an average of 4 trillion yen per year to solve the energy problem no matter it decides to stay with nuclear energy or to replace it with thermal and renewable energy. For the manufacturing industry, according to METI (2012a), by July 2011, only three months after the disaster, 80.3% of the factories damaged by the disaster were restored. That being said, although the damaged factories were restored fairly quickly, some economists (e.g., Fujita & Hamaguchi, 2011) believed that the Great East Japan Earthquake has a much more profound structural impact to Japan's manufacturing industry. Because the southern Tohoku and northern Kanto regions are an important part of the agglomeration of high tech components for Japanese and global manufacturers, when these areas were damaged by the disaster, this once highly successful just-in-time and agglomerated system had backfired and created a major disruption to the supply chain for all major manufacturers in Japan and also across the world. Such disruption had forced many manufacturers to suspend the manufacturing or to shift to other suppliers overseas. For example, in July 2011, METI (2012a) surveyed 422 companies which their supply chain was affected by the disaster, and 50.2% of them had already switched to overseas suppliers. Furthermore, Although some still cast doubt on its viability and sustainability (e.g., Hayashi, 2014), another indirect but profound economic impact after the disaster was the introduction of 'Abenomics' - the aggressive economic reform with consists of monetary policy, fiscal policy and economic growth policy advocated by Prime Minister Shinzo Abe since he came to power in 2012 to revitalise the country's economy and to cease the two decades of deflation (Harada, 2013; Inoguchi, 2014).

Social impact – the Great East Japan Earthquake had changed the life of many in Japan as well as their perceptions of life. For instance, surveys have found that many had felt more insecure after the disaster, some felt they should spend more time with their

family, and most had become more cautious on the environment and conservative on energy consumption. In particular, many people had become very concern about the safety of nuclear electric power that the country has embraced for decades (e.g., Aldrich, 2012b; Scalise, 2012; Shibata & Iwai, 2012; Dentsu Macromill Insight, 2013).

The disaster had also raised the feelings of bonds or 'kizuna' (the connections between people and within family and society) among many people (Samuels, 2013). This word was first officially referred to the disaster by Prime Minister Naoto Kan in his statement 'Kizuna: The Bonds of Friendships'[5] one month after the disaster to express the gratitude from Japan to all the countries that had sent help during the disaster. After that, the word had been widely adopted by the media and quickly spread across the country. It became the representation of the solidarity and resilience of the people in the disaster area in Tohoku and also a symbol of the country's will to unite together to overcome the difficulties. The word was widely used in fund raising and charity events in the media. One of the examples was that when the Japanese Women football team won the 2011 FIFA Women's World Cup, the team selected 'kizuna' as their theme that '*provides us with the strength to rise above adversity and the courage to overcome our setbacks and misfortunes*' (Japan Football Association, 2013). The word had subsequently become the kanji (Chinese character) of the year for 2011 selected by the public in Japan (BBC News Asia, 2011).

Another noticeable impact to the Japanese society after the disaster was the revival of social and political activism. Within the first year after the disaster, almost one million people had volunteered in different kinds of post-disaster recovery activities both inside and outside the disaster area. In addition, after the disaster, a series of large scale demonstrations never seen since the 1960s were carried out by the public, the main theme of these demonstrations was to protest against the government's nuclear power policy. For example, 60,000 people assembled in Tokyo in September 2011 to join an anti-nuclear power plant rally to urge the government to shut down all nuclear power plants. In July 2012, more than 170,000 people gathered again in Tokyo to support the Sayonara-Genpatsu (goodbye nuclear power) demonstration, and 200,000 people surrounded the diet to demand the government to change its nuclear electric power policy. In March 2013, 60,000 people again assembled near the diet building in Tokyo to protest against the government's plan to restart the nuclear plan. Other than the fact that such long lasting demonstrations were not seen for decades in Japan, in these demonstrations, many were women and young people who were not active in political engagement before. In addition, social media had played an important role in the organisation and promotion of these demonstrations, that many people had turned to social media as the alternative source of information as they had become more and more distrustful of the information from mass media which are often believed to be controlled by the government (Slater, 2011; Kingston, 2012; Manabe, 2013).

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[5] Kizuna – The Bonds of Friendship. Speeches and Statements by Prime Minister, Prime Minister of Japan and His Cabinet. http://japan.kantei.go.jp/kan/statement/201104/11kizuna_e.html [Accessed 4 September 2014].

2.1.2 The Recovery

According to the latest report from the Japanese government, by August 2014, most of the key infrastructures that were destroyed by the disaster are fully or partially restored (Reconstruction Agency, 2014a). For example, the clearing of debits, reconstruction of sewages and river dams as well as critical social infrastructures such as schools and hospitals, and transportation infrastructures such as highways and railways, are fully or close to fully completed. Other restorations such as decontamination, temporary housing, sea walls and harbours were also well underway. The number of people had to evacuate from their home was reduced from 470,000 after the disaster to 247,000. Revival of local business and industries were also under progress, for instance, for the fishing industry that the area is heavily depended on, 60% of the fishing ports and 80% of the fish processing factories were restored. In fact, due to the intense reconstructions, some even say that there was an economic boom going on in some regions in the disaster area (e.g., Voigt & Boykoff, 2012).

For most people in Japan, life had also returned to normal, for instance, a survey conducted by Dentsu in 2013 has found that 80% of the people in the Tokyo metropolitan area felt that their daily life had returned to normal after the disaster (Dentsu Macromill Insight, 2013). This is also reflected on the number of volunteers and donations went to the area, which were reduced to only a few per cent from the peak (Watanabe, 2014) as shown in Figure 2-2 and Figure 2-3.

Figure 2-2 Average Monthly Donations for the Great East Japan Earthquake (x hundred million yen per month). Source: (Watanabe, 2014 p. 323)

万人

20
18
16
14
12
10
8
6
4
2
0

東日本大震災ボランティア（月ごと）

2011年3月　5月　7月　9月　11月　2012年1月　3月　5月　7月　9月　11月　2013年1月　3月　5月　7月
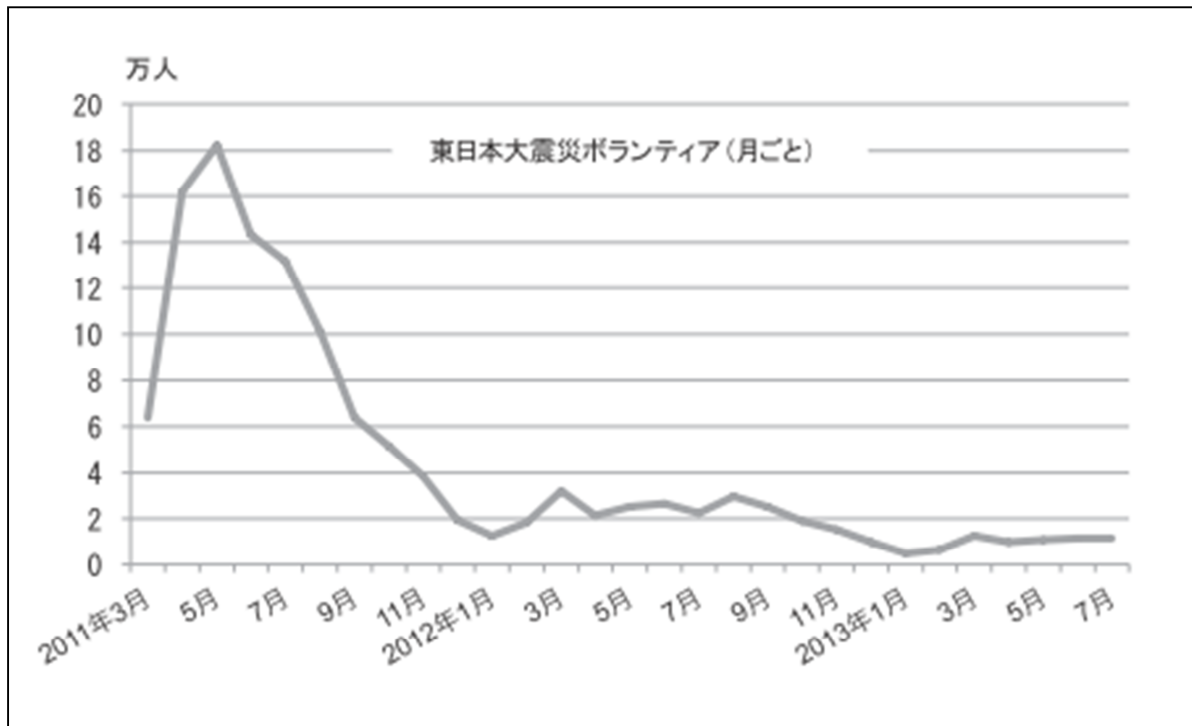
Figure 2-3 Average Monthly Volunteers for the Great East Japan Earthquake (x ten thousand people per month). Source: (Watanabe, 2014 p. 324)

However, for those that are living in the disaster area, especially the quarter of a million people that are still living in the evacuation centres, the story is very different. For instance, a survey conducted by NHK in 2014 has found that 44% of the people in the disaster area felt that there was no progress on the recovery at all and another 36% felt the progress was slower than they had expected (NHK Newsweb, 2014). Indeed, an survey by Imai (2014) on the victims living in the evacuation centres since 2011 has found that approximately half of them were still living away from their family, their hope of returning home were diminishing, and many still felt very frustrated towards the situation. In addition, other studies have found that many disaster survivors were suffering from 'secondary damage' such as physical and mental illnesses due to stresses and depressions (e.g., Ishikawa, 2013; Yabe et al., 2014; Yokoyama et al., 2014).

In fact, similar situation was also found in the 1995 Great Hanshin Earthquake that occurred almost 20 years ago, although the damaged infrastructures were restored within a few years, the human and social recovery had taken much longer time (Shaw, 2014; Shaw & Goda, 2004). In addition, Hayashi (2013) has pointed out, approximately 5 years after the Great Hanshin Earthquake, when the 'recovery boom' was over, the economic growth of the disaster area had slowed down and lagged behind the national average, and the local governments were staggered with problems such as high level of debts and shrinking population.

2.1.3 Compare with the Great Hanshin Earthquake

Prior to the Great East Japan Earthquake, the most severe earthquake that hit Japan in recent history was the Great Hanshin Earthquake (the Kobe Earthquake) that occurred on the 17th January 1995. The M7.3 earthquake that struck the southern part of Hyogo prefectures had cost 6,434 lives and 10 trillion yen of damages (Kobe City Fire Bureau, 2006). Therefore, many researchers tried to draw the experience from it and compare it with the Great East Japan Earthquake this time. For example, based on the work by Sato (2012), comparing with the Great Hanshin Earthquake, four unique challenges that are faced by the Great East Japan Earthquake this time can be drawn as below.

1. First is the type of disaster damage, the tsunami of Great East Japan Earthquake had stretched over 700km along the coastline and the types of damage were very diverse as the disaster areas were widely dispersed across many types of terrain such as cities, urban areas, suburban areas, farm villages, coastal towns and fishing villages. Such diverse types of damages made the organisation and management of recovery very complicated, especially it had to deal with damages from tsunami, floods, building collapses and fires. In comparison, the types of damage of the Great Hanshin Earthquake were much more homogeneous since it was an inland earthquake.

2. Second is the damage to the infrastructures, although the damages caused by the Great Hanshin Earthquake were also very severe, but part of the social infrastructures was still intact. In comparison, in the case of the Great East Japan Earthquake, the tsunami had destroyed almost the entire social and lifeline infrastructures including highways, railways, roads, hospitals as well as electricity and water supply facilities, given the vast area it covered, this also made the recovery extremely challenging.

3. Third is the aging and shrinking population, aging population is a prominent social problem in Japan, compared with the Great Hanshin Earthquake that occurred almost 20 years ago, the problem now had become even more severe. In particular, the three prefectures that sustained the most damages (Iwate, Miyagi and Fukushima) are some of the 'oldest' areas in Japan with more than 30% of the population were 60 years old and above (MIC, 2010). Other than the fact that these elderlies are more vulnerable to the disaster. For example, more than 60% of the casualties were 60 years old and above (Cabinet Office, 2012), their ability to recovery is also much weaker than the younger people.

4. Fourth is the continuous problem of the Fukushima nuclear power plant accident, which until today there is still no definite solution and there are still many uncertainties. Furthermore, many people were forced to leave their home for an indefinite period of time and hence, the financial, physical and psychological stresses they had to endure are very different from those that lost their home due to fire and collapse which can be rebuilt in the same location as in the case of the Great Hanshin Earthquake.

That being said, a lot still can be learnt from the experience from the Great Hanshin Earthquake, especially the important role of NGOs and local communities had played. As it could be seen during the Great Hanshin Earthquake, it was the neighbours and local communities that provided the first line of rescue, and subsequently they had played an important role to formulate, organise and execute the recovery and rebuilding process. In fact, the experience from the Great Hanshin Earthquake had raised the public's as well as the government's awareness on the importance of the social aspect of disaster preparedness and recovery, in particular the role of NGOs and the local communities in immediate disaster response and also in long term recovery (Tatsuki & Hayashi, 2002; Nishide, 2009; Aldrich, 2012a; Yamamura, 2014). In fact, these lessons learnt from the Great Hanshin Earthquake had led to the amendment of the 'Basic Policy' in the 'Basic Act for Disaster Countermeasures' to strengthen the communication and participation between NGOs, residents and local government as well as among the residents themselves (Mimaki & Shaw, 2014). In addition, the experience from the Great Hanshin Earthquake had also become the model of local community based recovery for many other disasters overseas (Nakagawa & Shaw, 2004).

2.2 Post-Disaster Recovery

Generally speaking, disaster management can be divided into three major phases; 1) the pre-disaster phase that focuses on risk assessment and preparedness, 2) the response phase that covers immediate disaster response and assistance and 3) the post-disaster recovery phase - the target of this study, which emphasises on on-going development strategies and activities for infrastructure restoration, social and economic recovery and rehabilitation (Todd & Todd, 2011). As shown in Figure 2-4, the three phases are linked with one another and formed into a cycle, and therefore, despite the fact that this thesis focuses mainly on the post-disaster phase, it is still important to understand the aims and requirements of the other two phases.
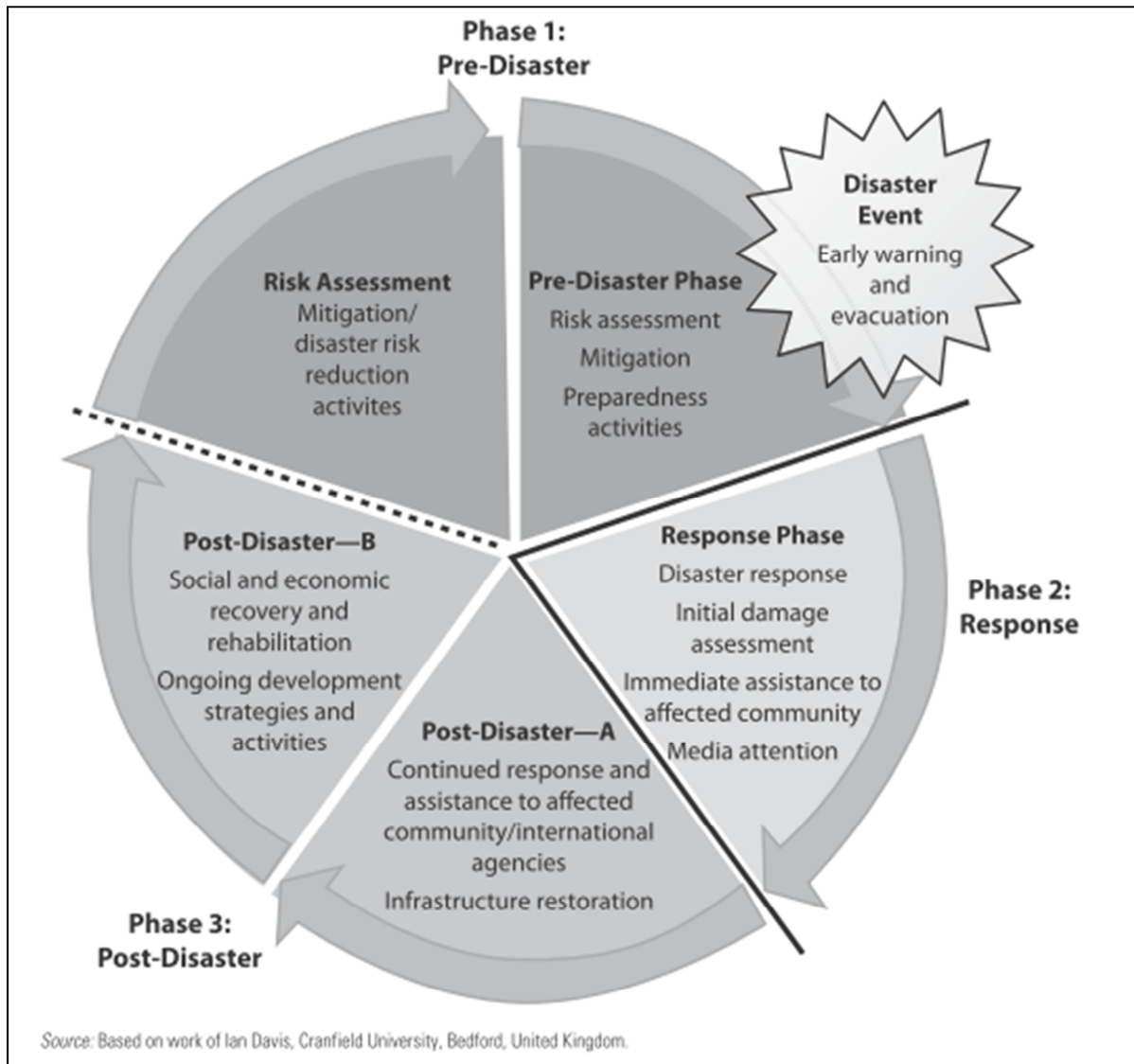
Figure 2-4 Phases of Disaster Management Cycle. Source: (Todd & Todd, 2011, p. 16)

- Phase 1 'the pre-disaster phase' mainly focuses on the preparation. It consists of 4 main elements, risk awareness and assessment, mitigation and prevention, disaster preparedness, and risk reduction. In particular disaster reduction and preparedness are closely linked with each other. They both stress on planning, knowledge development and public commitments, which in most cases these are drawn from the experience and knowledge from the recovery of previous disasters.

- Phase 2 'the response phase' begins immediately after a disaster struck, it concentrates in immediate rescue, relief and medium-term response that leads to the recovery phase by assessing damages to the infrastructure, communities, business and industries etc. The response phase usually ends when the situation stabilised, and in practice, it often overlaps with the post-disaster recovery phase.

- Phase 3 'the post-disaster recovery phase', the focus of this study. It includes activities for recovery, rehabilitation, and reconstruction. Usually it begins with the definition of

the recovery goals and objectives, arrangement of resources and then followed by different reconstruction projects to rebuilding infrastructures, homes and industry links to restore the society and the economy back to the pre-disaster status. It ends when these objectives are met, and then it creates the necessary improvements and adjustments to reduce future disaster risk, and the cycle go back to phase 1 again.

Furthermore, according to Lindell (2013), post-disaster recovery has three distinct but interrelated meanings.

'First, it is a goal that involves the restoration of normal community activities that were disrupted by disaster impacts…Second, it is a phase in the emergency management cycle that begins with stabilization of the disaster conditions (the end of the emergency response phase) and ends when the community has returned to its normal routines. Third, it is a process by which the community achieves the goal of returning to normal routines' (Lindell, 2013, p. 812)*.*

The scope of post-disaster recovery covers a wide range of topics such as economic, demographic, infrastructure and transportation (Aldrich, 2012a). This thesis follows the definition put forward by Aldrich (2012a) from a social science perspective, that post-disaster recovery is '*the process of repopulation by survivors – who may have fled or been evacuated – and the new residents along with the gradual resumption of normal daily routines for those occupants*' (Aldrich, 2012a, p. 5). Another term that is closely associated with or sometimes even interchangeable with post-disaster recovery is disaster resilience. As Mayunga (2007) points out it has become a widely used concept in disaster management especially after the adoption of the 'Hyogo Framework for Action 2005-2015' by the United Nations in 2005 (UNISDR, 2007). He further defines that

'Resilience can be measured in terms of the time it takes to recover or come back to normalcy (equilibrium)...However, social systems are in continuous state of change, so the notion of bouncing back to original state (equilibrium) after disaster is undesirable as it would leave the system just as vulnerable as before' (Mayunga, 2007, p. 4)*.*

In short, disaster resilience is the capacity for post-disaster recovery, this thesis follows the definition also put forward by Aldrich (2012a) that resilience '*is a neighbourhood's capacity to weather crises such as disasters and engage in effective and efficient recovery through coordinated efforts and cooperative activities*' (Aldrich, 2012a, p. 7). Furthermore, as Mayunga (2007) points out, post-disaster recovery is a long-term process of the community to restore itself to its pre-disaster condition, in which requires different types of capital from economic, human, physical, natural to social. Among all different types of capital, studies on the recovery progress of previous disasters have found that social capital is one of the most important factors, that communities which had a higher

level of social capital were found to have recovered faster than those with lower levels (Nakagawa & Shaw, 2004; Aldrich, 2012a).

2.3 Post-Disaster Recovery and Social Capital

The fundamental notion of social capital is about the connections and networks between people, as Field (2008) describes: '*by making connections with one other and keeping them over time, people are able to work together to achieve things they either could not achieve by themselves, or could only achieve with great difficulty…these networks can be considered as valuable capital*' (Field, 2008, p. 1).

The concept of social capital began from the works of Bourdieu and Coleman in the 1980s and 1990s. Since then, in particular after Putnam's works in 1993 which brought the concepts into mainstream media, social capital has been widely adopted in many different fields of study, in particular in social and political sciences, and it subsequently evolved into a multidisciplinary concept (Field, 2008). This study follows the definition put forward by Putnam that '[*social capital is*] *the features of social organisation, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions*' (Putnam, 1993, p. 167). In his later work, he futher elaborates that social captial consists of three main components; trust, social norms and social networks, which can be classified into two major types; bonding - the closed and inward type within a homogeneous group, and bridging - the open and outward type among diverse groups (Putnam, 2000). In his recent works, Putnam (2007; 2009) has future explored the evolution of social capital by applying the concept on the problems caused by ethnic diversity from immigrants in the US, he finds that although some ethnically diverse communities tend to have a lower level of traditional social capital such as lower level of trust and civic participation, the successful ones have overcome this by '*creating new, cross-cutting forms of social solidarity and more encompassing identities*' (Putnam, 2007, p. 137).

That being said, social capital has a dark side as well, for example, social fragmentation, isolation and even polarisation are also driven by social capital, in an extreme case, as Putnam (2009) himself has pointed out '*Al Qaeda, for instance, is an excellent example of social capital, enabling its participants to accomplish goals they could not accomplish without that network*' (Putnam, 2009, p. 138). Another major criticism of social capital is its vague and soft definition, as Portes (2000) argues, although he acknowledges the positive effects alleged with social capital, however, these positive effects may be spurious after controlling for other factors. Furthermore, because of the intangible characteristics of social capital, it is still being debated whether or not it can be classified as a quantifiable form of capital which according to conventional economic theories should be able to be generated, stored and transferred (Sobel, 2002).

Japan is considered to be a relatively 'rich' social capital country due to its historical and geographical background, it is characterised by a very high level of inward bonding type, but at the same time a relatively low level of outward bridging type (Inoguchi, 2000; Halpern, 2005). As Inoguchi (2000) points out, Japan's high level of inward bonding social capital was one of the main reasons for the country's remarkable democratic and economic growth after the Second World War as well as the reason that made the country highly resilient to the frequent natural disasters in the past. Indeed, studies (Nishide, 2009; Ogawa, 2009) have found that the local communities and NGOs in Japan that are driven by this type of bonding social capital had played an irreplaceable role in the relief and recovery of many natural disasters in the past. However, Inoguchi (2000) has critically pointed out that on top of the fact that Japan's level of bonding social is depending because of its aging and shrinking population, in this age of globalisation, just relying on the inward bonding social capital is not sufficient anymore. Hence, it is critical for Japan to transform its closed type of social capital to incorporate the more open bridging type of social capital.

In its applications in post-disaster recovery, studies on the recovery process of previous disasters have found that it is one of the most important factors contributing to the recovery efficiency. For example, the inward bonding social capital, in particular the trust towards local communities and authorities can enable a high level of collective action and decision making to unify the community over difficult times. At the same time, the outward bridging type, for instance the bridging networks to other communities and government authorities can enable the community to obtain additional external resources and information. The optimal effect is found when both bonding and bridging type are present. Furthermore, on top of the bonding and bridging social capital, civic participation is also found be a very important element for the efficiency of the recovery process because it can effectively link up the two social capital elements. The dynamic of these three components has explained why some communities could recovered and thrived after a disaster while some others just died out slowly even though they were in the same country (Nakagawa & Shaw, 2004; Mathbor, 2007; Hawkins & Maurer, 2010; Aldrich, 2012a). For example, participation in civic activities can increase the level of bonding trust towards the community, and subsequently increases the sense of ownership through collective decision making as well as increases the opportunities to establish more bridging connections externally, and these interactions will form a virtuous cycle to fuel the recovery continuously in the long run (Kweit & Kweit, 2004).

2.4 Social Capital and Media

Since the diffusion of the Internet in the 1990s, many scholars have placed high expectation on its potentials on the development of social capital (Putnam, 2000; Lin, 2001; Norris, 2001; 2003), and many studies have been carried out from different perspectives to investigate its effects. However, studies in the early 2000s found that although the Internet is an efficient communication tool to close geographical and political gaps, just the Internet

alone is not sufficient to develop social capital (e.g., Uslaner, 2000; 2004; Yang et al., 2009). It was not until the mid-2000s with the wide spread of social media applications (e.g., social network sites and blogs) that studies began to find that the Internet, in particular social media offer significant potentials to the development social capital (e.g., Ellison et al., 2007; 2011; Valenzuela et al., 2009; Kittilson & Dalton, 2010). Furthermore, recent studies by Rainie et al. (2011; 2012) have shown that Internet users are indeed more likely to be active in voluntary group and civic activities than non-Internet users, and social media have now become a feature of political and civic engagement.

In comparison, the mass media, in particular television is long found to have strong influences on social capital. As Putnam famously claimed, television was the main cause of the decline of social capital in the United States after the Second World War because of its time-displacement effect (Putnam, 2000). However, subsequent studies have found that the effect was not always one-sided, instead it was depended on the type of television programmes being viewed rather than the time spent on watching television. For instance, the viewing of informative television programmes such as news and current affairs is found to have a strong positive effect on the development of social capital because such programmes can create a shared experience and increase the level of awareness of social issues and current affairs among the public (Norris, 1996; Shah, 1998; Hooghe, 2002).

That being said, although it is apparent that both the Internet and television can increase people's awareness and engagement on social issues, it does not directly imply that they can lead to actual civic and political participation in real life. In fact, the use of media can create the opposite effect, as Lazarsfeld & Merton (1971) argue; the rich information from media can create the 'narcotizing dysfuncation' effect, which means that

> *'[the audience] takes his secondary contact with the world of political reality, his reading and listening and thinking, as a vicarious performance. He comes to mistake knowing about problems of the day for doing something about them'* (Lazarsfeld & Merton, 1971, p. 235).

In other words, people replace 'doing' with just 'knowing'. Indeed, as Kittilson & Dalton (2010) have pointed out, although the Internet has created many virtual civic societies online, however, studies on the effects of these virtual societies on civic participation in real life have given mixed results, and many have casted doubts on the linkage between online civic participation and actual civic participation in offline world. One of the answers to this question is by the studies by Shah et al. (2001; 2005; 2007). Using the communication mediation model, they suggest that informational media uses indeed have positive on civic engagement. However, these effects are indirect. They do not claim that media have no direct effects at all, but instead, most of the effects are mediated by the mediator in between. In other words, some processes are necessary to explain the effects of media on civic engagement. In their studies, they have found that interactive civic discussions such as

interpersonal talk and interactive messaging online can be an effective mediator. They explain that it is because this kind of communication can increase people's opportunity to come into contact with different perspectives, gain exposure on civic resources, and obtain knowledge and understandings of civic issues. Indeed, based on a similar concept, other studies (e.g., Kobayashi et al., 2006; Gil de Zúñiga et al., 2007; 2012; Gil de Zúñiga & Valenzuela, 2011) have also found that online civic participation can indeed lead to civic participation in the offline world.

2.5 ICT and Post-Disaster Recovery

Information Communications Technology (ICT) is the underlying driver of media diffusion. It is known to be one of the main forces for social change, for instance, the rise of Internet and social media had completely changed the way of communication in modern society (Samuels, 2013). ICT always played an important role in disaster management from the use of the paper bulletin boards in the 1923 Great Kanto Earthquake to the use of online message boards during the 2011 Great East Japan Earthquake. In particular in the past decade, with the rapid diffusion of mobile communication and social media, the importance of ICT in disaster management has increased substantially. For instance, mobile communications is found to be one of the most effect tools in disaster management, reports from the Great East Japan Earthquake (MIC, 2011a) as well as earlier disasters such as the 2005 Hurricane Katrina in the USA, the 2005 Central Europe Floods and the 2004 Indian Ocean Tsunami have all shown that mobile communications is the most effective and valuable communication tools for early warning, immediate response and recovery. It is because mobile communications can recover much faster than the other forms of communications, and also has the capability to decentralise the sharing of information (Coyle, 2005). With the development of mobile Internet, social media have increasingly become one of the most important sources of emergency information. A study conducted by the American Red Cross (2012) has found that social media had become the 6th most important source of emergency information for Americans. Similarly, in Japan, the survey by MIC (2011a) has found social media were considered the 7th most important source of information after the Great East Japan Earthquake. As for ICT as a whole, MIC (2011a) has found that after the earthquake ICT has effectively 1) provided a diversified content distribution method for broadcasters, public institutions and local newspaper; 2) allowed information to be made available immediately after the earthquake; 3) empowered ordinary citizens to disseminate information and 4) provided a new way for both individuals and organisations to extract, organise and redistribute information according to their own needs. However, at the same time, there are also some drawbacks from the use of ICT after the Great East Japan Earthquake, for example, MIC (2012) have pointed out that ICT is vulnerable to the loss of electricity and it is risky to rely on any single source of information technology. At the same time, the free flow of information over the Internet and social media could become confusing and difficult for users to find the correct information

especially in emergency situation. For instance, based on the experience during the 2010 Haiti earthquake, a report by United Nations Foundation (2011) has found that the combination of the new ICT tools had created an information overflow that was more than most NGOs can handle, and it had presented many challenges on how to effectively manage the large amount of information. With the continuous development of ICT, it is anticipated that the volume and diversity of information will continue to increase, and how to utilise ICT for post-disaster recovery has become a main challenges for researchers and scholars.

2.6 Post-Disaster Recovery, ICT, Media and Social Capital

Summing up from the above observations, it can be seen that:

1. The Great East Japan Earthquake posts an unprecedented challenge to Japan with a recovery period estimated to take at least 10 years.
2. Post-disaster recovery is a long-term process which requires different types of capital, and social capital is one of the most important types.
3. Social capital can be developed by the use of both mass and social media.
4. Driven by ICT advancements, both mass and social media played a very critical but different role after the disaster.

Looking back to the research question raised earlier in chapter 1 - what can mass and social media contribute to the post-disaster recovery in the long run? In particular, what are the effects (if any) of mass and social media in post-disaster recovery and how do they work? In response to this question, it is logical to link up the above four key observations and to anticipate that in the case of the Great East Japan Earthquake, the use of media can contribute to the post-disaster recovery by creating positive effects on the development of social capital – the capacity for a community to recovery effectively. Although the relationship between the use of media and social capital, between social capital and post-disaster recovery, and between the use of media and post-disaster recovery have been studied independently. However, as mentioned in chapter 1, because of the infrequent occurrence of large scale natural disasters and the fast changing pace of the media environment, currently very limited number of studies have been conducted to link these three concepts together, in particular and very few have taken consideration of the complex media environment in a highly mediated society such as Japan and the challenges posted by the Great East Japan Earthquake. Therefore with this background in mind, this thesis is set off to fill this knowledge gap by investigating the effects and the underlying mechanisms of the use of mass and social media on social capital in the context of post-disaster recovery in Japan; one of the world's most sophisticated media societies in the world, after the Great East Japan Earthquake; one of the most severe natural disasters in recent history.

Chapter 3 Theoretical Framework

This chapter[6] presents the details of theoretical framework of this thesis including the key theories behind.

First of all, as it can be seen during the Great East Japan Earthquake, both the traditional mass media and the rising social media had played a critical role for many people. However, it should be noted that in fact they are very different by nature. For instance, mass media (e.g., television, newspapers) are a vertical network wherein a similar message is simultaneously broadcasted from a few sources to the audience at large in more or less one direction. The flow of information (e.g., what and when to broadcast) is usually managed by professional gatekeepers[7] (e.g., journalists, editors) and mass media typically represent the verified and official information (Watson & Hill, 2012). On the other hand, social media (e.g., social network sites, blogs, and message boards) are a group of Internet-based applications built on Web 2.0 that enable the users to create and share their own content over the Internet. Social media have created a horizontal network in which the users can assume their own gatekeeping role to decide what, when as well as who to communicate with (Kaplan & Haenlein, 2010).

In reality, however, the differentiation between these two media is not as clearly cut, especially driven by the convergence of mass and social media. As could be seen during the Great East Japan Earthquake, the government and authorities had also begun to use social media to communicate with the public (Yoshimura & Inoue, 2012), and at the same time, user generated content such as frontline reports from the disaster area originated from social media had made into news headlines in traditional mass media (Slater et al., 2012b). The convergence of the vertical and horizontal network has created a new form of socialised communication that Castells (2007) envisions as the 'mass self-communication' which is '*self-generated in content, self-directed in emission, and self-selected in reception by many that communicate with many*' (Castells, 2007, p. 428). Based on this concept, Cardoso (2011) further elaborates that mass communication in modern societies has evolved into 'network communication', which is '*a constant reformulation of relations between media forms, interconnecting interpersonal communication media and mass media*' (Cardoso, 2011, p. 119). Under this new form of communication, the boundaries between mass and social media, as well as the role of information producer and consumer are becoming more and more blurred. This new form of communication has shifted the power from the media producers to the consumers. It has created a new generation of audience, who no longer

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[6] Part of this chapter is based on the paper titled 'The Effects of the Use of Mass and Social Media on Post-Disaster Recovery – A Theoretical Framework' (Cheng, 2014) by the author.

[7] The term gatekeeper refers the controllers of the Gatekeeping process in media - '*a regime of control over what content is allowed to emerge from the production processes in print and broadcast media; the controllers (journalists, editors, owners) of these media, in other words, control the gates through which content is released to their audiences*' (Bruns, 2005, p. 11).

depend on the mass media as the sole information source, they actively utilise alternative media resources online to confirm, contribute and even challenge the information from the mass media. In other words, as people can now be audience of mass media and user of social media at the same time, media audience and user are become one, hence, acknowledging this fact, in this thesis, the term 'audience', 'user' and 'people' are exchangeable.

Under this new media environment, it has become impractical and unrealistic to separate and analyse the effect of mass and social media individually. How to evaluate the effect of different media in this new media environment has been a puzzle for many researchers and scholars, specifically, knowing the fact that just the exposure of people to information is often not sufficient to conclude that it has affected their behaviour. In media, social and political studies, many researches and debates have been carried out to tackle this question, two of the most widely adopted but often rivalry approaches are the passive audience and the active audience perspective (Biocca, 1988). In a nutshell, the passive audience perspective sees that the audiences are passive '*conformist, gullible, anomic, vulnerable, victims'* (Biocca, 1988, p. 51)*,* and the active audience perspective assumes the audiences are *'individualistic, "impervious to influence", rational, and selective'* (Biocca, 1988, p. 51). As their name and definition indicate, the two perspectives are contradict with each other, while the passive audience perspective resembles the characteristics of mass media audiences in the vertical one way network, the active audience perspective can represent the characteristics of social media users in the horizontal interactive network. Therefore, in order to evaluate the effects of both mass and social media simultaneously, one of the possible way is to evaluate the combined effects of the media from the two different but related perspectives first, and then to synthesis the findings and look for commonalities and differences.

3.1 Passive Audience Perspective

As its name suggests, the passive audience perspective sees that people in general are passive and are '*grey, uniform, anomic, faceless, gullible, and defenseless against the power of the propagandist*' (Biocca, 1988, p. 56). In simple words, most people are at the mercy of the directly influence from media, this perception is often associated with mass media, in particular television, which is found to be able to exert great influence to alter people's perceptions of the reality and behaviours as were seen in the many propagandas throughout modern history (Watson, 1998). The passive audience perspective in media studies is most notably represented by the cultivation theory pioneered by Gerbner and his research team in the early 1980s (Gerbner et al., 1980), they define the concept of cultivation as the '*the independent contributions television viewing makes to viewer conceptions of social reality*' (Gerbner et al., 2002, p. 47). They propose that the viewing of television can cultivate a common perspective that represents a homogenised set of perceptions of reality which can override social diversity known as the 'mainstream effect',

i.e., the more people receive the same message from the media, the more likely they will believe in it. Second, referred as the 'resonance effect', people will resonate their own background and experience with the information from media, thus the closer resemblance the message from the media to people's own experience, the more likely they will trust that message. Furthermore, they have found that the cultivation effect from television is especially salient with the violence and crimes being shown on television, known as the 'mean world syndrome' - that the viewing of television mainly affects people perception of dangers and risks in society (Gerbner, 1988; Gerbner et al., 2002). Constructed mainly based on the features of television, they further describe the cultivation process be defined as a '*massive, long-term and common exposure of large and heterogeneous publics to centrally produced, mass-distributed and repetitive systems of stories*' (Gerbner et al., 2002, p. 47), and that '*the more important, consistent, and coherent [the messages in these stories are,] the more cultivation can be expected*' (Gerbner et al., 2002, p. 60).

On the surface, these assumptions drawn from television – a vertical mass media, which by definition is the exact opposite of the horizontal structured social media which are characterised by fragmentation and diversity. However, as it was seen in the case of the Great East Japan Earthquake, in a 'mass self-communication' society such Japan, mass and social media were highly converged and intertwined. For instance, after the disaster, the shocking video footages of the tsunami were broadcasted over mass media and also were shared repetitively on social media all over the world, and subsequently created a much wider and prolonged effect than the mass media did initially. In this respect, social media also fit the criteria of the cultivation process, thus social media user will also be subjected to the cultivation effect from the media. Furthermore, although the cultivation theory is usually associated with negative effects such as fear and terror as well as consumerism and propaganda, as Gerbner et al. (2002) have pointed out, it also acknowledges that media can also be applied on positive aspects such as to unify the society over regional, political and socioeconomic differences and help to '*absorb or override differences in perspectives and behaviour that ordinarily stem from other factors and influences*' (Gerbner et al., 2002, p. 51). In addition, they have stressed that cultivation is not a one-way, monolithic process; instead it is an integral aspect of a dynamic process through which the media messages affect the values and social norms of the public. Therefore, on top of being able to represent mass media and their audience, the passive audience perspective, in particular the cultivation theory can also represent some features of social media and their user as well.

3.2 Active Audience Perspective

Contrary to the passive audience perspective, the active audience perspective sees that most people are active. Hence, they are more than just audience, specifically, 'audience activity' can be defined as people's 'selectivity' – selective in attention, perception, retention and selective in exposure, 'utilisatiarians' – the utility of information and media source, 'intentionality' – the processing and cognitive of incoming information and

'involvement' – the involvement with both cognitive effort and affective arousal (Biocca, 1988). In other words, the active audience perspective sees that most people are actively making their own decision on their utilisation of media, as well as on their understanding of the messages and their involvement in the media selectively. As Biocca (1988) further defines,

> '[active audience] implies a vigilant, self-directed, rationalistic consciousness aware of its needs and motivations, being media materials in pursuit of these motivations and in the maintenance of cognitive independence' (Biocca, 1988, p. 63).

Hence, from the active audience perspective, the effects from media are often indirect, and are often depended on people's own choices and actions. One of the widely adopted theories developed from this perspective in media studies is the uses and gratifications theory pioneered by McQuail et al. (1972). It is based on the assumption that people in general are active and capable of making their own decisions on what kind of media to consume and how to make use of the information. As Watson (1998) defines, the uses and gratifications theory assumes that '*people are capable of making their own minds up, accepting some messages, rejecting others, using the media for a variety of reasons and using them differently at different times*' (Watson, 1998, p. 62).

Watson (1998) further elaborates that people make use of the media to gratify their needs for complimentary and/or supplementary purposes driven by four main reasons; 1) diversion – to escape from problems or burdens in real life, 2) personal relationships – to seek companionship and support, 3) personal identity – to reflect their own identify and value, and 4) surveillance – to gain awareness of the situation (Watson, 1998). The uses and gratifications theory also suggests that the use of media alone is usually not sufficient to change in people's perceptions and behaviours, rather it is through these activities - the making use and making sense of the information from the media - that their perceptions and behaviours are altered (Rubin, 2002). The rise of the Internet and social media has further increased the importance and popularity of the uses and gratifications theory to evaluate the effects of media on the user (LaRose & Eastin, 2004; Quan-Haase & Young, 2014), especially with addition of concepts such as 'interactivity' – wherein the user can interact with the media providers as well as other users, 'demassification' - the individualised selection of media and 'asynchroneity' – meaning that audiences can consume the information at their own selected time (Ruggiero, 2000). Based on the uses and gratifications theory, Dutta-Bergman (2004; 2006) has pointed out that in crisis situations such as major disasters, people indeed tend to utilise all available media sources to gratify their needs, and hence, instead of competing, in these situations different media can often complement each other. This phenomenon can also be seen in the case of the Great East Japan Earthquake, hence, while the active audience perspective can represent social media users, at the same time, it can also describes of the behaviours of mass media audience as well.

3.3 Social Cognitive Theory

Both the cultivation and uses and gratifications theories from the passive and active audience perspectives respectively have been subjected to their own share of criticism. For example, the cultivation theory has been criticised for failing to include the variations in audience. On the other hand, the uses and gratifications theory has been challenged because of its individualistic treatment of the audience. One common challenge that both theories have faced is that they both have not clearly addressed the process between the input (i.e., media consumption) and the output (i.e., changes in behaviours and perceptions). While the cultivation theory tends to focus on the effects (output), the uses and gratifications theory pays more attention on the use and consumption of media (input) (Rubin, 2002; Williams, 2006; Watson & Hill, 2012). This missing process between the input and the output can be linked with the cognitive process described in the social cognitive theory (Shrum, 2002). In brief, the social cognitive theory suggests that people's behaviours, their individual and personal factors, and the environmental events all interact and form a reciprocal relationship with each other, and '*because of this bidirectionality of influence, people are both products and producers of their environment*' (Bandura, 2002, p. 61). In the application of media effects, such cognitive process can potentially moderate and/or mediate the effects from the use of media to the changes in people's perceptions and behaviours (Bandura, 2002; Shrum, 2002). Although the term cognitive is associated with rational and intellectual judgements, Watson (1998) points out that in the consideration of media effects, the affective aspect such as the emotions and feelings should also be considered in the process. Because of the social cognitive theory's capability to model the link between the use of media and the changes in the people's perceptions and behaviours, it has been applied with both cultivation and uses and gratifications theory individually in different studies (e.g., Bandura, 2002; LaRose & Eastin, 2004).

3.4 The Framework – Cultivation, Uses and Gratifications and Social Cognitive Theory

Based on the observation above, it can now be seen that theories, specifically the uses and gratification theory and the cultivation theory can be used to model the effects of media on people's behaviour change, in particular with the consideration of the social cognitive theory to explain the process. With this in mind, this section constructs the theoretical framework by synthesising these three different theories to model link up the use of media and their effects in post-disaster recovery.

First of all, as the social cognitive theory suggests, so as the studies by (Shah et al., 2005; 2007) have demonstrated, although the use of media can lead to changes in people's behaviours and perceptions e.g., civic and political participation, most of the effects are indirect and are mediated via some cognitive processes. These cognitive processes if taken from the passive audience perspective can be represented by people's perceptions

cultivated by the media as the cultivation theory has suggested. On the other hand, if taken from the active audience perspective, these processes can be manifested by people's reactions and activities related to the media as suggested by the uses and gratification theory. As illustrated in Figure 3-1, a framework is developed based on the abovementioned assumptions, it consists of three main components, the 'media use' as the input, which lead to the 'cognitive process' and then the 'media effects' as the output. These three components are further elaborated as follows:
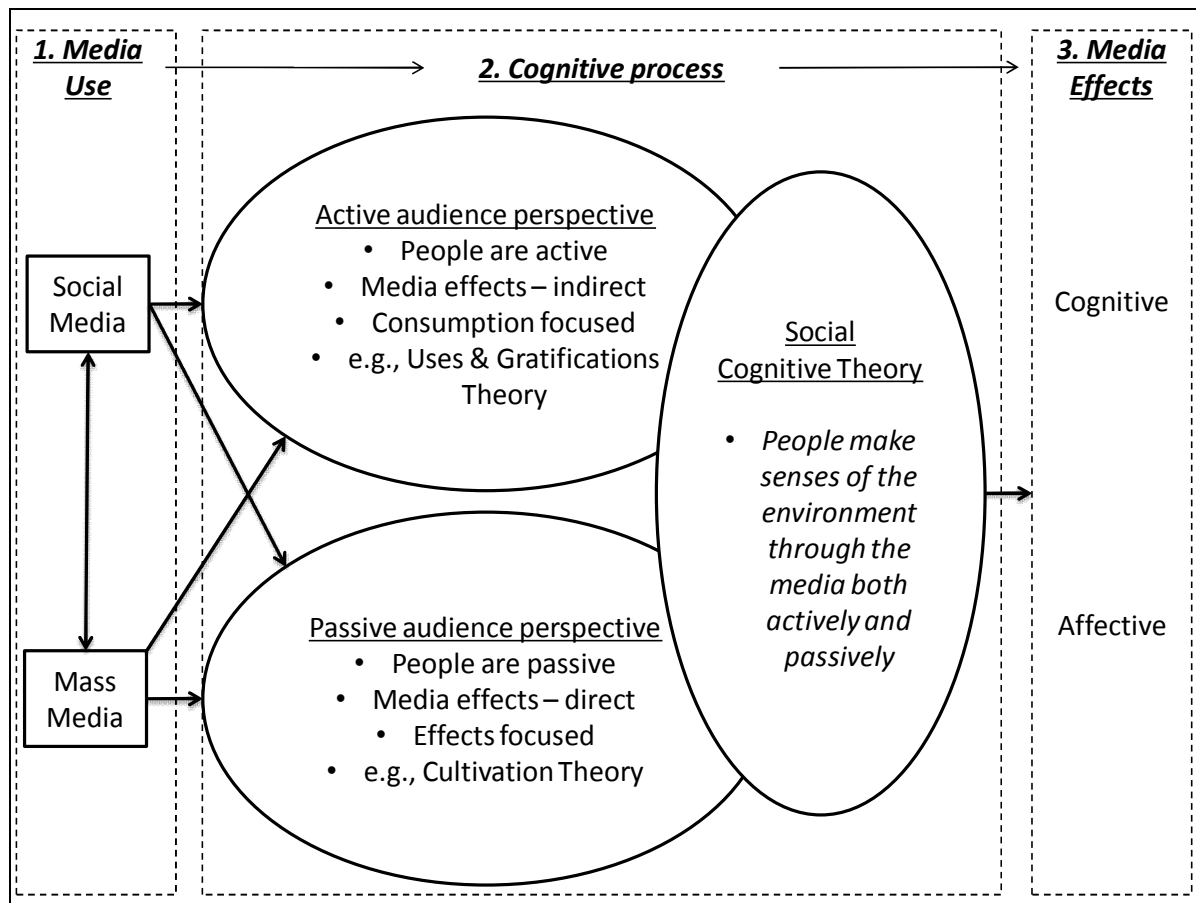
Figure 3-1 Theoretical Framework

Media Use - In the case of the Great East Japan, the use of media is represented by the use of both mass and social media, which can be operationalised as follows:

- The use of mass media can be represented by the usage of different mass media such as television which is found to be the most trusted and used media source after the disaster.
- The use of social media can be represented by the usage of different social media applications such as social network sites (e.g., Facebook, Twitter), personal websites, blogs, message boards and streaming video websites (e.g., YouTube and NicoNico) that were widely used after the disaster.

Of course, other media such as newspaper, Internet (e.g., official homepages and portal sites), as well as personal and face-to-face communication also are expected to have influence on people's attitudes and behaviours, but since the main purpose of this framework is to investigate the effects of mass and social media, the use of other media will be included but as control variables instead of the inputs.

Cognitive Process – based on the social cognitive theory, the cognitive process incorporates the uses and gratification theory and the cultivation theory from the active and passive audience perspectives respective as described in the followings:

- First, acknowledging the fact that in the case of the Great East Japan Earthquake, many people had utilised social media to discuss and share information related to the disaster, as well as to organise and participate in post-disaster recovery activities. Taken from the active audience perspective, specially the uses and gratification theory, these online activities and participations can be modelled as a cognitive process to explain the effects from the use of media to people's behaviours such as their level of civic engagement. Indeed, based on a similar approach, studies (e.g., Kobayashi et al., 2006; Gil de Zúñiga et al., 2007; 2012; Gil de Zúñiga & Valenzuela, 2011) have found that civic interaction online can lead to actual civic pariciation offline. Hence, in this framework, online civic participation is selected to represent the cognitive process between the use of media and their effects on civic engagement, and it will be operationalised by people's online activities that are specifically related to post-disaster recovery.

- Second, taken from the passive audience perspective, specifically the cultivation theory which Gerbner et al. (2002) have out, the cultivation of people's perceptions is only part of the dynamic process of forming their values and social norms. Thus, it is anticipated that these perceptions influenced by the use of media will become the cognitive process to link up the use of media and their effects on people's behaviour. In the case of the Great East Japan Earthquake, people's perceptions of the disaster can be represented by their perceptions of as concerns about the disaster and anxieties about the future (Nakayachi et al., 2014) as well as their feeling of bonds (kizuna)[8] within the society.

Furthermore, as pointed out in the previous chapter, knowing that both mass and social media are intertwined with each other, their effects are also assumed to be interrelated. In other words, it is anticipated that the use of social media will affect people's perceptions and the use of mass media will also motivate online civic participation.

Media Effects - As pointed out in section 2.3 and section 2.4, social capital is one of the most important elements for post-disaster recovery and resilience, and it can also be affected by the use of media. Therefore, in this framework, social capital is selected to be the proxy to represent the effects of media on the capacity of post-disaster recovery. From

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[8] As mentioned in section 2.1.1, bonds (kizuna) was one of the most prominent themes portrayed by the media after the disaster.

the active audience perspective, these effects can be operationalised different social capital elements such as their level civic participation, their bridging networks to other communities as well as their level of trust towards different organisations related to post-disaster recovery. On the other hand, from the passive audience perspective, the media's effects can be operationalised by people's intentions, in other words, their willingness to do something to support the recovery such as to share the information with others, to carry out altruistic actions and to prepare for future disasters.

3.5 Causal Relationship

Derived based on the cultivation and uses and gratifications theories, this framework assumes a causal relationship from the use of media to the changes in people's perceptions and behaviours. Although theoretically, all three theories consider the use of media as the precondition, in practice however, the possibilities of reverse and/or spurious relationships cannot be completely eliminated (Beaudoin, 2007). One of the most direct ways to address this issue is to employ time series longitudinal data, although such data are not easily available because of the high resource requirement. Nonetheless, based on the findings from the limited number of studies that used longitudinal survey data in the US (Eveland Jr. et al., 2005; Shah et al., 2005; Gil de Zúñiga et al., 2007; Beaudoin, 2007), as well as in Japan (Miyata & Kobayashi, 2008; Miyata et al., 2008) to investigate the effects of media on civic and political participations, it can be argued that the causal direction is indeed more likely to flow from the media to people's behaviours and perceptions. Furthermore, Boulianne (2009) used a meta-analysis approach to look into 38 different studies on the relationship between the media and civic engagement, and has identified that in comparison with studies that assumed the media as the precondition, results of the studies that assumed a reverse and/or reciprocal causal relationship are less significant indeed. These empirical studies have further reinforced the abovementioned theories and hence, this framework adopts a similar assumption that the use of media will lead to changes in people's behaviours and attitudes as shown in Figure 3-1.

3.6 Empirical Analysis

Based on the above framework, a three-part empirical analysis is constructed to answer the research question of what are the effects of mass and social media is post-disaster recovery and how to they work. The first two parts are the core analysis and the third part is the extended analysis, they are described as follows:

Core analysis – the theoretical framework shown in Figure 3-1 is constructed based on the uses and gratification theory drawn from the active audience perspective, and the cultivation theory based on the passive audience perspective. Thus, the core analysis consists of two separate parts to analyse the media's effect based on these two theories respectively.

- Part one – 'Effects of Mass and Social Media on Social Capital', based on the active audience perspective, specifically the uses and gratification theory and the social cognitive theory. The first part of the analysis anticipates that in the case of the Great East Japan Earthquake, the use of mass and social media will encourage people to participation in activities related to the recovery online, and these online participations in turn will increase their level of social capital, such as their level of bonding trust, bridging networks and offline civic participation to represent the cognitive effects from the active audience perspective. This analysis is presented in details in chapter 5.
- Part two – 'Media's Effects of People's Perceptions and Intentions', based on the passive audience perspective, specifically the cultivation theory and the social cognitive theory. The second part of the analysis assumes that in the case of the Great East Japan Earthquake, the use of mass and social media will cultivate people's perceptions of the disaster such as concerns, anxieties and bonds. These perceptions will increase their intention to participate in post-disaster recovery activities such as civic discussions, altruistic actions and preparations. This analysis is described in details in chapter 6.

Extended analysis - after the first two part of the analysis, a key question was raised on the interactivity between mass and social media, it is deemed that further understanding of the interactivity between them especially under the convergence of mass and social media will enhance the implications of the findings from the core analysis on post-disaster recovery. Therefore, the extended analysis (part three of the analysis) – 'Effects of Convergence between Mass and Social Media' was developed to look beyond post-disaster recovery into the interactivity of mass and social media in practice, the details of the extended analysis is presented in chapter 7.

Chapter 4 Methodology

The complex relationships between different media and their effects on the people always present a challenging puzzle for scholars and researches, especially on how to identify their effects and to pinpoint the underlying mechanisms. As described in the previous chapter, in today's 'mass self-communication' society, the interconnectivity and interactivity between mass and social media as well as the people have made it almost impossible to analyse their relationship linearly. For instance, while the two media might interact with each other, at the same time, their interaction might also be moderated by the reactions of the people. Quantitative method is often chosen to examine these non-linear relationships because statistical tools can precisely model these complex relationships (Byrne, 1998), and therefore, as it can be seen from the literature in chapter 2, many studies on the relationships between the use of media and their effects on the people are based on quantitative methods with empirical data (e.g., Eveland Jr. et al., 2005; Shah et al., 2005; 2007; Beaudoin, 2007; Gil de Zúñiga et al., 2007; 2012; Miyata & Kobayashi, 2008; Miyata et al., 2008). Among different statistical tools, multivariate statistics is widely adopted as it can model the relationships between multiple causes and effects. Thus, this thesis also adopts the quantitative approach. Specifically, it uses multivariate statistics with empirical data to evaluate the three analyses described in the theoretical framework in chapter 3. Details of the data collection and analysis method are described in the following sections.

4.1 Data Collection – Internet Survey

Diffusion of the Internet has substantially reduced the cost, time and accessibility for survey data collection. In particular, in comparison with traditional methods such as random direct dial (RDD) telephone survey, mail and face to face survey, features of Internet survey such as its ability to carry out self-administered and interactive survey, as well as its capability to increase the coverage and reduce the turnaround time have made large scale survey much more accessible to researchers and scholars. In addition, as the diffusion of Internet is becoming almost universal, together with a wide selection of both conventional and innovative survey methods over different platforms (e.g., webpage, email and social media), Internet survey has become one of the mainstream data collection methods for both individual and institutional researchers and scholars.

4.1.1 Error of Internet Survey

Despite its popularity, there are a few underlying problems that one has to pay attention to when employing Internet survey as data collection instrument. For instance, there are four main types of error that might limit the reliability, applicability and viability of Internet survey, namely non-coverage error, sampling error, non-response error and measurement error (Couper, 2000; Sills & Song, 2002; Hill et al., 2007).

- Non-coverage error – it is one of the major shortcomings of Internet survey. General speaking, non-coverage error is '*a function of the mismatch between the target population and the frame population*' (Couper, 2000, p. 467). Whereas the target population is the subject of interest (for example, in this case, people from the three prefectures that were directly hit by the disaster), and the frame population refers to where the samples are drawn from (for example, people from these three prefectures that have access to Internet – since the survey is carry over the Internet). In other words, the non-coverage error in Internet survey comes from the fact that it literately can only cover people can access to the Internet. The impact of the non-coverage error depends on the purpose of the survey and the Internet penetration of the total population (Couper, 2000). For instance, in the case of Japan, that by the end of 2012, 79.5% of the total population had access to the Internet (included both wireline and wireless Internet) (MIC, 2013), therefore, one can argue that the non-coverage error of Internet survey is not too severe.

- Sampling error – while non-coverage error is caused by those who are not covered by the frame population, sampling error occurs in the selection process of the sample from the frame population. As Couper (2000) defines '*sampling error arises from the fact that not all members of the frame population are measured. If the selection process were repeated, a slightly different set of sample persons would be obtained*' (Couper, 2000, p. 467). In other words, the probability of a member from the frame population being selected. Sampling error varies between different Internet survey methods.

- Non-response error – non-response error is the discrepancy between the observed samples (those that have responded) and the entire frame population (those that have responded plus those that have not responded) (Sills & Song, 2002). It '*arises through the fact that not all people included in the sample are willing or able to complete the survey*' (Couper, 2000, p. 473). Again, similar to sampling error, non-response error varies between different Internet survey methods, for example, the non-response error will be very different between surveys that are voluntary and that are compulsory or with incentive.

- Measurement error – since Internet survey is mostly self-administrated, measurement errors could '*arise from the respondent (lack of motivation, comprehension problems, deliberate distortion, etc.) or from the instrument (poor wording or design, technical flaws, etc.)*' (Couper, 2000, p. 475). Another source of measurement effort comes from self-report bias as the respondents tend to overstate or understand the answer because '*In general, research participants want to respond in a way that makes them look as good as possible. Thus, they tend to under-report behaviors deemed inappropriate by researchers or other observers, and they tend to over-report behaviors viewed as appropriate*' (Donaldson & Grant-Vallone, 2002, p. 247). On top of the survey methods, measurement error also varies between different target population and the subject of the questions being asked.

4.1.2 Types of Internet Survey

Fundamentally, Internet survey can be classified into two main types; non-probability methods and probability-based methods (Couper, 2000).

- Non-probability methods are methods that recruit the respondents via specific channels, whereas the respondents can decide whether or not they want to participate in the survey voluntarily. Examples of non-probability method are 'entertainment-typed survey' (surveys that are designed to attract respondents with entertainment purposes), 'self-selected web survey' or 'volunteer panel surveys' (surveys that recruit respondents through pop-up advertisements on websites and social media). The advantages of non-probability methods are the relatively low operational cost required to recruit a large number of respondents. However, as the frame population in most cases are unknown and the samples are selected fully based on their own will, the risk of non-coverage error and sampling error are quite high, and the non-response error and measurement error are also uncontrolled. Hence non-probability methods are usually not suitable for surveys that aim for generalisation.
- Probability-based methods – in contrast, probability-based methods attempt to define the frame population first, and then select the respondents from the frame population based on certain sampling criteria. For example, 'intercept survey' and 'list based samples survey' recruit the respondents systematically by either intercepting the traffic to popular websites or by specific user list, and 'pre-recruited panels survey' recruit people to participate as the panel via various channels both online and/or offline. In probability-based methods, usually the basic demographic data of the respondents are available, and hence, the profile of the frame population can be constructed.

The advantage of probability-based methods is that with a known frame population, the non-coverage error and the sampling error can be controlled. In addition, depends on way the survey is carried out, the non-response and measurement errors can also be controlled. In particular, as Internet survey is becoming more and more popular, many commercial survey companies are offering professional Internet survey services, these companies usually have a fairly large survey panel (frame population) to reduce the non-coverage error and sampling error. In addition, these companies usually offer some incentives to the respondents to increase the response rate, and some of them also employ some quality control policies to control the measurement error. Professional Internet panel survey has become one of the mainstream Internet survey methods for both marketing and academic researches (Couper, 2000; Sills & Song, 2002; Tsuboi et al., 2012). However, since by nature, Internet survey inherit some non-coverage error because of the fact it can only cover the Internet users (unless in some case the target population is only Internet users), and most Internet survey are self-administrated. Therefore, some studies in Japan, the US and the UK (e.g., Tsuboi et al., 2012; Dennis et al., 2005; Grandcolas et al., 2003) have found that Internet panel survey, as like other methods such as face to face or telephone survey,

do have a certain level of bias. That being said, from a practical point of view, by comparing the data of large scale Internet surveys and national surveys, Hill et al., (2007) argue that a mildly biased but large scale survey can produce more reliable estimates than small but unbiased survey. Therefore, considering the cost, time, and reliability factors, professional Internet panel survey offers the most balanced solution and hence it is deemed suitable as the data collection method for the empirical analysis in thesis.

4.1.3 Post-Stratification Weighting

There are many methods to reduce or mitigate the coverage and sampling errors statistically, one of commonly used methods is post-stratification weighting (Little, 1993; Barboza & Williams, 2005). In short, post-stratification is a '*method of data analysis which involves forming units into homogeneous groups after observation of the sample*' (Little, 1993, p. 315). It often involves comparing the observed sample with some expected (reference) samples, and in many cases, large scale surveys such as government census surveys are used as the expected sample. A common technique of post-stratification is to create a post-stratification weighting factor by comparing the basic social demographic data e.g., age, gender, geographic location of the observed sample with the expected samples to calculate a ratio based weighting factor. The weighting factor is then applied to the observed sample to create the weighted samples, which will be used for further statistical analysis. Although in some cases, it is found that post-stratification weighting factor can effectively reduce the coverage and sampling errors and increase the representativeness of the sample (Barboza & Williams, 2005). However, it is important to note that post-stratification cannot reduce non-response and measurement errors, nor it can increase the precision of the survey (Little, 1993). In fact, in other cases, it is found that post-stratification weighting adjustment has only a minor effect on the results (Loosveldt & Sonck, 2008).

4.1.4 Data Collection Procedure

Probability based Internet panel survey by professional survey company is chosen as the data collection method for this thesis because of its advantages described in section 4.1.2. In this thesis, two separate Internet panel surveys[9] were carried out, the first survey was conducted in March 2013 to collect the data for the core analysis, and the second survey was carried out in March 2014 to collect the data for the extended analysis. Both surveys were commissioned by Macromill Inc., one of the largest online research companies in Japan. They have an online survey panel of approximately 1 million active registered respondents across Japan. They recruit the respondents online, and will compensate them with points that can be exchanged for cash or coupons upon completing the survey. They select the samples randomly from this relatively large panel base to minimise the sampling error. On top of that, Macromill Inc. also employs a set of quality assurance policies to

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[9] Both surveys in this study are sponsored by the Japan Commercial Broadcasters Association.

ensure the quality of the survey data, for example, they regularly compare their panel data with other large scale surveys carried out by the government and other survey companies to check the representativeness of their panel to reduce the potential non-coverage error. In addition, they also monitor the survey panel to check for non-responses, false and repeated registrations in order to reduce the non-response error. Furthermore, the privacy of the personal data of the respondents is protected by the company's privacy policy (Macromill, 2014). For the survey procedure, first, the questionnaire is sent to the research company, who will double-check the wordings to ensure they can be easily understood by the respondents to reduce the potential measurement error. Then they will convert the questionnaire to online format and the hyperlink to the questionnaire is sent to the respondents via email. The respondents are randomly drawn by the company from their survey panel according to the research specific requirements. Finally, noting that Internet survey do have certain level of inherited bias, post-stratification weighting will be employed if necessary to minimise the possible error.

4.2 Data Analysis - Multivariate Statistics

Multivariate statistics is a set of powerful statistical tools for handling complex relationships, specifically, it can analyse complex data sets with multiple independent variables (IVs) and multiple dependent variables (DVs) that are correlated with one another in different degrees. Coupled with the advancement in computing power and software packages, it has become widely adopted in many areas of studies including social and political science which often involve complex models with multiple IVs and DVs. In short, multivariate statistics is an extension of univariate (one dependent variable) and bivariate (two dependent variable) statistics. It is capable to analyse multiple IVs and DVs simultaneously in both exploratory and confirmatory approach (Tabachnick & Fidell, 2013). Because of its capability to handle complex data sets with different approaches, multivariate statistics is deemed to be appropriate for the empirical analysis in this thesis. The key multivariate statistics methods being applied in this thesis are Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM).

4.2.1 Exploratory and Confirmatory Factor Analysis

Generally speaking, factor analysis can be classified into two main types; Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). As Lyytinen & Gaskin (2012a) define, EFA is '*concerned with how many factors are necessary to explain the relations among a set of indicators and with estimation of factor loadings. It is associated with theory development*' (Lyytinen & Gaskin, 2012a, p. 7), and CFA is '*concerned with determining if the number of factors 'conform' to what is expected on the basis of pre-established theory. Do items load as predicted on the expected number of factors. Hypothesize beforehand the number of factors*' (Lyytinen & Gaskin, 2012a, p. 7).

Both EFA are CFA are fundamental elements of Structural Equation Modelling (SEM – which will be explained in the following section), their main purpose is to investigate the inter-relationships among a group of 'observed variables' to see if they can be grouped / or how well they are being grouped into a reduced number of 'latent variables' in both exploratory and confirmatory way. The latent variables (also called factors, constructs, or unobserved variables) refer to variables that cannot be measured directly, often associated with social or psychological status (for example, in this case, one's perceptions of the disaster). On the other hand, the observed variables (or sometimes referred as indicators or manifest variable) are variables than can be measured directly (e.g., frequency). The fundamental notion of factor analysis is that it assumes a latent variable can be represented by a set of observed variable (Tabachnick & Fidell, 2013). For example, in this case, one's concerns about the disaster can be represented by their level of concerns about the damages, level of concerns about the victims and level of concerns about recovery. However, it should be noted that although both EFA and CFA are factor analysis, they serve a different purpose.

For EFA, the two main purposes are 1) patterns exploration - to group the correlated observable variables together and reveal patterns among the their inter-relationships, and 2) data reduction - to reduce a large number of observed variables into a smaller number of set of data (factor) that represent better the underlying variance. Usually, EFA is performed in the early stages of the research. The process of EFA is based on the comparison of the correlation matrix produced by the observed variables – the 'observed correlation matrix' and the correlation matrix produced by the factors – the 'reproduced correlation matrix' to create the 'residual correlation matrix' that represents their difference. The basic idea of EFA is to minimise the residual correlation matrix by rotating the factors to create the best fit result. The fitness of an EFA is typically measured by the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy[10] which range from 0 to 1, whereas the typical acceptable margin is 0.50 and above, and also by the Bartlett's test of sphericity[11] which tests hypothesis that the correlated matrix is an identity matrix[12] (Lyytinen & Gaskin, 2012a; Tabachnick & Fidell, 2013).

For CFA, the two main purposes are 1) to confirm a hypothesis of factor structure - to test whether a set of observed variables are loaded together to represent a latent variable, in other words, if they can explain the latent variable, and 2) theory testing - to test the hypothesised relations between a group of latent variables and their corresponding observed variables based on theories. Usually, CFA is executed in the advanced stages of the

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[10] 'The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is an index that compares the sizes of the observed correlation coefficients to the sizes of the partial correlation coefficient' (Norusis, 2005, p. 392).

[11] Bartlett's test of sphericity is used to 'test the null hypothesis that the observed data are a sample from a multivariate normal population in which all correlation coefficients are 0' (Norusis, 2005, p. 394)

[12] Identity matrix 'is a correlation matrix with 1.0 on the principal diagonal and zeros in all other correlations' (Lyytinen & Gaskin, 2012a, p. 29).

research process. The process of CFA involves multiple regression analyses of the model, i.e., the causal relationships between the factors (the latent variables) and their corresponding observed variables. It also accesses the construct validity[13] of the model which is required to be derived based on priori theories (Lyytinen & Gaskin, 2012a; Tabachnick & Fidell, 2013). The measurement of CFA is described in section 4.2.3.

4.2.2 Structural Equation Modelling

Structural Equation Modelling (SEM) is an extension of CFA, on top of the causal relationships between the latent variables and the observed variables. In SEM it assumes the causal relationships between different latent variables based on priori theoretical assumptions to formulate the path model. SEM is also referred as the general causal model, causal modelling, causal analysis or path analysis. In general, it can be defined as

'a collection of statistical techniques that allow a set of relationships between one of more IVs, either continuous or discrete, and one or more DVs, either continuous or discrete, to be examined. Both IVs and DVs can be either factors (latent variable) or measured variable (observed variable)' (Tabachnick & Fidell, 2013, p. 681).

For example, in this case study, it can be used to model the assumption that people's concerns of the disaster (a latent variable represented by their level of concerns of the disaster area, victims and recovery status) will increase their intention to perform altruistic actions (another latent variable represented by their intention to volunteer and to make donations). One of the key strengths of SEM is that it enables researchers to examine complex relationships such as mediation, moderation, and interaction to model actual situations.

Mediation effect – in short, mediation effect represents a series of casual effects, i.e., it explains the chain of events between the causes and the effects, i.e., how the independent variables (IVs) affect the dependent variables (DVs) through the mediators as shown in Figure 4-1.
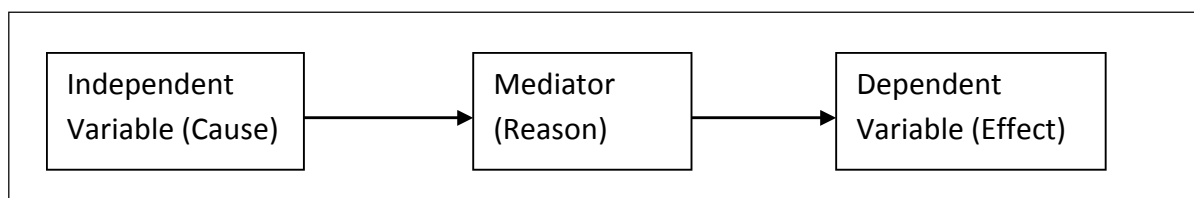
Figure 4-1 Mediation Effect

In other words, the mediation effect can explain the reason (e.g., the how and why) between the causes and the effects. For example, in this case study, it assumes that the use

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[13] Construct validity *'is the extent to which a set of measured items actually reflect the theoretical latent construct they are designed to measure...(it) is made up of four important components: Convergent validity, discriminant validity, nomological validity and face validity'* (Lyytinen & Gaskin, 2012a, p. 6).

of media will lead to the development of social capital, however, in order to understand how the underlying reasons, it hypothesises that the effect is mediated by online civic participation. In general, there are three types of mediation effect; full mediation, partial mediation and indirect mediation (Shrout & Bolger, 2002; Cribbie, 2012; Lyytinen & Gaskin, 2012b).

1. For full mediation (Figure 4-2), although the independent variable has a significant direct effect on the dependent variable without the mediator, however, when the mediator is introduced to the model, if the mediator's effect on the dependent variable becomes significant and the effect from the independent variable becomes insignificant, it can be said that the effect on the dependent variable is 'fully mediated' by the mediator. Hence, the mediator can fully explain the relationship between the independent variable and the dependent variable.
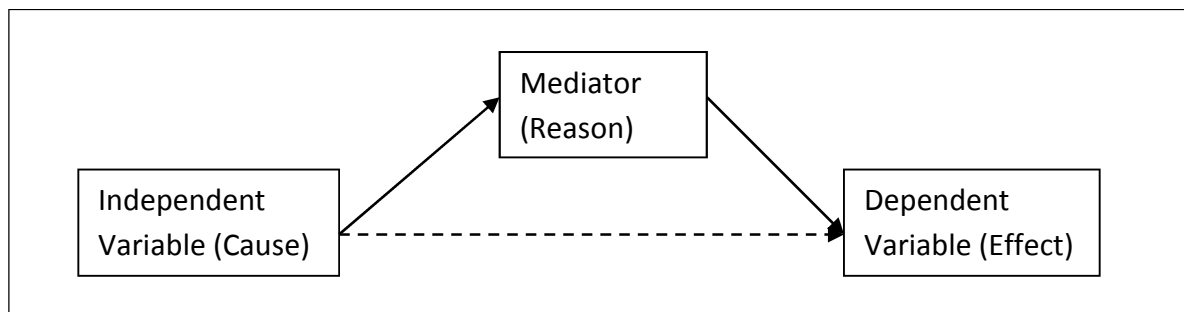
Figure 4-2 Full Mediation

2. For partial mediation (Figure 4-3), the independent variable has a significant direct effect on the dependent variable without the mediator, and when the mediator is introduced to the model, if the effect from the mediator to the dependent variable is significant while the effect from the independent is still significant, the effect from the independent variable to the dependent variable can be said as 'partially mediated' by the mediator. Hence, the mediator can explain part of the relationship between the independent variable and the dependent variable.
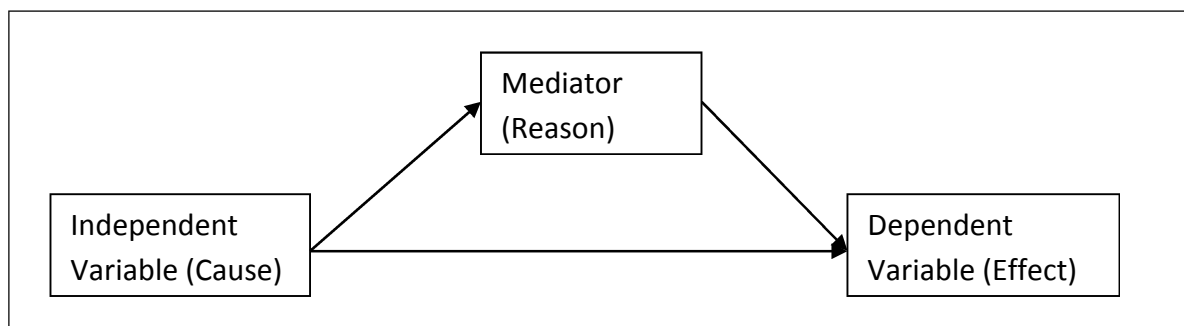
Figure 4-3 Partial Mediation

3. For Indirect mediation (Figure 4-4), the independent variable has no significant direct effect on the dependent variable without the mediator, but when the mediator is introduced to the model, if the mediator has a significant on the dependent variable, the effect from the independent variable to the dependent variable can be said as 'indirectly mediated' by the mediator. Hence, the mediator can only explain the relationship between the independent variable and the dependent variable indirectly.
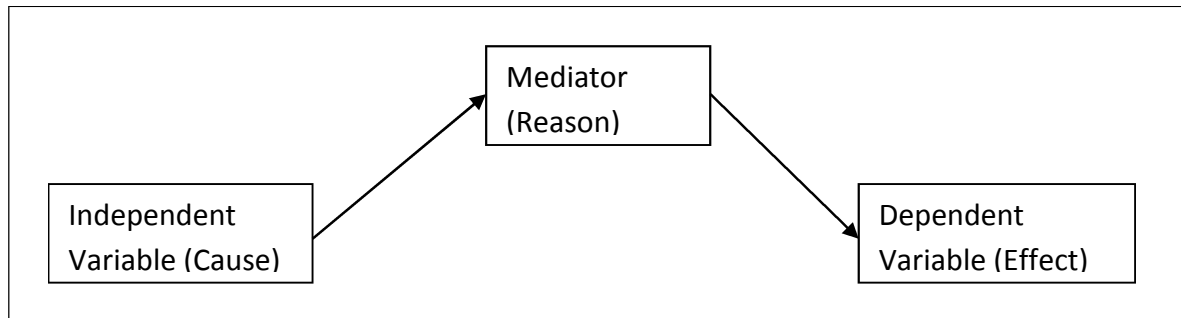
Figure 4-4 Indirect Mediation

Statistically, there are different ways to test the mediation effects (i.e., the change in the significance between the independent variable and the dependent variable with and without the mediator). Some of the most commonly employed methods are zero-order and partial correlation, hierarchical regression models, and SEM. In SEM, it can be tested by bias-corrected bootstrap[14] confidence intervals sampling (Cheung & Lau, 2008).

Moderation effect – different from the mediation effect which explains the reason between the cause and the effect, moderation effect refers to conditions that might affect the relationship between the cause and effect. In other words, as shown Figure 4-5, the variable (moderator) that influences the effect of the independent variable (cause) on the dependent variable (effect) (Shrout & Bolger, 2002; Cribbie, 2012; Lyytinen & Gaskin, 2012b). For example, in this case, it is assumed that having experienced the disaster directly will affect media's effect on people's perceptions, hence, it hypotheses that experience from the disaster (moderator) will moderate the effect from the media (cause) on the user's perceptions of the disaster (effect). Moderation effect can be tested by comparing statistical difference of the path coefficient and significance between different conditions or different groups of sample, hence, it is often refers as multi-group moderation (Lyytinen & Gaskin, 2012b).

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[14] '*Bootstrapping is a process by which statistics (e.g., regression weights) are generated over a very large number of replication, with samples drawn with replacement from a data set*' (Tabachnick & Fidell, 2013, p. 143).
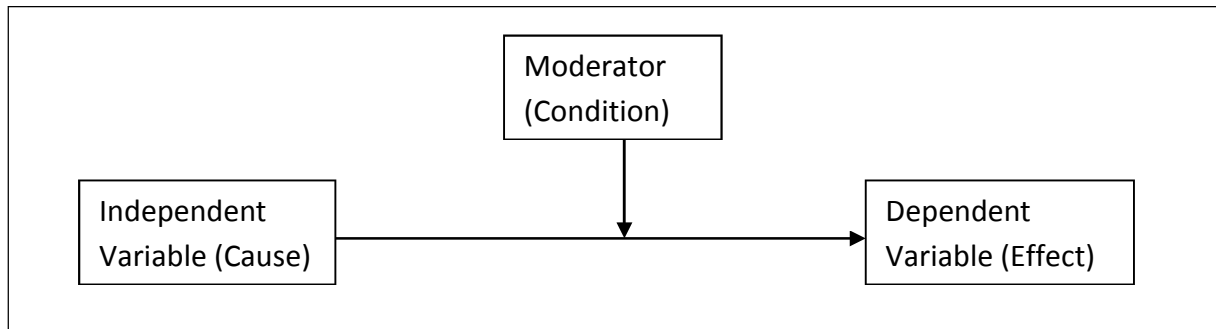
Figure 4-5 Moderation Effect

Interaction effect – it refers to the joint effect of two or more causes on the effect. In other words, it is another form of moderation effect, but as an internal factor. The moderator is the product of multiple independent variables (causes) on the dependent variable (effect) as shown in Figure 4-6 (Hair Jr et al., 1998; Lyytinen & Gaskin, 2012c). For example, in this case, it assumes that the use of mass and social media interacts with each other on their effect on online civic participation, hence, it hypotheses that the use of mass media increases the effect of the use of social media on online civic participation. Interaction effect can be examined by adding the interaction term - '*the joint effects of the two treatment variables in addition to the individual main effects*' (Hair Jr et al., 1998, p. 329) in the path model and then examines its significance on the dependent variable. The interaction term is created by multiplying the two to the independent variables together (Lyytinen & Gaskin, 2012c).
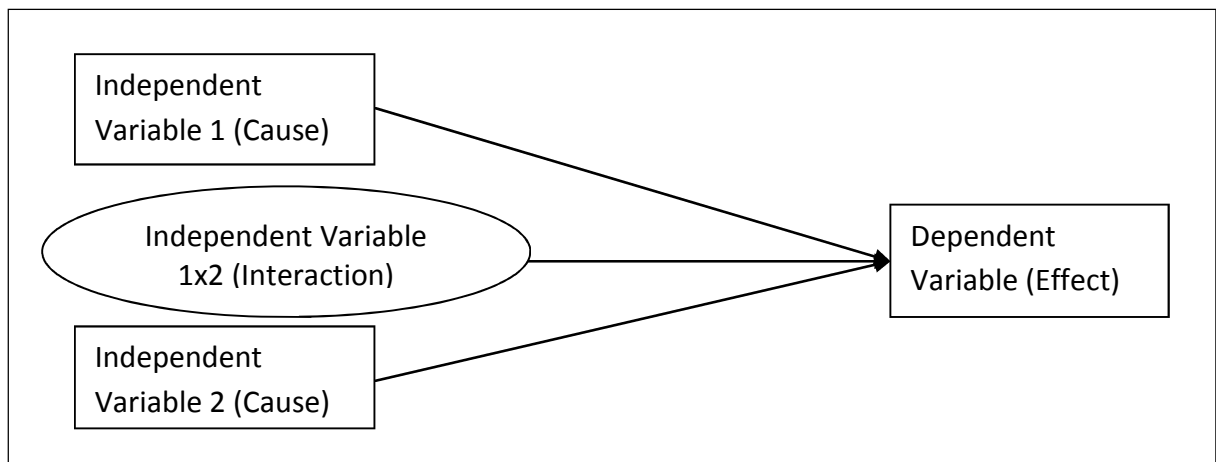
Figure 4-6 Interaction Effect

4.2.3 Model Fit Indices

The fitness of a CFA and SEM model is evaluated by following model fit indices. In short, the fitness of the model refers to '*the ability of a model to reproduce the data (i.e., usually the variance-covariance matrix). A good-fitting model is one that is reasonably consistent with the data and so does not require respecification*' (Kenny, 2014).

In general, the model fit indices can be classified into six main categories; absolute fit measures, relative fit measures, parsimony adjusted measures, fit measures based on the non-central chi-square distribution, fit measures based on information theory and the Hoeleter measures (Hair Jr et al., 1998; Blunch, 2008; Tabachnick & Fidell, 2013; Kenny, 2014).

- Absolute fit measures assess the fit of a model by itself without reference to other models.
- Relative fit measures (or comparative fit measures) judge the fit of a model by comparing it to an explicit based model.
- Parsimony adjusted measures improve the fit by complicating the model by increasing the number of parameters
- Fit measures based on the non-central chi-square distribution assume that the there is no correct model, all models can only be 'approximately' correct.
- Fit measures based on information theory are an alternative way that instead of judging the fit of a single model, it is used as the indication to choose among several realistic but different models.
- The Hoeleter measures attempt to pinpoint the connection between sample size and significance of the chi square.

In assessing the model fitness of a CFA and SEM model, some researchers (e.g., Gaskin, 2012d; Kenny, 2014) have stressed, instead of attempting to fit all indices, the aim should be set to achieve a model that is logical and supported by sound theoretical background with acceptable fit indices. This thesis follows this philosophy and the model fit indices being applied in this thesis are summarised in Table 4-1 (Blunch, 2008; Kenny, 2014; Gaskin, 2012d). In addition, there are some factors that will affect the model fit indices such as the sample size and the normality of the samples, and cautions should be taken when analysing the model fit indices. For example, RMSEA will be larger with smaller sample size, Chi-square test is almost always statistically significant with sample size greater than 400, and non-normally distributed samples (samples with high kurtosis) will inflate chi square and other absolute fit measures (Kenny, 2014).

Table 4-1 Model Fit Indices for CFA and SEM Analysis. Source: Gaskin (2014d).

Type of Measure	Measure	Definition	Threshold
Absolute Fit Measure	CMIN / DF	Chi-square / degree of freedom	< 3 good; < 5 sometimes permissible
	p-value for the model	Chi square test	> 0.05[15]
	GFI	Goodness of Fit Index	> 0.95
	AGFI	Adjusted Goodness of Fit Index	> 0.80
Relative fit measures	CFI	Comparative Fit Index	> 0.95 great; > 0.90 traditional; > 0.80 sometimes permissible
Fit measures based on the non-central chi-square distribution	RMSEA	Root Mean Square Error of Approximation	< 0.05 good; 0.05 to 0.10 acceptable; > 0.10 not acceptable
	PCLOSE	P-value for a test of the null hypothesis that the RMSEA is less than 0.05	> 0.05

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[15] '*For models with about 75 to 200 cases, the chi square test is a reasonable measure of fit. But for models with more cases (400 or more), the chi square is almost always statistically significant*' (Kenny, 2014).

Chapter 5 Effects of Mass and Social Media on Social Capital

5.1 Introduction

This chapter[16] presents the first part of the three-part empirical analysis based on the theoretical framework describe in chapter 3. The aim is to investigate the research question of 'what are effects of mass and social media on post-disaster recovery and how do they work?' from the active audience perspective, which assumes that most people are active in the media's effects are often indirect.

As pointed out in chapter 1, one of the most remarkable aspects of the Great East Japan Earthquake is the role social media had played. As Slater et al. (2012a) vividly depict,

'the generation of information and images occurred at such a fast pace that social media not only represented, but also directly mediated our experience of the disaster more than any other event today' (Slater et al., 2012a, p. 94).

After the disaster, when the traditional telecommunication network was paralysed, ICT such mobile Internet and social media provided the vital communication platform for many people in Japan and across the world to obtain and share critical information. In particular, social media such as social network sites (SNS), blogs, forum and video sharing sites enabled many people to collect and disseminate information, as well as to rally for support and organise help. On top of that, social media had fostered different types of civic activities both online and offline after the disaster (Aizu, 2011; Appleby, 2013; Slater et al., 2012b). The critical role social media played after the disaster had changed the way many people perceived them, e.g., surveys (e.g., IMJ Mobile, 2011; MIC, 2011b) have found that approximately 10%-20% of the people in Japan had started to use or increased the usage of social media after the disaster. That being said, at the same time, this free flow of information enabled by social media had also created some negative effects such as information distortion, overflow and disparity (MIC, 2011a; iSPP, 2012). As Satoshi Miura, president and CEO of NTT mentioned during the ITU Telecom World 2011 conference when he was asked about Japan's experience of social media in the Great East Japan Earthquake:

'…we experienced the dark side [of social media]. Some information was distorted in spreading from person to person. Misinformation circulated rapidly around the globe, with harmful results…Aside from the good and the bad, we were confronted by some limitations of social media. Due to the huge amount of inputs, it was hard for users to find the information they needed. Also, there were divide issues, especially among the elderly…' (Mirua, 2011).

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[16] Part of this chapter is based on the paper titled 'The Effects of the Use of Web 2.0 Applications and Television on Social Capital in Post-Disaster Recovery – A Case Study of the Great East Japan Earthquake' (Cheng et al., 2014a) by the author.

As a matter of fact, despite that social media had caught most people's attention after the disaster; many reports have found that traditional mass media (e.g., radio, newspaper and television) were still regarded as the most trusted and reliable information sources (Kimura, 2011; MIC, 2011a). Therefore, it can be see that while social media had played the role to enable people to participate in different activities related to the disaster online, many of them still rely on mass media for information.

With this background in mind, this chapter attemps to address the research question from the active audience perspetive, specifically, it links up the use of mass and social media with people's civic activities online, and their effects on social capital. Social capital is selected as the proxy to represent the capacity for post-disaster recovery because it is found to be one of the most important elements for the efficiency of post-disaster recovery, for example, social capital elements such as bonding trust can bring the community together and increase the level of collective actions, while bridging networks can bring in additional support and resoruces and civic pariticpation can link up these two elements together (for details, see section 3.4.3).

This chapter is arranged as follows; section 5.2 describes the theoretical model and hypotheses of this study, followed by section 5.3 which provides the detail of the data analysis including the construction of the questionnaire and the characteristics of the sample data. Then in section 5.4, the hypotheses are tested and the results are analysed, the key findings are then consolidated in section 5.5. Finally, section 5.6 links up the analytical findings with the people in practice to derive the implications to conclude this chapter.

5.2 Theoretical Model

As described in section 3.2, the active audience perspetive, in particular the uses and gratification theory sees that most people are actively in terms of media usage and the effects from media on them are often indirect. With the rise of the Internet and social media, many studies have adopt this view and found that interactive online civic activities in fact can lead to actual civic participation in the offline world (e.g., Kobayashi et al., 2006; Gil de Zúñiga et al., 2007; Gil de Zúñiga & Valenzuela, 2011). In fact, recent studies by Rainie et al. (2011; 2012) have found that Internet users are more likely to be active in civic activities than non-users, and social media have become a feature of political and civic engagement. However, on the other hand, other studies (e.g., Kittilson & Dalton, 2010) have argued that although the Internet indeed has enabled the creation of many virtual civic societies online, their effects on the actual civic participation in the offline world are still undetermined. Many studies have attempted to address this question, for example, using the communication mediation model based on the uses and gratification theory, Shah et al. (2005; 2007) have found that although informational media uses have positive effects on civic engagement in the offline world, however the effects are mostly indirect. In other

words, although they do not claim that the media have no direct effects at all, they suggest that some kind of mediation process in between are necessary to explain the use of media and their effects on civic engagement. In their studies, they have found that interactive civic discussions such as interpersonal talk and interactive messaging online is an effective mediator to mediate the positive effects from the informational use of media on civic engagement in real life. They further explain that because this type of interactive communication can increase people's opportunity to come into contact with other people with a different perspective, as well as to gain additional resources, knowledge and understandings of different civic issues and activities, as a result, these interactions have motivated many of them to participate in civic activities offline.

Based on these observations, this chapter also adopts the communication mediation model to examine the role of online civic participation in the case of the Great East Japan Earthquake. Specifically, it anticipates that the use of media can increase people's level of civic participation online, which in turn these online activities will lead to the development of social capital elements that are important for post-disaster recovery such as bonding trust, bridging networks as civic participation in offline world (see section 2.3 for details of social capital and its effect on post-disaster recovery). Before moving forward, it should be noted that although this analysis focuses on the role of online civic participation enabled by social media, it does not imply that mass media is excluded. Instead, it fully acknowledges the fact that both media had played an important role after the disaster. Therefore, based on the theoretical framework described in chapter 3, both mass and social media will be incorporated in the model. Furthemore, since people can be both mass media audience and social media user at the same time, the term 'audinece', 'user' and 'people' are interchangale in this chapter.

The model in this analysis is constructed based on the communication mediation model put forward by Shah et al., (2005; 2007). As shown in Figure 5-1, it assumes that informational media use has positive but indirect effects on civic engagement, and most of the effects are mediated by a mediator, it also assumes that the causal direction is from the use of media to civic engagement. Although theoretically the other direction is also possible, on top of the work by Shah, other similar studies in the US (e.g., Eveland Jr. et al., 2005; Beaudoin, 2007; Gil de Zúñiga et al., 2007) as well as in Japan (e.g., Miyata & Kobayashi, 2008; Miyata et al., 2008) that used longitudinal time series data have all supported the former causal direction. Thus, this study adopts the same assumption that the use of media will lead to civic engagement.

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┌─────────────────────────────────────────────────────────────────────┐
│                                                                       │
│  ┌──────────────────┐    ┌──────────────────┐    ┌──────────────────┐ │
│  │    Media use     │    │    Mediator      │    │      Civic       │ │
│  │      e.g.        │    │                  │    │   Engagement     │ │
│  │   Social Media   │    │      e.g.,       │    │                  │ │
│  │ (e.g., SNS, Blog)│───▶│  Online civic    │───▶│  e.g., Social    │ │
│  │        &         │    │  participation   │    │    capital -     │ │
│  │    Mass Media    │    │                  │    │  Bonding trust,  │ │
│  │ (e.g., television│    │                  │    │    Bridging      │ │
│  │    news and      │    │                  │    │    networks,     │ │
│  │  current affairs │    │                  │    │  Offline civic   │ │
│  │      prog)       │    │                  │    │  participation   │ │
│  └──────────────────┘    └──────────────────┘    └──────────────────┘ │
│                                                                       │
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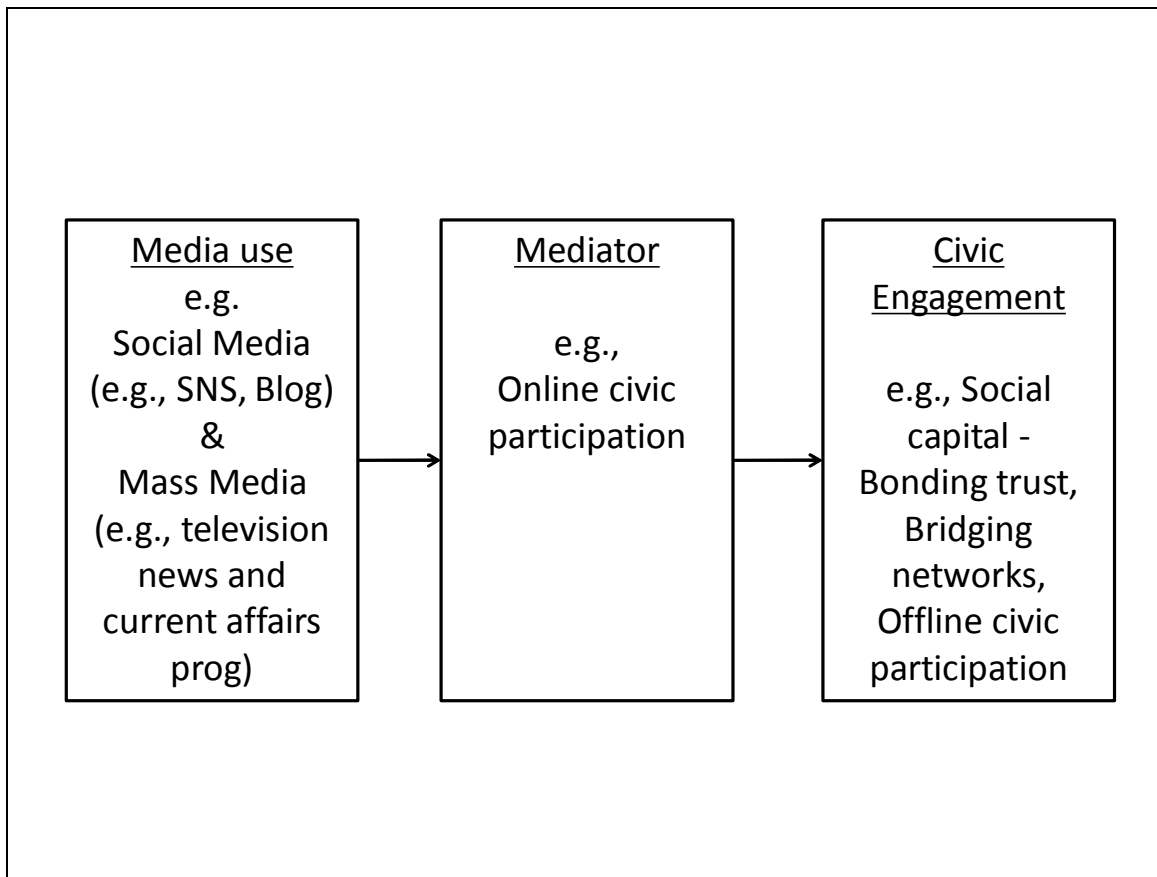
Figure 5-1 Communication Mediation Model

The model is further elaborated as follows:

- Media use – as mentioned earlier, this model takes into account of both mass and social media to represent the use of media. The use of social media is represented by the general use social media applications (e.g., SNS, blogs, BBS and video sharing sites) and the use of mass media is represent by the viewing of informative television programmes (e.g., news, current affairs) in general.

- Mediator – it is anticipated that online civic activities such as information collection, sharing, and interactive discussions can act as an effective mediator between the use of media and their effects on civic engagement. In the case of the Great East Japan Earthquake, knowing that many people had utilised social media to share and discuss post-disaster recovery related information, and to organise and participate in relief events. It is therefore assumed that these online post-disaster recovery activities will fulfil the role of mediator.

- Civic Engagement – as described in section 2.3, social capital elements such as bonding trust, bridging networks and civic participation are indispensable for post-disaster recovery. Therefore, in this study, civic engagement is represented by these three key social capital elements for post-disaster recovery.

5.2.1 Hypotheses

Based on the assumptions in the above section, a set of hypotheses can now be drawn to examine the relationships between the use of mass and social media, online civic participation and social capital as shown in Figure 5-1. First of all, as the communication mediation model assumes, it is anticipated that the use of media will lead to online civic participation, which in turn will increase the level of social capital. Therefore, it is assumed that:

- Hypothesis H1: The use of social media has a positive effect on online civic participation.
- Hypothesis H2: The use of mass media has a positive effect on online civic participation.
- Hypothesis H3: Online civic participation has a positive effect on offline civic participation.
- Hypothesis H4: Online civic participation has a positive effect on the level of bonding trust.
- Hypothesis H5: Online civic participation has a positive effect on the size of bridging networks.

Next, it is assumed that online civic participation will act as the role of mediator (see section 4.2.2 for details of the different types of mediation effect) between the use of media and social capital. First of all, for social media, since they are on the some communication platform (the Internet) with online civic participation, it is therefore assumed that the effect of social media on social capital will be fully mediated by online civic participation. In other words, it is through online civic participation, that the use of social media can affect different social capital elements. On the other hand, for mass media, as they are on a different media platform with online civic participation, it is therefore assumed that the effect from television will only be partially mediated by online civic participation. In other words, only part of the influence from mass media on social capital comes from online civic participation. Hence, it is anticipated that,

- Hypothesis H6: Online civic participation fully mediates the effect of the use of social media on offline civic participation.
- Hypothesis H7: Online civic participation fully mediates the effect of the use of social media on the level of bonding trust.
- Hypothesis H8: Online civic participation fully mediates the effect of the use of social media on the size of bridging networks.
- Hypothesis H9: Online civic participation partially mediates the effect of the use of mass media on offline civic participation.
- Hypothesis H10: Online civic participation partially mediates the effect of the use of mass media on the level of bonding trust.
- Hypothesis H11: Online civic participation partially mediates the effect of the use of mass media programmes on the size of bridging networks.

Furthermore, as pointed out in section 3.2, people will use more than one medium to gratify their functional needs and interests especially during time of crisis, it is therefore anticipated that the use of mass and social media as well as their effects are not mutually exclusive, but instead they co-exist and interactive with one another, thus,

- Hypothesis H12: There is an interaction effect between the use of mass media and the use of social media on online civic participation.

Finally, it is anticipated that social background such as gender, age, employment status and direct experience (damage suffered) from the disaster will also affect the levels of social capital, thus they are included as control variables. Based on the above hypotheses, a path model is constructed as shown in Figure 5-2.
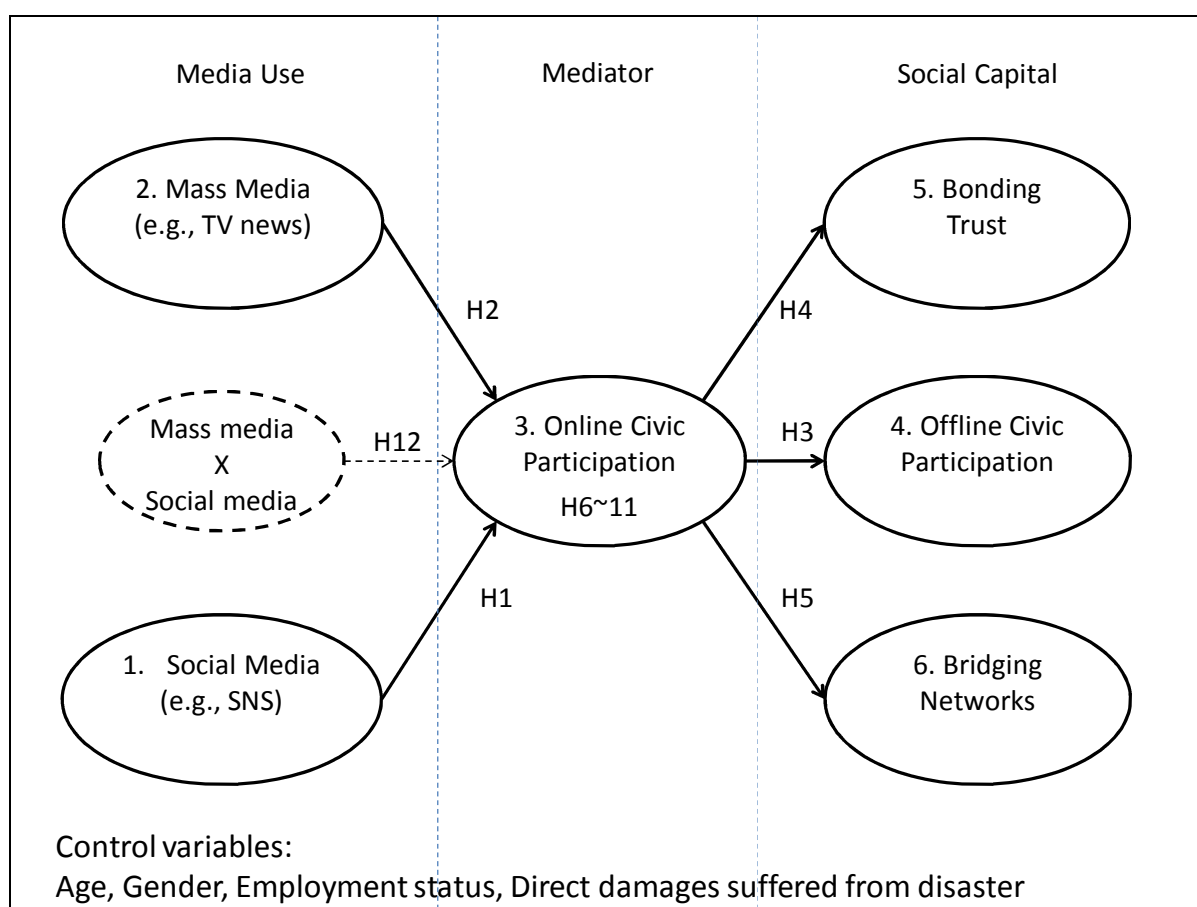
Figure 5-2 Path Model

5.3 Data Analysis

Based on the path model shown in Figure 5-2, it consists of six variables. A questionnaire was constructed to collect information from the samples about their usage of mass and social media, participations in post-disaster recovery activities both online and offline, as well as their level of social capital to represent these six variables as follows:

Media use – media use is represented by the use of Social Media and Mass Media generally.

1. Social Media - the use of social media is represented by asking the respondents *'Generally, how often do you use the following tools online to obtain information? for 1. Social network sites (e.g., Facebook, Twitter, Mixi etc.), 2. Forum / BBS / Discussion group, 3. Blog / Unofficial homepage / Personal homepage and 4. Video sharing sites (YouTube, Niconico etc.)'* in a 5 levels Likert scale (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily) in the questionnaire. The frequency of using these four social media applications are represented as individual observed variable and together they make up the latent variable of Social Media in the path model.

2. Mass media – informative television programmes is selected to represent the use of mass media and it is operationalised by asking the respondents *'Generally, how often do you watch the following TV programme? for 1. News / Weather, 2. Current affairs, 3. Educational / Documentary / Scientific and 4. Finance / Business'* in a 5 levels Likert scale (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily) in the questionnaire. The frequency of watching these four television programmes are represented as individual observed variable and together they make up the latent variable of Mass Media in the path model.

Mediator – the mediator is represented by 'Online Civic Participation' on activities related to the recovery for the Great East Japan Earthquake.

3. Online civic participation – the level of online civic participation is represented by asking the respondents *'How often do you utilise the Internet (e.g., Homepage, Blog, BBS, SNS etc.) to perform the following activities to support the Great East Japan Earthquake Recovery? for 1. Share latest Information / News, 2. Express own opinions, 3. Discuss with family and friends, 4. Encourage others to take action, 5. Make donations online / Purchase goods from disaster areas and 6. Participate and organise volunteering works'* in a 5 levels Likert scale (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily) in the questionnaire. The frequency of carrying out these six online activities are represented as individual observed variable and together they make up the latent variable of Online Civic Participation in the path model.

Social capital – the proxy to represent the capacity for post-disaster recovery, it is represented by the three social capital elements Offline Civic Participation, Bonding Trust and Bridging Networks related to the recovery for the Great East Japan Earthquake.

4. Offline civic participation – the level of offline civic participation is represented by asking the respondents *'According to the recovery-related information from them you have seen, do you agree that you have done to following activities to support the recovery for the Great East Japan Earthquake? for 1. Joined volunteering works, 2. Joined charity*

activities, 3. Encouraged others to support the recovery and *4. Requested government authorities and NGOs to support the recovery*' in a 5 levels Likert scale (1=Not agree, 2=Somewhat disagree, 3=Neutral, 4=Somewhat agree, 5=Agree) in the questionnaire. The level of agreement of these four types of activity are represented as individual observed variable and together they make up the latent variable of Offline Civic Participation in the path model.

5. Bonding trust – the level of bonding trust is represented by asking the respondents '*Do you think the following organisations can be trusted related to recovery of the Great East Japan Earthquake? for 1. Local government (city government, the municipal authorities etc.)* and *2. Local communities (Neighbourhood associations, NGOs, local disaster prevention group etc.)*' in a 5 levels Likert scale (1=Cannot be trusted, 2=Somewhat cannot be trusted, 3=Neutral, 4=Somewhat can be trusted, 5 = Can be trusted) in the questionnaire. The level of trust towards these two types of organisation are represented as individual observed variable and together they make up the latent variable of Bonding Trust in the path model.

6. Bridging network – the size of the bridging network is represented by asking the respondents '*Do you know anyone in the following organisations that can provide you with information regarding Earthquake Recovery? for 1. Institutional organisations (i. Central government, ii. Local government, iii. Local community, iv. Police / Fire department / Self Defence Force)* and *2. Non-Government organisations (i. NGOs, ii. Private Companies, iii. Utilities Companies, iv. Universities)*' in a dichotomous answer of Yes and No in the questionnaire. The number of yes for each type of organisation is then summed up into two observed variables and together they make up the latent variable of Bridging Networks in the path model.

In the construction of the questionnaire, it is acknowledged that the use of social media and online civic participation might create some collinearity issues because of their similar nature as they both are activities carried over the Internet. In order to maintain their independency, media use is specifically referred to the use of mass and social media in general, while the mediator (online civic participation) is specifically referred to online activities that are related to post-disaster recovery.

The data were collected from an Internet panel was conducted in March 2013. The initial target was to collect 2,000 samples from the three prefectures (Iwate, Fukushima and Miyagi) that were directly hit by the disaster. These three prefectures are selected because the samples would be more likely to have experienced the disaster directly. In total, 2,064 samples were collected. The data collection procedures are described in section 4.1.4. In data screening, 17 unengaged observations were identified and removed, resulted in a total of 2,047 effective samples. Among them, similar to the national average[17], 50.3% were male

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[17] 48.8% of the total population of Japan were male and 51.2% were females in 2010 according to the Population Census (MIC, 2010).

and 49.7% were female. Their average age was 43.4, which was similar to the national average but younger than the average of the three prefectures[18]. 63.3% of the samples had suffered direct damages from the disaster either themselves or their family[19] and 67.5% were employed (include full time, part time and self-employed). The latent, observed and control variables are listed in Table 5-1 below with their corresponding code, maximum and minimum value, mean and standard deviation, and the original questions in Japanese are listed in Appendix A.

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[18] The average age of the total population of Japan was 43.3 in 2010 according to the Population Census (MIC, 2010). The average age in these three prefectures was 46 in 2011 (Deguchi, 2011).

[19] Direct damages to self or family include physical damage (e.g., injury, housing damage) and financial damage (e.g., loss of job, significantly reduce of income). Indirect damages (e.g., inconveniences caused by loss of lifeline, lack of supplies) are excluded.

Table 5-1 Latent, Observed and Control Variables

			Code	M	SD	Min	Max
Latent	1	**Social Media**	IIT				
Observed	1.1	Social network sites	SNS	2.19	1.54	1	5
	1.2	Forum / BBS / Discussion group	BBS	1.81	1.22	1	5
	1.3	Blog / Unofficial homepage / Personal homepage	BLG	2.10	1.31	1	5
	1.4	Video sharing site	STV	2.56	1.39	1	5
Latent	2	**Mass Media (Viewing of informative TV programmes)**	ITV				
Observed	2.1	News / Weather	NEW	4.60	0.88	1	5
	2.2	Current affairs	CUA	2.81	1.15	1	5
	2.3	Educational / Documentary / Scientific	DOC	3.11	1.04	1	5
	2.4	Finance / Business	FIN	2.30	1.13	1	5
		Mediator					
Latent	3	Online Civic Participation	OnCP				
Observed	3.1	Share latest Information / News	OnSR	1.63	1.17	1	5
	3.2	Express own opinions on recovery	OnEX	1.51	0.95	1	5
	3.3	Discuss with family and friends	OnFF	2.14	1.24	1	5
	3.4	Encourage others to take action	OnEN	1.55	0.93	1	5
	3.5	Make donations online / purchase goods from disaster area	OnDN	1.99	1.19	1	5
	3.6	Participate and organise volunteering works	OnVR	1.43	0.86	1	5
Latent	4	**Offline Civic Participation**	OfCP				
Observed	4.1	Joined volunteering	OfVR	2.14	1.29	1	5
	4.2	Joined charity activities	OfCH	2.10	1.23	1	5
	4.3	Encouraged others to support the recovery	OfEN	2.02	1.13	1	5
	4.4	Requested government authorities and NGOs to support the recovery	OfRE	1.85	1.04	1	5
Latent	5	**Bonding Trust**	BoTR				
Observed	5.1	Local government (city government, the municipal authorities etc.)	TrLG	3.19	0.93	1	5
	5.2	Local communities (Neighbourhood associations, NPOs, disaster prevention group etc.)	TrLC	3.38	0.82	1	5
Latent	6	**Bridging Network**	BrNW				
Observed	6.1	Contacts in numbers of Institutional organisations (i)	BrIO	1.55	0.92	1	5

				M	SD	Min	Max
		Central government., ii) Local government, iii) Local community, iv) Police / Fire dept. / Self Defence Force)					
	6.2	Contacts in numbers of Non-government organisations (i) NGOs, ii) Private companies, iii) Utilities companies, iv) Universities)	BrNG	1.37	0.74	1	5
	7	**Control Variables**					
	7.1	Age (Scale)	AGE	43.70	15.21	15	69
	7.2	Gender (0=Male, 1=Female)	GEN	0=50.1%; 1=49.9%			
	7.3	Employment (0=Unemployed, 1=Full time, part time or self-employed)	AIN	0=37.9%; 1=62.1%			
	7.4	Direct damages suffered from Earthquake (self and family) (0=No, 1=Yes)	DID	0=39.3%; 1=60.7%			
M – Mean; SD – Standard Deviation							

From the Table 5-1, first of all, it can be seen that, mass media (television programmes in this case) was indeed very widely used in general, in particular, television news which has a mean value of 4.66[20], followed by educational and documentary programme (m=3.11), current affairs (m=2.81) and finance / business programmes (m=2.30). In comparison, the general use of social media appears to be not as frequent, for instance, among different social media applications, video sharing sites (e.g., YouTube) was the most widely used with a mean of 2.56[21], followed by SNS (m=2.19), blogs and personal homepages (m=2.1), and forum and BBS (m=1.81). That being said, given that all of them have a relatively high standard deviation, which means that the use of social media varies quite a lot between different people. Similarly, the mean values of the online civic participation activities are also not too high as well because social media are the main platform for these activities. Among different online civic participation activities, discuss with family and friends was the most commonly performed task with a mean value of 2.14[22], followed by make donations online (m=1.99), share latest information online (m=1.63), encourage others to take action (m=1.55) and participate and organise volunteering works (m=1.43). Other than the fact that these online activities are limited by the number of social media users, another possible reason for the relatively low participation is because the survey was conducted in 2013, two years after the disaster, which as mentioned in section

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[20] Range: 1 (minimum) to 5 (maximum).
[21] Range: 1 (minimum) to 5 (maximum).
[22] Range: 1 (minimum) to 5 (maximum).

2.1.2; the general public's attentions and supports toward the disaster were fading out, and it seems that this is no exception even for people in these three prefectures that are closest to the disaster area.

Next, moving on to the levels of social capital, first of all, for offline civic participation, similar to their online counterpart, the average levels of the offline civic participation activities are not too high either. For instance, the most common participated activity was joining volunteering works (m=2.14[23]) followed by joining charity activity (m=2.10), encouraging others to support the recovery (m=2.02) and requesting government authorities and NGOs for support (m=1.85). On the other hand, the average level of bonding trust is quite high, that the mean value of trust towards the local community is 3.38[24] and towards the local government is 3.19; this indicates that most people were quite trustful towards these organisations. For bridging networks, the average value for institutional and non-government organisations is 1.55[25] and 1.37 respectively, which are quite low as well.

How these different observed variables are related to the latent variables that represent Bonding Trust, Bridging Networks, Offline Civic Participation, Online Civic Participation, Mass Media and Social Media, as well as how these latent variables are related with each other will be further examined in the next section. It should be noted that the since the mean of some of these observed valuables (for example, those under 3. online civic participation and 6. Bridging network) are quite low, which indicate the potential of floor effect[26] and their skewness and kurtosis are also quite high relatively. These indicate that some variables are non-normally distributed, in order to meet the joint multivariate normal distribution assumption for CFA and SEM, bootstrap re-sampling method are employed (Bollen & Stine, 1992).

5.3.1 Post-Stratification Weighting

Despite the fact that the samples were drawn from a sufficiently large panel pool, knowing that Internet panel survey consists a certain level of non-coverage error (see section 4.1 for details), in order to evaluate the errors and to increase the representativeness of the data set, the group's gender, age and geographic location distribution were compared with the latest (2010) national census data form the Japanese government (MIC, 2010) as reference. The age of the survey panel was ranged from 15 to 69 years old, according to the 2010 census data, this age group represented approximately 68% (3.8 million) of the total 5.7 million populations in these three prefectures, and they are selected to be used as the reference data. The age, gender and geographic location

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[23] Range: 1 (minimum) to 5 (maximum).
[24] Range: 1 (minimum) to 5 (maximum).
[25] Range: 1 (minimum) to 5 (maximum).
[26] Floor effect refers to the issue when many subjects in the study have scores on a variable that are at or near the lower limit and reduces the possible amount of variation in the variables (Everitt, 2002).

distribution of collected samples (observed samples) and the 2010 census data (expected samples) are summarised in the Table 5-2 below.

Table 5-2 Observed Data and Expected Data

	Observed Data (Collected samples)		Expected Data (2010 Census)		One way Chi-square test
	N	%	N	%	
Gender					Chi square
Male	1,030	50.3%	1,938,385	50.1%	0.04;
Female	1,017	49.7%	1,933,468	49.9%	df= 1;
	2,047	100.0%	3,871,853	100.0%	Asymp. Sig. NS
Location					Chi square
Iwate	452	22.1%	880,302	22.7%	82.26;
Miyagi	1,053	51.4%	1,635,598	42.3%	df= 2;
Fukushima	542	26.5%	1,355,953	35.0%	Asymp. Sig. ***
	2,047		3,871,853		
Age group					Chi square
15-19	85	4.2%	286,037	7.4%	334.221;
20-24	96	4.7%	273,577	7.1%	df= 10;
25-29	183	8.9%	307,859	8.0%	Asymp. Sig. ***
30-34	274	13.4%	349,725	9.0%	
35-39	180	8.8%	381,959	9.9%	
40-44	222	10.8%	344,397	8.9%	
45-49	169	8.3%	352,005	9.1%	
50-54	373	18.2%	376,513	9.7%	
55-59	220	10.7%	429,334	11.1%	
60-64	172	8.4%	432,470	11.2%	
65-69	74	3.6%	337,977	8.7%	
	2,047	100.0%	3,871,853	100.0%	
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant					

As shown in Table 5-2, the male and female distributions of the observed data are similar to the census data (around 50/50). However, the distribution of the three prefectures appear to be different, while the ratio of Iwate prefecture is similar to the census data (22%), Miyagi is over-represented (51.4% versus 42.3%) and Fukushima is under-represented (26.5% versus 35%). Furthermore, among different age groups, while some of the younger (15-19 and 20-24) and older (60-64 and 65-69) groups are under-represented, the 30-34 and 50-54 groups are over-represented. One-way chi square test was then carried out to examine if the distributions of the observed data are different from the expected data distributions statistically. The results (also shown in Table 5-2) show that although there is no significant difference between gender distributions, but the difference between the observed and expected data for the distribution of location and age are

significantly different. These observations indicate that there is a certainly level of non-coverage error exists in the observed samples as expected from an Internet panel survey.

As mentioned in section 4.1.3, one widely adopted method to reduce non-coverage error is post-stratification weighting, which the post-stratification weighting factors are calculated by comparing the observed samples and the expected (or reference) samples such as national census data. The weighting factors are then applied to the observed sample to weight it towards the reference sample (see section 4.1.3 for details). In this case, using gender, age and location distribution of the expected sample (the 2010 Japan national census (MIC, 2010)) as reference, a set of ratio-based post-stratification weighting factor was calculated as shown in Table 5-3[27]. These weighting factors were then applied to the observed samples and created the weighted samples, which will be used throughout the analyses in this chapter unless otherwise specified (including the data in Table 5-1).

Table 5-3 Post-Stratification Weighting Factors

	Iwate		Miyagi		Fukushima	
Age	Male	Female	Male	Female	Male	Female
15-19	1.59	1.12	2.04	1.34	2.30	3.25
20-24	1.45	2.41	1.30	1.21	1.72	2.08
25-29	0.81	0.88	1.04	0.60	1.18	1.23
30-34	0.57	0.57	0.53	0.72	0.72	1.19
35-39	0.80	0.94	1.55	0.75	1.84	1.54
40-44	1.14	1.09	0.63	0.60	0.98	1.21
45-49	0.84	1.55	0.73	1.07	1.51	1.74
50-54	0.71	0.69	0.50	0.37	0.73	0.52
55-59	1.22	0.84	0.78	0.92	1.19	1.70
60-64	1.35	1.86	1.06	0.99	1.54	2.11
65-69	1.47	8.03	1.42	2.04	2.55	10.87

As shown in Table 5-4, after applying the weighting factor, the gender, age and location distributions match closely with the 2010 census data.

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[27] The high weighting factor for female between 65-69 from Iwate and female between 65-69 from Fukushima indicate that these groups are particularly under-represented in the Internet survey panel.

Table 5-4 Observed Samples (Weighted)

	Observed Data (Collected samples)		Expected Data (2010 Census)
	N=2050[28]	%	%
Age			
Average age	43.7		
Standard deviation	15.2		
15-19	151	7.4%	7.4%
20-24	145	7.1%	7.1%
25-29	163	8.0%	8.0%
30-34	185	9.0%	9.0%
35-39	202	9.9%	9.9%
40-44	182	8.9%	8.9%
45-49	187	9.1%	9.1%
50-54	199	9.7%	9.7%
55-59	228	11.1%	11.1%
60-64	229	11.2%	11.2%
65-69	179	8.7%	8.7%
Total	2050	100%	100%
Gender			
Male	1027	50.1%	50.1%
Female	1023	49.9%	49.9%
Location			
Iwate	466	22.7%	22.7%
Miyagi	866	42.3%	42.3%
Fukushima	718	35.0%	35.0%
Damage (self and family)	1244	60.7%	N/A
Owned TV set	1934	94.3%	N/A
Owned Internet Access	1832	89.3%	N/A
Employed	1275	62.1%	67.80%

5.3.2 Media Usage

From Table 5-4 above, it can be seen that the Internet penetration of this group is quite high as expected from an Internet survey, that 89.3% of them had Internet access[29], at the same time, 94.3% of them owned a Television set, therefore, most of the sample were able to access both media. In terms of their general use of media, as shown in Figure 5-3, similar to the observations from Table 5-1, television is the most frequently used, almost

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[28] After applying the weighting factor, N was normalised from 2,047 to 2,050
[29] According to the data from MIC, by the end of 2012, the national average Internet penetration rate was 79.5% (MIC, 2013).

77% of samples watched television daily to obtain information, followed by newspaper and Internet portal sites. Among different social media applications, video sharing sites are most frequently used with approximately 50% of the sample had used them more than a few times a month, followed blogs and personal homepages (35%), SNS (34%) and Forum and BBS (24%).
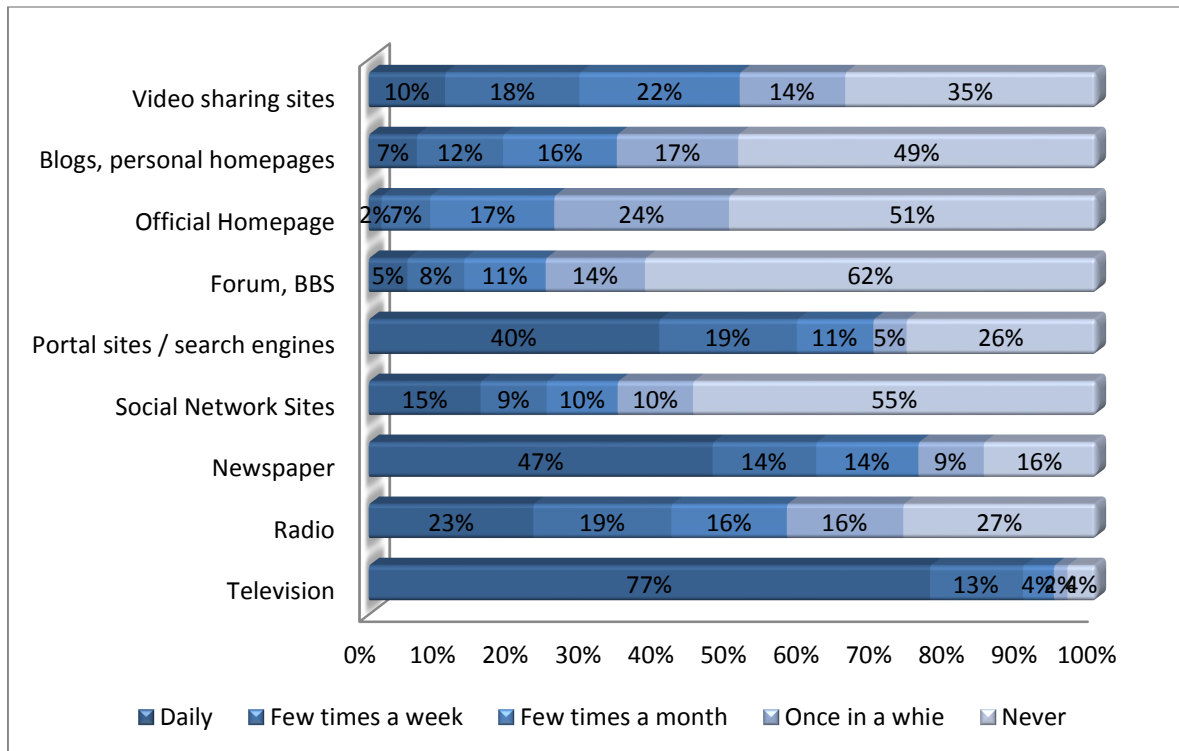
Figure 5-3 Frequency of General Media Use

Furthermore, as it is mentioned after observing from the data in Table 5-1, the use of social media tends to varies between different groups. Acknowledging age is probably one of the many causes of this variation, the usage of media between different age groups are further examined by an one-way ANOVA test to test if the mean values of the usage of different media between different age groups are statistically different. The results in Table 5-5 show that other than official Internet homepage, the usages of all other media are indeed statistically significantly different between different age groups. In particular, the usage of mass media (television, radio, newspaper) is higher among the older generations while the use of social media (SNS, Forum, blogs and video sharing sites) is much higher among younger age groups. But since the mean of television use for all age groups are quite high, in comparison, the mean of social media use for the younger groups are much higher than the older groups, it can be said that mass media (information television programmes) served as the main media source for all age groups, but social media was mainly used by the younger people.

Table 5-5 General Use of Media between of Different Age Groups

Media		Age Group											ANOVA	
		15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	F	Sig.
Television	M	4.3	4.0	4.4	4.5	4.6	4.6	4.7	4.6	4.8	4.7	4.8	10.4	***
	SD	1.0	1.4	1.1	0.9	0.8	1.0	0.8	0.9	0.7	0.9	0.8		
Radio	M	2.2	2.1	2.3	2.6	2.8	2.9	3.1	3.2	3.3	3.7	3.7	26.5	***
	SD	1.2	1.3	1.3	1.5	1.4	1.5	1.6	1.5	1.5	1.4	1.5		
Newspaper	M	2.7	2.8	2.9	3.2	3.6	3.7	3.8	4.0	4.2	4.3	4.5	34.9	***
	SD	1.5	1.5	1.4	1.5	1.4	1.5	1.5	1.4	1.4	1.3	1.2		
SNS	M	3.3	2.8	2.9	2.7	2.4	2.0	2.0	1.9	1.6	1.6	1.5	30.7	***
	SD	1.7	1.7	1.6	1.7	1.6	1.4	1.5	1.4	1.1	1.2	1.0		
Portal sites	M	3.8	3.7	4.0	3.8	3.7	3.6	3.5	3.3	3.2	3.0	2.3	15.4	***
	SD	1.5	1.5	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.6		
Forum, BBS	M	2.0	2.2	2.0	1.9	2.0	1.9	1.7	1.6	1.6	1.6	1.6	5.6	***
	SD	1.4	1.5	1.4	1.2	1.2	1.3	1.2	1.1	1.1	1.0	1.0		
Official Homepage	M	1.8	1.9	1.7	1.8	2.0	1.8	1.9	1.9	1.9	2.0	1.7	1.5	NS
	SD	1.1	1.2	1.0	1.0	1.1	1.0	1.1	1.0	1.0	1.0	0.9		
Blogs, personal HP	M	2.3	2.3	2.3	2.3	2.3	2.2	2.0	2.0	1.9	1.9	1.6	6.1	***
	SD	1.4	1.4	1.5	1.3	1.3	1.3	1.4	1.2	1.2	1.3	1.0		
Video sharing sites	M	3.3	3.3	2.8	2.6	2.6	2.5	2.6	2.4	2.4	2.3	1.8	16.2	***
	SD	1.5	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.3	1.3	1.1		

M – Mean; SD – Standard deviation
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant

In addition, noting that television is the most commonly used information, the types of programmes being watched is further examined in Figure 5-4. It can be seen that more than 90% of the samples watched news at least a few times a week, however, the view of other informative television programmes (e.g., current affairs, educational and finance) are relatively lower than the entertainment and drama programmes.
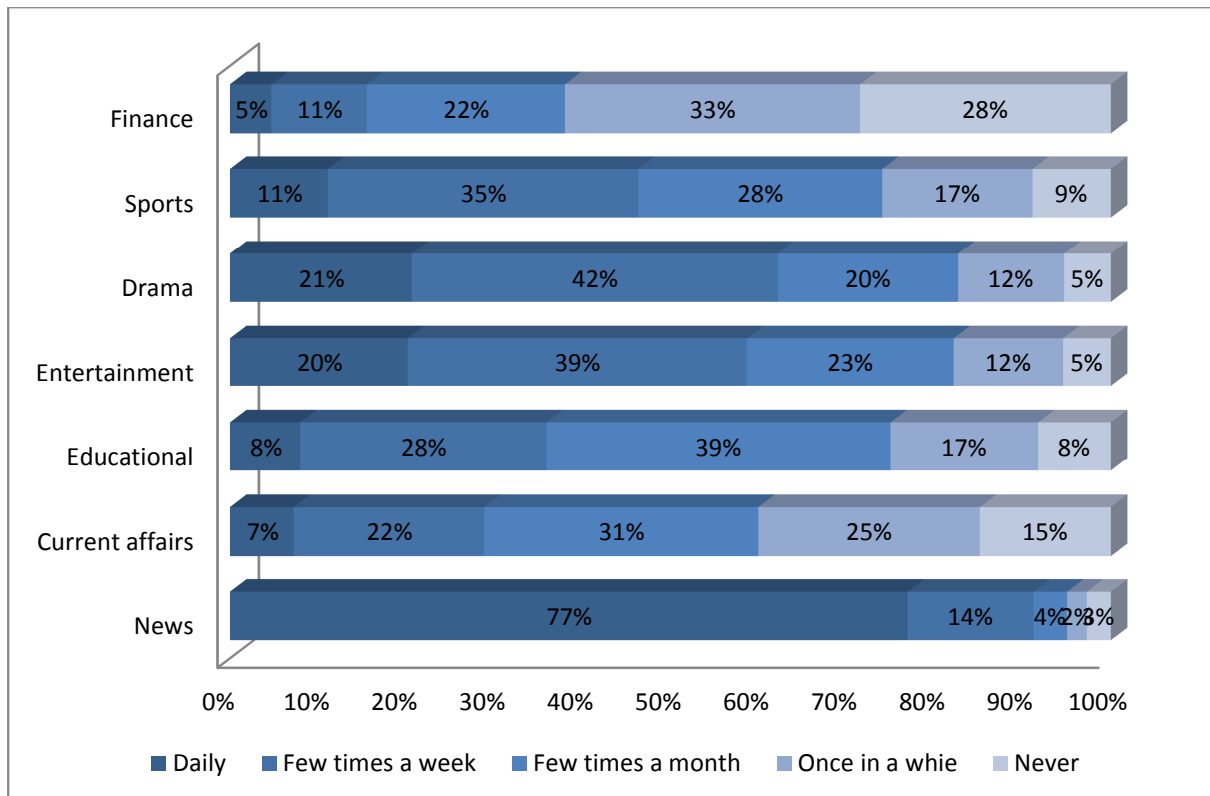
Figure 5-4 Frequency of Television Programmes Watched

Next, acknowledging that online civic participation plays the important role of the mediator in this study, it is worthwhile to look closer into the context of different online civic participation activities. As Figure 5-5 shows, despite the fact that the Internet penetration of this group is quite high with 89.3% of the sample had Internet access, the level of online civic participation activities specifically related to post-disaster recovery was not too high. Among different activities, discussion with family and friends has the highest frequency with approximately 38% of the samples had performed it more than once in a while, followed by sharing information with others (19%), encouraging others to join the recovery (17%), expressing their own opinions (16%) and making donations online (11%). In line with the observations from Table 5-5 above and from Table 5-1 above, this relatively low level of online civic participation is possibly related to the fact it is limited by the number of social media users (mainly the younger people).
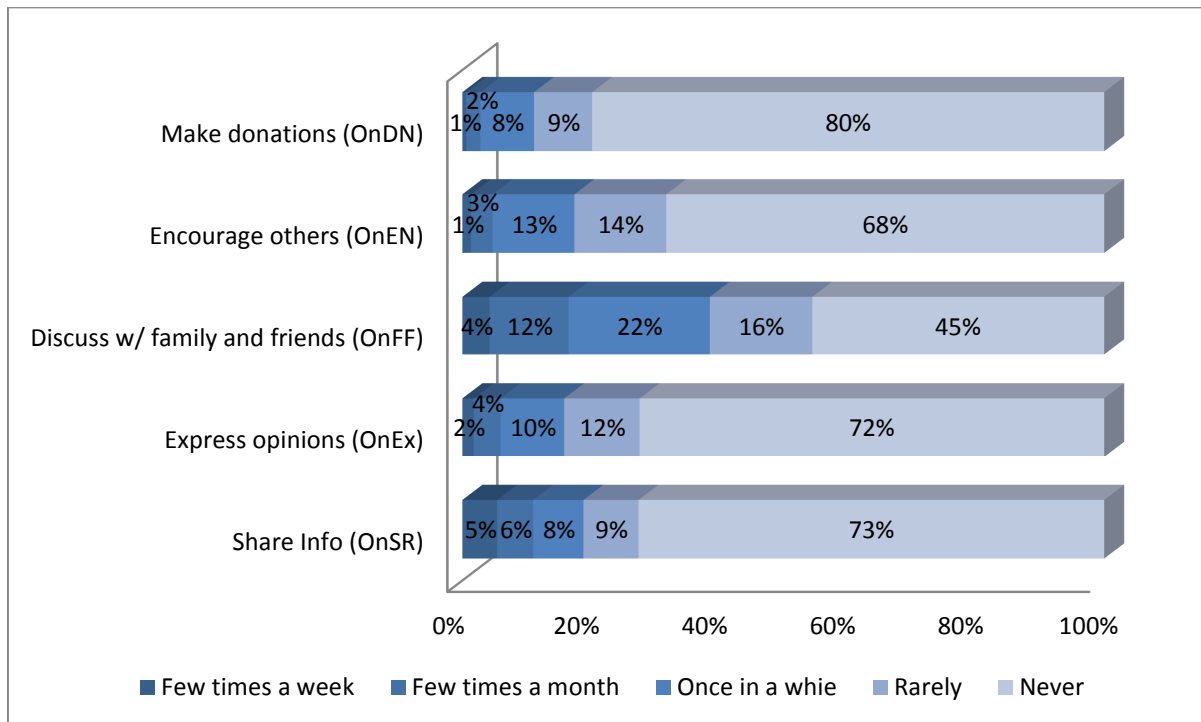
Figure 5-5 Frequency of Online Civic Participation related to Post-Disaster Recovery

5.4 Result Analysis

The data were analysed with the statistical analysis software SPSS and AMOS. First, Exploratory Factor Analysis (EFA) was performed to test if the observed variables were loaded together as expected. Then Confirmatory Factor Analysis (CFA) was conducted to evaluate the model fit and the factors reliability and validity. Finally, Structure Equation Modelling (SEM) was employed to test the hypotheses to examine the relationships between the different variables mentioned in the previous section.

The Exploratory Factor Analysis (EFA)[30] resulted in six factors as expected. The communalities for all variables were >0.3. The Cronbach's alphas[31], Kaiser-Meyer-Olkin[32] and Bartlett's Test for sampling adequacy were all sufficient. The total variance explained by the six factors model was 65.53%. Linearity[33] and Common Method Bias[34] were also tested and no major concerns were found. Overall, the EFA results indicated that the chosen variables were adequate. The EFA factor loadings and the corresponding Cronbach's alphas are shown in Table 5-6.

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[30] Obtained with principle component extraction and Varimax rotation.

[31] The Cronbach's alphas of all factors were >0.7 expect for bonding trust's which was reasonably close at 0.681.

[32] The Kaiser-Meyer-Olkin test result was 0.837.

[33] The linearity between the different latent variables were tested using curve estimation regression, all relationships were sufficiently linear with p-values less than 0.001.

[34] Since the data were collected using the same instrument, the Common Method Bias was tested. Using the Harman's single factor test (Podsakoff et al., 2003), the single un-rotated factor accounted for 25.18% of the total variance, indicated that it was not a concern.

Table 5-6 EFA Factor Matrix

Latent Variable	Observed Variable	Factor						Cronbach's alphas
		1	2	3	4	5	6	
IIT	SNS	.320		.630				.754
	BLG			.738				
	BBS			.806				
	STV			.749				
ITV	NEW				.672			.735
	CUA				.787			
	DOC				.792			
	FIN				.675			
OnCP	OnSR	.693						.833
	OnEX	.698		.356				
	OnFF	.729						
	OnEN	.748						
	OnDN	.674						
	OnVR	.620	.465					
OfCP	OfVR		.791					.871
	OfCH		.820					
	OfEN		.856					
	OfRE		.818					
BoTR	TrLG					.892		.754
	TrLC					.885		
BrNW	BrIO						.835	.681
	BrNG						.845	

Confirmatory factor analysis (CFA) [35] was then performed with bootstrap re-sampling[36] to test the model fit and the factors validity and reliability. The CFA modification indices were referred to improve the model fit[37]. Overall, the CFA model fit indices (CMIN/DF=5.663, CFI=0.948, GFI=0.957, AGFI=0.941, RMSEA=0.048, PCLOSE=0.899) indicated that the overall goodness of fit of the model was sufficient. In addition, the Average Variance Extracted (AVE) [38] and Composite Reliability (CR) [39] were tested using the

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[35] Using Maximum Likelihood.

[36] Bootstrap Samples=2000; Bias-Corrected Confidence level = 95%.

[37] The indices indicated that OnVR and OfVR had the highest modification index for covariance; that was probably because both questions were related to volunteering and hence they were highly correlated, since OnVR had a relatively lower loading factor in comparison, it was removed from the model.

[38] The Average Variance Extracted (AVE) for all factors were >0.5 (the desired threshold, (Hair Jr. et al., 2010) except for OnCP (0.446), IIT (0.449) and ITV (0.424). As they were sufficiently close to 0.5 with Cronbach's reliability >0.7 and the standardised regression weight of all their observed variables were >0.5 with p=0.001, they were considered as admissible.

model by Gaskin (2012b) and the results were also acceptable. Finally, a SEM model was constructed with references to the modification indices[40] to represent the path model shown in Figure 5-2 to test the hypotheses defined in section 5.2.1. The SEM model fit indices (CMIN/DF=6.443, CFI=0.920, GFI=0.942, AGFI=0.921, RMSEA=0.052, PCLOSE=0.148) shown the overall goodness of fit of the model was sufficient. The final SEM model is shown in Figure 5-6 and the resultant standardised estimate (Est.) and significance (Sig.)[41] of the factors are shown in Table 5-7.
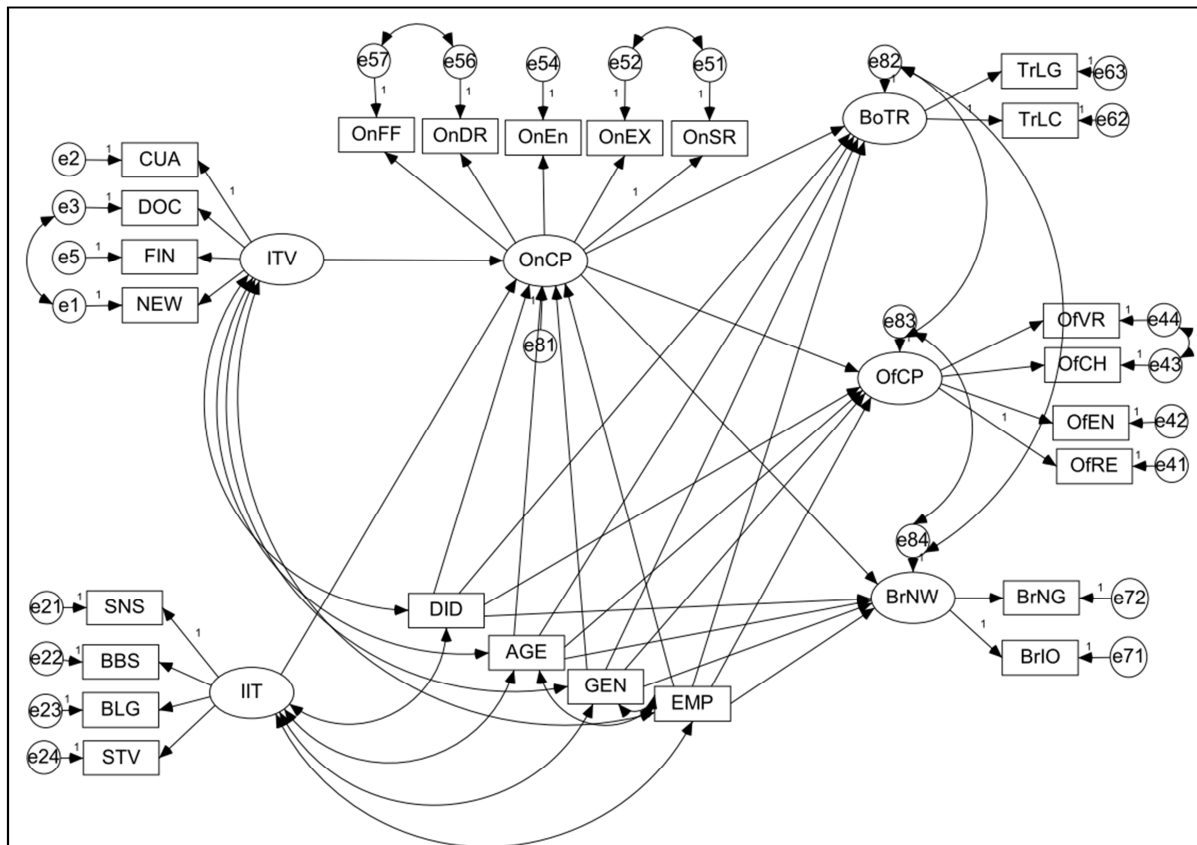
Figure 5-6 Structural Equation Model

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[39] The composite reliability for all factors were >0.7 (the desired threshold, (Hair Jr. et al., 2010)) except for bridging networks which was sufficiently close at 0.691.

[40] Based on the modification indices, the errors of some variables were co-varied. For examples, the errors of bonding, bridging social capital and online civic were co-varied, which is logically as they were interrelated according to the literature. Similarly, the use of media and the control variables were also co-varied, as it is logical to expect that social backgrounds were related to media usage.

[41] Obtained with bootstrap re-sampling. Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%

Table 5-7 Structural Equation Model Factors' Standardised Estimate and Significance

Parameter			Est.	Sig.	Parameter			Est.	Sig.
OnCP	<---	IIT	0.51	***	BrNW	<---	DID	0.06	**
OnCP	<---	ITV	0.30	***	OfCP	<---	DID	0.00	NS
BoTR	<---	OnCP	0.14	**	BoTR	<---	DID	-0.04	NS
OfCP	<---	OnCP	0.50	***	OnCP	<---	DID	0.06	**
BrNW	<---	OnCP	0.44	***	OfCP	<---	EMP	-0.03	NS
BBS	<---	IIT	0.68	***	BoTR	<---	EMP	-0.01	NS
SNS	<---	IIT	0.64	***	BrNW	<---	EMP	0.05	*
BLG	<---	IIT	0.73	***	OnCP	<---	EMP	0.03	NS
STV	<---	IIT	0.63	***	BrNW	<---	GEN	-0.08	**
NEW	<---	ITV	0.40	***	OfCP	<---	GEN	-0.06	**
DOC	<---	ITV	0.63	***	BoTR	<---	GEN	-0.01	NS
CUA	<---	ITV	0.86	***	OnCP	<---	GEN	0.05	**
FIN	<---	ITV	0.61	***	EMP	<-->	AGE	0.09	***
OnEN	<---	OnCP	0.81	***	IIT	<-->	AGE	-0.36	***
OnEX	<---	OnCP	0.65	***	ITV	<-->	AGE	0.36	***
OnFF	<---	OnCP	0.66	***	IIT	<-->	DID	0.08	**
OnSR	<---	OnCP	0.56	***	ITV	<-->	DID	0.01	NS
OnDN	<---	OnCP	0.59	***	ITV	<-->	EMP	0.00	NS
TrLC	<---	BoTR	0.89	***	IIT	<-->	EMP	-0.02	NS
TrLG	<---	BoTR	0.68	***	EMP	<-->	GEN	-0.29	***
OfCH	<---	OfCP	0.73	***	IIT	<-->	GEN	-0.11	***
OfEN	<---	OfCP	0.92	***	ITV	<-->	GEN	-0.07	**
OfRE	<---	OfCP	0.80	***	e83	<-->	e84	0.13	***
OfVR	<---	OfCP	0.70	***	e82	<-->	e83	0.06	**
BrIO	<---	BrNW	0.71	***	e82	<-->	e84	0.16	***
BrNG	<---	BrNW	0.74	***	e56	<-->	e57	0.19	***
BrNW	<---	AGE	0.02	NS	e52	<-->	e51	0.41	***
OfCP	<---	AGE	-0.01	NS	e43	<-->	e44	0.20	***
BoTR	<---	AGE	0.05	NS	e3	<-->	e1	0.23	***
OnCP	<---	AGE	-0.01	NS					
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant									

5.4.1 Media Use, Online Civic Participation and Social Capital

Hypotheses H1 to H5 were tested by examining the standardised estimate (Est.) and corresponding significance (Sig.)[42], the results are summarised in Table 5-8. The results show that both the use of Social Media (IIT) and Mass Media (ITV) have a significant positive effect on Online Civic Participation (OnCP). Hence, both H1 and H2 are supported. Furthermore, Online Civic Participation (OnCP) also has a significant positive effect on Offline Civic

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[42] Obtained with Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.

Participation (OfCP), Bridging Networks (BrNW) and Bonding Trust (BoTR) and therefore, H3, H4, and H5 are also supported. However, it is worth noting that the effect of Online Civic Participation on Bonding Trust (H4) appears to be lower than on Bridging Networks (H5) and Offline Civic Participation (H3).

Table 5-8 SEM Standardised Regression Weight and Significance for Hypotheses H1 to H5

Hypothesis	Parameter	Est.	Sig.	Result
H1	OnCP <- IIT	0.51	***	Supported
H2	OnCP <- ITV	0.30	***	Supported
H3	OfCP <- OnCP	0.50	***	Supported
H4	BoTR <- OnCP	0.14	**	Supported
H5	BrNW <- OnCP	0.44	***	Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant				

5.4.2 Mediation Effect of Online Civic Participation

The mediation effects of Online Civic Participation (OncP) on the use of Mass and Social Media on the different social capital components (H6 to H11) were tested by comparing the standardised estimate (Est.) and its significance (Sig.) between the independent variables (the use of Mass Media - ITV and the use of Social Media - IIT) and the dependent variables (Offline Civic Participation - OfCP, Bridging Network - BrNW and Bonding Trust - BoTR) in three different conditions; 1. directly without the mediator (Online Civic Participation - OnCP), 2. directly with the mediator, and 3. indirectly with the mediator[43]. The results[44] are summarised in Table 5-9. (See section 4.2.2 for details on mediation effect).

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[43] For details of different mediation effects and the testing method, see Cheung and Lau (2008).
[44] Obtained with 2000 bias-corrected bootstrap re-samples.

Table 5-9 Mediation Effect of Online Civic Participation for Hypotheses H6 to H11

Hypothesis	Condition	1.Direct without Mediator (Est./Sig.)	2.Direct with Mediator (Est./Sig.)	3.Indirect with Mediator (Est./Sig.)	Mediation Type	Result
H6 – Full Mediation	OfCP <- OnCP <- IIT	0.185 ***	-0.058 * (NS)[45]	0.247 ***	Full	Supported
H7 – Full Mediation	BoTR <- OnCP <- IIT	0.028 NS	-0.025 NS	0.054 **	Indirect	Not Supported
H8 – Full Mediation	BrNW <- OnCP <- IIT	0.257 ***	0.066 NS	0.197 ***	Full	Supported
H9 – Partial Mediation	OfCP <- OnCP <- ITV	0.269 ***	0.134 ***	0.030 ***	Partial	Supported
H10 – Partial Mediation	BoTR <- OnCP <- ITV	0.145 ***	0.113 ***	0.134 **	Partial	Supported
H11 – Partial Mediation	BrNW <- OnCP <- ITV	0.162 ***	0.053 NS	0.107 ***	Full	Not Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant						

For the mediation effect of Online Civic Participation (OnCP) on the use of Social Media (IIT), the results show that it has fully mediated the effect from the use of Social Media on Bridging Networks (BrNW) (H8), as well as on Offline Civic Participation (OfCP) (H6). In other words, the direct effect from the use of Social Media on Offline Civic Participation and Bridging Network are fully replaced by mediator (Online Civic Participation) once it is introduced, hence, it has fully mediated their effects and therefore, H6 and H8 are supported. In other words, Online Civic Participation can fully explain the positive effect from Social Media on Offline Civic Participation and Bridging Networks. On the other hand, in the case of Bonding Trust (BoTR) (H7), it can be seen that the use Social Media has no direct effect on it neither with nor without the mediator, but it has some indirect effect on it when the mediator is introduced. In other words, instead of a full mediation, Online Civic Participation has only indirectly mediated the effect of Social Media on Bonding Trust, and hence, H7 is not supported. On the other hand, for the mediation effect of Online Civic Participation (OnCP) on the use of Mass Media (ITV), in the case of

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[45] Since the beta coefficient is very close to zero and the significance is only at the 0.1 level, it can be considered as not significant in this case, in other words, there is almost no direct effect from IIT to OfCP with the present of the mediator.

Offline Civic Participation (OfCP) (H9) and Bonding Trust (BoTR) (H10), the direct effect with and without the mediator and the indirect effect with the mediator are all significant, hence, they imply that Online Civic Participation has partially mediated the effects from the use of Mass Media on them, hence, H9 and H10 are supported. In order words, Online Civic Participation can explain part of the effects from Mass Media on Offline Civic Participation and Bonding Trust. However, in the case of Bridging Network (BrNW) (H11), the result show that once the mediator is introduced, the direct effect has changed from significant to insignificant, given the indirect effect with the mediator is significant, these imply that instead of a partial mediation, Online Civic Participation actually has fully mediated the effect of Mass Media on Bridging Network, hence H11 is rejected.

In summary, the tests on the mediation effects have shown that Online Civic Participation has fully mediated the effect of Social Media on Offline Civic Participation and Bridging Network, but not on Bonding Trust. On the other hand, Online Civic Participation has partially mediated the effect of Mass Media on Offline Civic Participation and Bonding Trust, and on top of that it has fully mediated the effect of Mass Media on Bridging Network.

5.4.3 Interaction Effect of Mass and Social Media

The interaction[46] between the use of Social Media (IIT) and Mass Media (ITV) stated in hypothesis H12 was tested by examining the significance of their interaction term[47] (ITV x IIT) on Online Civic Participation (OnCP) by adding it to the path model as an independent variable as shown in Figure 5-2 and test if it is statistically significant. The result shows that the interaction term indeed has a significant and positive effect (0.057**) on Online Civic Participation and hence H12 is supported. In other words, Mass and Social Media can interact with each other to create some positive effect on Online Civic Participation. Using the model by Gaskin (2012a), the type of interaction effect was further examined by plotting the corresponding un-standardised regression coefficients with the use of Social Media (IIT) as the independent variable, the use of Mass Media (ITV) as the moderator, the interactive term (ITV x IIT) as the interaction and Online Civic Participation (OnCP) as the dependant variable as shown in Figure 5-7, where the level of use of Mass and Social Media are divided into High (one standard deviation above the mean), and Low (one standard deviation below the mean). The figure shows that the use Mass Media has strengthened the positive relationship between the use of Social Media and Online Civic Participation. In other words, the use of Mass Media (watching television news and current programmes in this case) can encourage social media users to participate more in online civic activities.

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[46] Refer to section 4.2.2 for details on interaction effect.

[47] The interaction term is '*the joint effects of the two treatment variables in addition to the individual main effects*' (Hair Jr. et al., 1998, p. 329). It was generated by standardising and multiplying the two treatment variables together in a path model with composite variables formed by imputing the variables (Gaskin, 2012c).
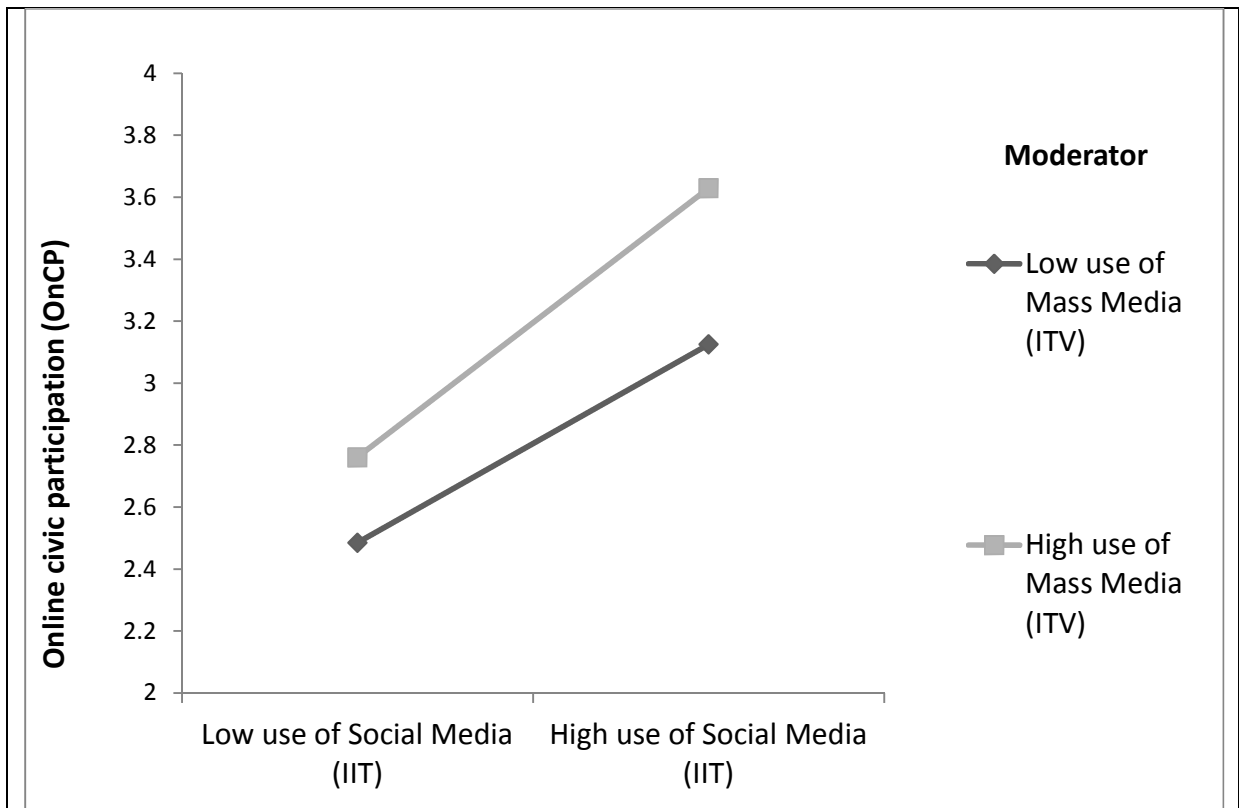
		Dependent variable Online Civic Participation (OnCP) (Un-standardised estimate)
Independent variable	Social Media (IIT)	0.377
Moderator	Mass Media (ITV)	0.195
Interaction	ITV x IIT	0.057

Figure 5-7 Interaction Effect between Use of Social Media and Mass Media on Online Civic Participation

5.4.4 Control Variables

Among the control variables, as shown on Table 5-7, it can be seen that age (AGE) and gender (GEN) are negative correlated with the use of Social Media (IIT), which indicate that younger male tend to utilise social media more than others. At the same time, age is also positively correlated with Mass Media (ITV), which means that older people tend to utilise mass media more. This is in line with the observations in section 5.3.2. Other than the above, it appears that the control variables (age, gender, employment and disaster experience) have no major influence on all three social capital elements.

5.5 Key Finding

Using the communication mediation model with Online Civic Participation assumed as the mediator and the social capital elements of Bonding Trust, Bridging Networks and Offline Civic Participation as the proxy for the capacity for post-disaster recovery, the

analysis presented in previous section has examined the effects of mass and social media on post-disaster recovery from the active audience perspective. Generally speaking, the findings are promising and are in line with the expectations derived from the theoretical framework. In summary, the key findings can be consolidated into the following three points.

1. Media's effect on social capital - the results have demonstrated that mediated by Online Civic Participation, mass and social media can create positive effect on all three social capital elements that are essential for post-disaster recovery which include Bonding Trust, Bridging Networks, and Offline Civic Participation. At the same time, it can still be seen that Online Civic Participation can strongly encourage people to participation in recovery activities (Offline Civic Participation) and extend their connection network (Bridging Network) as well as increase the level of trust towards different organisations (Bonding Trust).

2. Online Civic Participation as the mediator – the results have shown that Online Civic Participation can effectively linkup the use of mass and social media and their positive effect on social capital and explain their relationships. Specifically, it can fully and partially mediate the effect of social and mass media on different social capital elements respectively. Furthermore, upon closer examination it can be seen that although Online Civic Participation has fully mediated the positive effect of social media on Offline Civic Participation and Bridging Networks, it has only indirectly mediated the effect on Bonding Trust. This implies that just the use of ICT (social media in this case) alone is not sufficient to increase all aspects social capital; rather it is the context that matters. On the other hand, it is also interesting to find that instead of a partial mediation, Online Civic Participation actually has fully mediated the effect of mass media on Bridging Networks despite the fact that they are on a different media platform. This implies that while mass media can provide the networking information, it is through the online civic activates that the bridging connections are established.

3. Interaction between mass and social media – the results have shown that mass and social media can interact with one another in a positive way, for instance, the use of mass media has a positive influence on the effect of social media on Online Civic Participation. In other words, social media users who use more mass media (information television programmes in this case) tend to be more active in the participation in civic activities related to the recovery online. This finding is particularly interesting because it has demonstrated the potential of the interactivity between the two media, which will have important implication for how to utilise both media to encourage more people to support the recovery, and this interaction shall be further investigated.

5.6 Discussion and Conclusion

As the first part of the three-part empirical analysis, this chapter attempts to answer the research question of 'what are the effects of mass and social media in post-disaster recovery and how do they work' from the active audience perspective. The empirical

analysis presented above has demonstrated the positive effects of mass and social media on the development of social capital for post-disaster recovery as well as the underlying mechanism analytically. In practice, how these analytic findings are connected to the people and what are the implications for post-disaster recovery?

First, let's start with the subject of this case study. This study focuses on the people from the three prefectures (Miyagi, Fukushima and Iwate) that were hit by the disaster directly, thus they were more likely to have experienced the disaster directly and also more likely to be related to the recovery (indeed, 60% of them had reported that either themselves or their family had suffered direct damages from the disaster). Furthermore, although these three prefectures are traditionally known as the agricultural areas, this group was quite well connected to the media, for instance, 77% of them watched television daily, 90% had access to the Internet and 45% had used SNS such as Facebook and Twitter. That being said, it is worth noting that the usage of media is strongly related to their age, for instance, while the younger people used both mass and social media quite frequently, the older people tended to rely mainly on the traditional mass media.

So how these people are related to the effects of media in post-disaster recovery? To being, let's assume that most people do make their own decision to select their use of media according to their personal preferences and background as the active audience perspective suggests[48]. In the case of the Great East Japan Earthquake, the disaster had created many profound changes to the Japanese society politically, economically, environmentally and socially. Most people tried to understand the situation by obtaining information from different media sources available to them. In a highly mediated society such as Japan, there are many choices of media. For instance, on television, a wide range of informative programmes such as news, current affairs, documentary and scientific, and finance and business programmes[49] were available that can provide information on different issues related to the disaster and recovery. At the same time, owing to ICT development, people could also utilise different social media applications such as SNS (e.g., Facebook, Twitter), forum and BBS, blogs and personal homepages as well as video sharing sites (e.g., YouTube)[50] to obtain information related to the disaster and recovery. Furthermore, on top of allowing people to obtain information from a diverse range of sources, social media also empowered them to share, exchange information and even to create their own reports to fulfil their needs and motives much easier than before. For instance, as they learned about different controversial issues related to the disaster such as the Fukushima nuclear power plant accident, the economic impact of the disaster and also the difficulties and successes of the recovery, some people utilised social media to react on

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[48] See section 3.2 for details on the active audience perspective.

[49] These different types of television programme are represented different measured variables that construct the factor 'Mass Media' in the model. The frequency of their usage is shown in section 5.3.2.

[50] These different social media applications factors are represented different measured variables that construct the factor 'Social Media' in the model. The frequency of their usage is shown in section 5.3.2.

these information. It can be seen in section 5.3.2, among different online activities, the most commonly performed one was to discuss these information with their family and friends that approximately 38% of them had done this more than a few times a month, followed by to share these information online with other people, to encourage other people to support the recovery, to express their own opinions and to make donations online[51]. It was through these online interactions, people increased their chances to make contact with other people share similar interest, as well as to obtain new information and resources. These new information and connections helped them to understand what was going on, and it was thought these cognitive processes of making sense of the reality that they had changed their attitudes and behaviours towards the disaster. For instance, as they learned more about the different organisations that were working on post-disaster recovery such as the local communities and NGOs, and the activities they had carried out, they became more trustful towards these organisations[52]. At the same time, through these online interactions, some people had established contact with different organisations (e.g., institutional organisations such as central and local government authorities, local communities, police, fire department and SDF, as well as non-government organisations such as NGOs, private and utilities companies, universities), and subsequently expanded their bridging networks[53] of resources and information for post-disaster recovery. Furthermore, as people learned more about the problems that were faced by the disaster victims, as well as obtained more resources on how to support them, they became more active in participating in different activities in the offline world such as to join volunteering works, to participate in charity events, to encourage others to support the recovery and to request government authorities and NGOs to support the recovery[54]. Collectively referred as social capital, this kind bonding trust, bridging networks and active participation in civic activities will encourage the people to continue to support the recovery[55].

As described above, it can now be clearly seen how the use of mass and social media can lead to the development of social capital in practice. Moving forward, what are their implications for post-disaster recovery? First of all, knowing that the online civic participation can play the key role to link up the use of media and their positive effect on social capital, for both government organisations and NGOs that are working on post-disaster recovery, they can further utilise social media to engage with more people in the online community to support the recovery. At the same time, they can also utilise mass

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[51] These activities are represented by different measured variables that construct the factor Online Civic Participation in the model. The frequency of their usage is shown in section 5.3.2.

[52] Their levels of trust towards different organisations are represented by different measured variables to represent the factor Bonding Trust in the model.

[53] The numbers of their contact in different organisations are represented by different measured variables to represent the factor Bridging Networks in the model.

[54] The different activities are represented by different measured variables to represent the factor Offline Civic Participation in the model.

[55] Refer to section 2.3 for details on the relationship between social capital and post-disaster recovery.

media to raise the general public's awareness on the recovery. Together if they can utilise both media coherently, then by taking advantage of the reaching power of the Internet and social media, they can encourage more users to engage with the recovery online, which subsequently will increase the level of social capital in the offline world. How these implications can be fitted into the big picture will be further discussed in chapter 8 together with the findings from other parts of the analysis.

In conclusion, in response to the research question, looking from the active audience perspective, the analysis presented in this chapter has demonstrated the positive effect of mass and social media on the develop of social capital for post-disaster recovery such as bonding trust, offline civic participation and bridging network. It has also explored the mechanism of how these effects are generated. The findings stress the importance of online civic participation as the mediator as well as the interactivity between mass and social media. That being said, these findings are derived based on the assumption that most people are active and they decide their use of media consciously. As pointed out in chapter 3, this is only one way of looking into the effects of media; will the effects be different if most people are passive instead? This question will be addressed in the following chapter.

Chapter 6 Media's Effects on People's Perceptions and Intentions

6.1 Introduction

This chapter[56] presents the second part of the three-part empirical analysis. Based on the theoretical framework in chapter 3, the first part of the analysis presented in chapter 5 began with looking into the effects of mass and social media on social capital using theories form the active audience perspective. This chapter continues the analysis to investigate the research question – 'what are the effects of mass and social media in post-disaster recovery and how do they work?' based on the cultivation theory from the passive audience perspective. In particular, it investigates media's effects on people's perceptions and intentions. In order to maintain the consistence of the analysis, this chapter uses the same data set as the first part of the analysis.

As described in chapter 1, after the Great East Japan Earthquake, the critical role ICT, in particular social media played had caught most of the public's attention not only in Japan, but also around the world (e.g., Wallop, 2011; Sternberg, 2011, Slater et al., 2012b). That being said, the role of mass media still cannot be undermined. First of all, in the disaster area, one of the main problems after the disaster was that most of the ICT infrastructures were destroyed, coupled with the shortage of electricity, many local communities had no access to the Internet nor mobile phones for an extended period of time, and all they could rely on was the traditional mass media such as radio and television (MIC, 2011a). In addition, for the rest of the nation, NHK – the national television channel as well as other commercial channels had provide 24 hours non-stop live coverage of the event in the following days to inform the public as the event unfold (Tanaka, 2012). Indeed, despite the fact that the general usage and influence of television has been on a continuous declining trend in Japan (NHK, 2013), after the disaster many reports have shown that traditional mass media, in particular television are still regarded as the most trusted, reliable and used information sources (e.g., Kimura, 2011; MIC, 2011a). Furthermore, as Tanaka et al. (2012) have found out, mass media specifically television had exterted a great influence on the public that the number of volunteers and the amount of donations went to the disaster area were directly related to the frequency of disaster reports being shown on television. Therefore, acknowledging the influence of mass media, in particular in a crisis situation when people rely of the information from the media to make judgement of the reality, it is critical to examine the effects of media from the perspective on mass media audiences. In particualr, it adopts the cultivation theory from the passive audience perspective as described in chapter 3 to investigate what are the media's cultivation media's effects on people's

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[56] Part of this chapter is developed based on the paper 'The Role of ICT and Mass Media in Post-disaster Restoration and Recovery Progress - A Case of the Great East Japan Earthquake' (Mitomo et al., 2013) which the author is one of the co-authors.

perceptions of the diaster and how these perceptions can affect their intention to particpate in post-diaster recovery actvities.

This chapter is arranged as follows, section 6.2 describes the theoretical model used in this study and also the hypotheses, followed by section 6.3 which provides the detail of the data analysis including the construction of the questionnaire and the characteristics of the sample data. Then in section 6.4, the hypotheses are tested and the results are analysed. The key findings are then consolidated in section 6.5. Finally the results derived from the analytical model are linked up with the people in practice to derive the implications in section 6.6 to conclude this chapter.

6.2 Theoretical Model

Taken from the passive audience perspective which assumes most people are passive and are subjected to the influence from the media directly, as described in section 3.1, the cultivation theory put forward by Gerbner and his team (Gerbner et al., 1980) suggests that information from the media, in particular television can change how people perceptive the reality (Potter, 1986; 1988) in two main ways, first, known as the 'mainstream effect' - the more people seeing the same message from the media, the more likely they will believe in it. Second, the 'resonance effect' - as people see messages from the media that are similar to their own, they will be more likely to believe in it[57]. Furthermore, as the social cognitive theory suggests, the formulating of these perceptions can be seen as the cognitive process that explains how people change their attitudes and behaviours as they change their perceptions of the reality (Shrum, 2002). For example, in the case of natural disasters, many studies have found that people's perceptions of the disaster such as risk and safety have affected their intention to carry out different activities such as their willingness to evacuate, to help others and to prepare for future disasters (Riad & Norris, 1998; Paton, 2003; Shaw et al., 2014). In the case of Great East Japan Earthquake, the study by Mitomo et al. (2012) has found a similar pattern that the rationalised information provided by the media can effectively motivate people to take immediate actions after the disaster such as information collection, altruistic actions and preparation for aftermath even though they were not in the disaster area. Furthermore, many recent studies have found that the Great East Japan Earthquake indeed has altered many people's perceptions such as anxieties and intention to carry out different activities related to the disaster (e.g., Kano, 2013; Nakayachi et al., 2014; Naoi et al., 2014; Yamamura et al., 2014). Although this part of the analysis focuses on the use of mass media, it also acknowledges the effects of social media because as pointed out in section 3.1, they can also influence people as mass media do. Therefore, similar to the first part of the analysis in chapter 5, as people can be mass media audience and social media user at the same time, the term 'audience', 'user' and 'people' are interchangeable in this analysis.

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[57] Refer to section 3.1 for details on the cultivation theory, the mainstream effect and the resonance effect.

Based on the above observations, the theoretical model for this chapter is constructed as shown in Figure 6-1. First of all, based on the cultivation theory and the social cognitive theory, it assumes that the use of media will affect people's perceptions of the disaster as the mainstream effect has predicted. These effects, assumed as the cognitive process in turn will alter their intention to participate in civic activities related to post-disaster recovery. Furthermore, as the resonance effect suggests, it is anticipated that the media will exert a greater influence on those who were directly affected by the disaster.
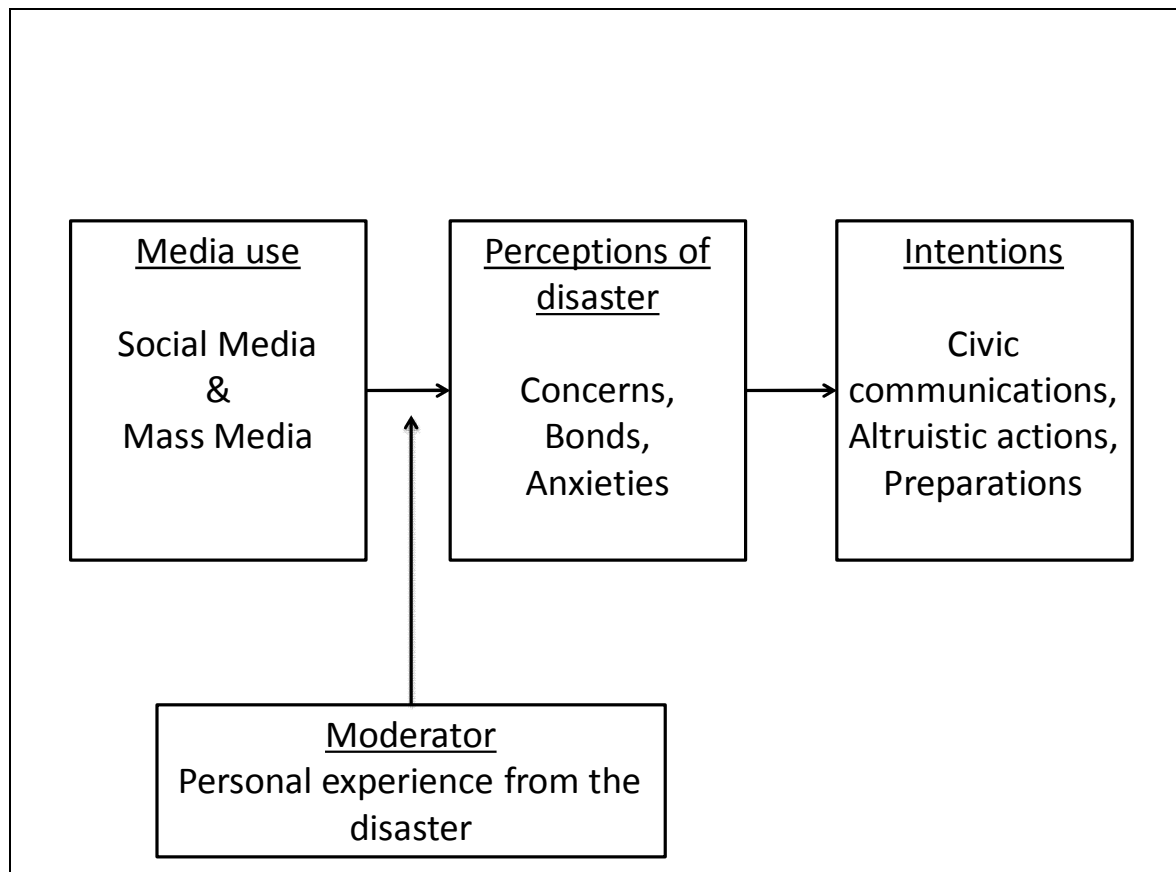
Figure 6-1 Media Use, Perceptions and Intentions

The model is further elaborated as follows:

- Media use – the use of media is represented by the use of mass and social media. In order to evaluate the cultivation effect of the media on post-disaster recovery, the use of mass media is specifically referred to the different information being seen on television that are related to the disaster and the recovery. On the other hand, the use of social media is represented by the use of different social media applications (e.g., SNS, blogs, forum and video sharing sites) to obtain and to collect information specifically related to the disaster and the recovery.
- Perceptions of disaster – typically the perceptions of disaster is represented by people's perceived level of anxieties and concerns, in addition, after in the Great East Japan Earthquake, as pointed out in section 2.1.1, one the of the most frequently used terms

in the media was bonds (kizuna) which depicts the bonds and connections exist between people, family and society. Therefore, it is anticipated that the perception of bonds will also play an important role and hence, it is also included as one of the main perceptions together with concerns and anxieties.

- Intentions – it is referred to people's intention to carry out or to support different activities that are related to post-disaster recovery, in this case, they are represented by three particular civic activities. First is civic discussions, as pointed out in section 2.4, interactive discussion is one of the main drivers to encourage civic engagement. Second is altruistic actions such as volunteering and donations which represent reciprocity - one of the key manifestations of social capital described in section 2.3. Third is preparations for future disasters which is an important part of the disaster management cycle to increase the community's disaster resilience as described in section 2.2. Together, these three intentions are used as the proxy to represent the capacity for post-disaster recovery.

- Moderator – as the resonance effect suggests (refer to section 3.1 for details), the cultivation effect of media will increase if the message from the media is similar to people's own experience. Therefore, it is anticipated that for those who were affected by the disaster directly, media will have a stronger effect on their perceptions of the disaster. Hence, personal experience from the disaster will be used as the moderator which is expected to alter the effect of media on people's perceptions.

6.2.1 Hypotheses

Based on the assumptions in the above section, a set of hypotheses is drawn to examine the relationships between the use of media, the perceptions of the disaster, intention to carry out recovery related activities and their personal experience from the disaster as shown in Figure 6-1. First of all, as the mainstream effect suggests, message from the media will directly affect people's perceptions of the reality. Hence, it is anticipated that:

- Hypothesis H1: The use of mass media has a positive effect on the perception of concerns.
- Hypothesis H2: The use of mass media has a positive effect on the perception of bonds.
- Hypothesis H3: The use of mass media has a positive effect on the perception of anxieties.
- Hypothesis H4: The use of social media has a positive effect on the perception of concerns.
- Hypothesis H5: The use of social media has a positive effect on the perception of bonds.
- Hypothesis H6: The use of social media has a positive effect on the perception of anxieties.

Secondly, knowing that as a form of cognitive process, people's perceptions of the reality will affect their intentions. Hence, it is hypothesised that:

- Hypothesis H7: The perception of concerns has a positive effect on the intention of civic discussion.
- Hypothesis H8: The perception of concerns has a positive effect on the intention of altruistic actions.
- Hypothesis H9: The perception of concerns has a positive effect on the intention of preparations.
- Hypothesis H10: The perception of bonds has a positive effect on the intention of civic discussions.
- Hypothesis H11: The perception of bonds has a positive effect on the intention of altruistic actions.
- Hypothesis H12: The perception of bonds has a positive effect on the intention of preparations.
- Hypothesis H13: The perception of anxieties has a positive effect on the intention of civic communications
- Hypothesis H14: The perception of anxieties has a positive effect on the intention of altruistic actions.
- Hypothesis H15: The perception of anxieties has a positive effect on the intention of preparations.

Thirdly, as the resonance effect suggests, the effect of media will be further strengthened if the media content is similar to people's own experience. Therefore, in this case, it is anticipated the effects from the media on people's perceptions of the disaster will be moderated[58] by their experience of the disaster, hence, it is assumed that:

- Hypothesis H16: Having affected by the disaster directly increases the effect of mass media on the perception of concerns.
- Hypothesis H17: Having affected by the disaster directly increases the effect of mass media on the perception of bonds.
- Hypothesis H18: Having affected by the disaster directly increases the effect of mass media on the perception of anxieties.
- Hypothesis H19: Having affected by the disaster directly increases the effect of social media on the perception of concerns.
- Hypothesis H20: Having affected by the disaster directly increases the effect of social media on the perception of bonds.
- Hypothesis H21: Having affected by the disaster directly increases the effect of social media on the perception of anxieties.

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[58] Refer to section 4.2.2 for details on moderation effect.

Furthermore, is it anticipated the effect from mass and social media will interact with each other because people had utilised more than one media as pointed out in chapter 2, therefore,

- Hypothesis H22: There is an interaction effect between the use of social media and the use of mass media on the perception of concerns.
- Hypothesis H23: There is an interaction effect between the use of social media and the use of mass media on the perception of bonds.
- Hypothesis H24: There is an interaction effect between the use of social media and the use of mass media on the perception of anxieties.

Finally, social background such as age, gender, employment status as well as the use of other media (e.g., newspaper, Internet websites) are also expected to have influence on people's intentions and therefore they are included as control variables. Based on the above hypotheses, a path model is constructed as shown in Figure 6-2.
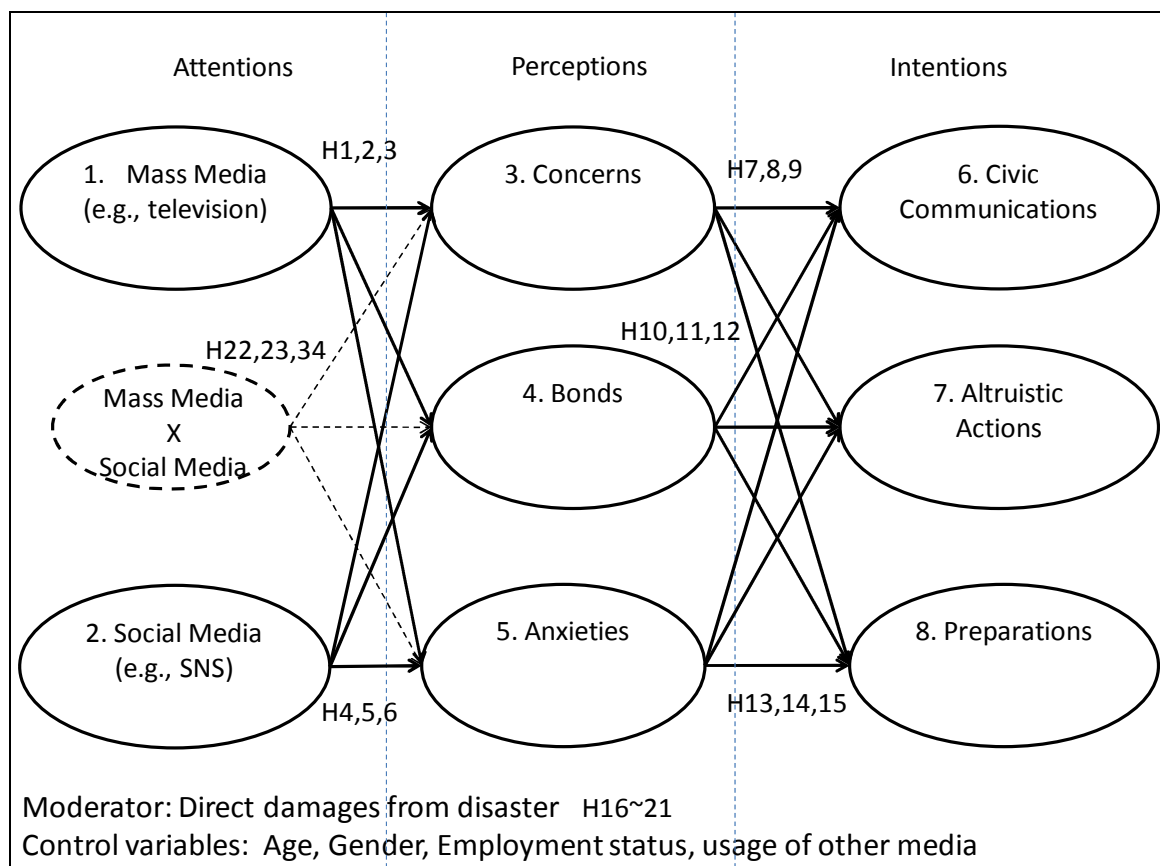
Figure 6-2 Path Model

6.3 Data Analysis

Based on the path model shown in Figure 6-2, a questionnaire was constructed to collect information from the samples about their usage of media, their perceptions of the disaster, and their intention to participate in post-disaster related activities to represent the eight variables in the path model as follows:

Media use – media use is represented by the use of mass and social media to obtain information related to the disaster and the recovery.

1. Mass Media – is represented by people's exposure of information related to the disaster and the recovery from television. It is operationalised by asking the respondents *'In the past year, how often had you seen the following contents on television? for 1. Damages caused by the Great East Japan Earthquake, 2. Recovery status in the disaster areas, 3. Events supporting the recovery for the Great East Japan Earthquake (volunteering, charity events), 4. Discussions on the problems and policies associated with the recovery, and 5. Preparations for future disasters'* in a 5 levels Likert scale (1= Never, 2= Rarely, 3= Once a few month, 4= A few times per month, 5= A few times per week) in the questionnaire. The frequency of watching each of these five types of contents on television is represented as individual observed variable and together they make up the latent variables of Mass Media in the path model.

2. Social Media – is represented by usage of different social media applications to obtain information related to the disaster and recovery, it is operationalised by asking the respondents *'In the past year, how often had you used the followings to obtain information relating to the disaster and recovery? for 1. Social network sites (e.g., Facebook, Twitter, Mixi etc.,), 2. Forum / BBS / Discussion group, 3. Blog / Unofficial homepage / Personal homepage, and 4. Video sharing site (YouTube, Niconico etc.,)'* in a 5 levels Likert scale (1= Never, 2= Rarely, 3= Once a few month, 4= A few times per month, 5= A few times per week) in the questionnaire. The frequency of using each of these four social media applications are represented as individual observed variable and together they make up the latent variables of Social Media in the path model.

Perceptions – Perceptions of the disaster is represented by the perception of Concerns about the disaster, Bonds in the society and Anxieties of future disasters.

3. Concerns – is represented by asking the respondents *'Did you feel the followings when you saw the information about the disaster and recovery from the media (e.g., television, Internet, newspaper, magazine)? for 1. Heart-broken about the disaster area, 2. Heart-broken about the status of the people in the disaster area, 3. Heart-broken about the financial situation of the people in the disaster area, 4. Heart-broken about the safety of the people in the disaster area, and 5. Heart-broken about the psychological status of the people in the disaster area'* in a 5 levels Likert scale (1= Not at all, 2= Not much, 3=

Cannot tell, 4= Somewhat, 5= Strongly) in the questionnaire. The level of concern for each of these five issues is represented as individual observed variable and together they make up the latent variables of Concerns in the path model.

4. Bonds (kizuna) – the perception of bonds in the society is represented by asking the respondents '*Did you feel the followings when you saw the information about the disaster and recovery from the media (e.g., television, Internet, newspaper, magazine)? for 1. Touched by the volunteering activities, 2. Strong bonds exist in the society and 3. Strong bonds exist in families*' in a 5 levels Likert scale (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly) in the questionnaire. The level of concern for each of these three issues is represented as individual observed variable and together they make up the latent variables of Bonds in the path model.

5. Anxieties – is represented by asking the respondents '*Did you feel the followings when you saw the information about the disaster and recovery from the media (e.g., television, Internet, newspaper, magazine)? for 1. Anxious about future disasters, and 2. Must prepare for future disasters*' in a 5 levels Likert scale (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly) in the questionnaire. The level of anxiety for each of these two issues is represented as individual observed variable and together they make up the latent variables of Anxieties in the path model.

Intentions – the intention to participating in post-disaster recovery related activities is represented by the intention of carrying out civic discussions, altruistic actions and preparation.

6. Civic discussions - is represented by asking the respondents '*For the recovery of the Great East Japan Earthquake in the future, did you intend to do the followings? for 1. To find out more about the recovery status and information, 2. To discuss with family about the recovery status and information, 3. To discuss with friends about the recovery status and information and 4. To discuss with work or school colleagues about the recovery status and information*' in a 5 levels Likert scale (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly). The level of intention for each of these four activities is represented as individual observed variable and together they make up the latent variables of Civic Discussions in the path model.

7. Altruistic actions – is represented by asking the respondents '*For the recovery of the Great East Japan Earthquake in the future, did you intend to do the followings? for 1. To make donations, 2. To encourage other people to make donations, 3. To support volunteering works, 4. To encourage other people to support volunteering works and 5. To join charity events to support the recovery*' in a 5 levels Likert scale (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly). The level of intention for each of these five activities is represented as individual observed variable and together they make up the latent variables of Altruistic Actions in the path model.

8. Preparations – is represented by asking the respondents '*For the recovery of the Great East Japan Earthquake in the future, did you intend to do the followings? for 1. To prepare supplies and tools for future disasters, 2. To find out more about the evacuation procedures for future disasters, and 3. To learn about the safety procedures for future disasters*' in a 5 levels Likert scale (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly). The level of intention for each of these three activities is represented as individual observed variable and together they make up the latent variables of Preparations in the path model.

This analysis employs the same data set as the first part of the analysis presented in chapter 5, i.e., the 2,067 samples from the three prefectures that were directly hit by the disaster (Iwate, Miyagi and Fukushima) collected form the Internet panel survey conducted in March 2013 (The data collection procedures are described in section 4.1.4). As described in section 5.3.1, the data were weighted with the 2010 national census data using post-stratification weighting method. In summary, the average age of this group was 43.7 years old, 53% were affected by the directly by the disaster personally[59], 89.3% had Internet access and 94.3% owned a Television set. The latent, observed and control variables are listed in Table 6-1 below with their corresponding code, maximum and minimum value, mean and standard deviation, and the original questions in Japanese are listed in Appendix B.

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[59] Differ from the analysis in chapter 5, which included both themselves and their family. In order to capture the personal experience from the disaster, in this chapter only those who suffered direct damages from the disaster personally are included. Direct damages include physical damage (e.g., injury, housing damage) and financial damage (e.g., loss of job, significantly reduce of income). Indirect damages (e.g., inconveniences caused by loss of lifeline, lack of supplies) are excluded.

Table 6-1 Latent, Observed and Control Variables

		Media use	Code	M	SD	Min	Max
Latent	1	**Use of mass media (from television)**	MMMU				
Observed	1.1	Damages caused by the Great East Japan Earthquake	MDG	3.66	1.07	1	5
	1.2	Recovery status in the damaged areas	MRE	3.75	1.05	1	5
	1.3	Events supporting the recovery for the Great East Japan Earthquake (volunteering, charity events)	MAA	3.19	1.12	1	5
	1.4	Discussions on the problems and policies associated with the recovery	MDI	3.22	1.14	1	5
	1.5	Preparations for future disasters	MPR	3.23	1.08	1	5
Latent	2	**Use of social media**	MSMU				
Observed	2.1	Social network sites (e.g., Facebook, Twitter, Mixi etc.,)	SSN	1.86	1.34	1	5
	2.2	Forum / BBS / Discussion Group	SBL	1.59	1.12	1	5
	2.3	Blog / Unofficial homepage / Personal homepage	SBB	1.68	1.14	1	5
	2.4	Video sharing sites (YouTube, Niconico etc.,)	SST	1.84	1.23	1	5
Latent	3	**Concerns**	PCON				
Observed	3.1	Heart-broken about the disaster area	PW1	4.35	.77	1	5
	3.2	Heart-broken about the status of the people in the disaster area	PW2	4.32	.78	1	5
	3.3	Heart-broken about the financial situation of the people in the disaster area	PW3	4.07	.85	1	5
	3.4	Heart-broken about the safety of the people in the disaster area	PW4	4.10	.82	1	5
	3.5	Heart-broken about the psychological status of the people in the disaster area	PW5	4.10	.87	1	5
Latent	4	**Bonds**	PBON				
Observed	4.1	Heart-warming from the volunteering activities	PB1	3.80	.91	1	5
	4.2	Strong bonds in the society	PB2	3.31	.96	1	5
	4.3	Strong bonds in families	PB3	3.76	.89	1	5
Latent	5	**Anxieties**					
Observed	5.1	Anxious about future disasters	PA1	3.99	.88	1	5
	5.2	Must prepare for future disasters	PA2	4.20	.78	1	5

Latent	6	**Civic discussions**	ICID				
Observed	6.1	To find out more about the recovery status and information	IC1	3.39	.91	1	5
	6.2	To discuss with family about the recovery status and information	IC2	3.39	.92	1	5
	6.3	To discuss with friends about the recovery status and information	IC3	3.32	.92	1	5
	6.4	To discuss with work or school colleagues about the recovery status and information	IC4	3.14	.92	1	5
Latent	7	**Altruistic actions**	IALA				
Observed	7.1	To make donations	IA1	3.20	.98	1	5
	7.2	To encourage other people to make donations	IA2	2.74	.95	1	5
	7.3	To support volunteering works	IA3	2.99	.98	1	5
	7.4	To encourage other people to support volunteering works	IA4	2.70	.95	1	5
	7.5	To join charity events to support the recovery	IA5	2.97	.98	1	5
Latent	8	**Preparations**	IPRE				
Observed	8.1	To prepare supplies and tools for future disasters	IP1	3.80	.87	1	5
	8.2	To find out more about evacuation procedures for future disasters	IP2	3.74	.87	1	5
	8.3	To learn about the safety procedures for future disasters	IP3	3.76	.85	1	5
Control		Age	AGE	43.70	15.21	15	69
		Gender (1=Male, 2=Female)	GEN	0=50.1%; 1=49.9%			
		Employed (incl. full time, part time and self-employed) (0=No, 1=Yes)	EMP	0=37.9%; 1=62.1%			
		Direct damages from the disaster (self only) (0=No, 1=Yes)	SDID	.53			1
		Use of Internet port sites, search engines	MIP	3.57	1.52	1	5
		Use of Newspaper	MNP	2.57	1.54	1	5
M=Mean, SD=Standard Deviation							

From Table 6-1, first of all, it can be seen that the usage of mass media (i.e., different types of disaster and recovery related information seen from television) is similar to the previous chapter, that television was widely used. For example, in 2012, from television, recovery status of the disaster and the damages caused by the disaster were the most frequently seen among the samples that their mean value are 3.75[60] and 3.66 respectively,

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[60] Range: 1=Minimum to 5=Maximum.

followed by preparations for future disasters (m=3.23), discussions on the problems and policies related to the recovery (m=3.22), and events supporting recovery (m=3.19). For the usage of social media, again, also similar to the findings in the previous chapter, in comparison with mass media, the use of social media for obtaining information regarding the disaster and recovery was not as frequent, among different social media applications, video sharing sites and SNS were the most frequently used with a mean value of 1.86[61] and 1.84 respectively, followed by blogs and personal homepages (m=1.68) and forum and BBS (m=1.59). As found in section 5.3.2, since social media were mainly used by the younger age groups, thus, the average usage is also limited. Therefore, despite many reports had mentioned the active role social media had played after the disaster, it can be seen that overall most people still obtained information related to the disaster and recovery from mass media.

Next, looking into the mean values of people's perception of the disaster, first of all, regarding people's perception of Concerns, overall most of them were quite concerned about the disaster based on what they saw from the media. For example, most of them felt heart-broken and concerned about the disaster area and the status of the people living there, which their mean value are 4.35[62] and 4.32 respectively, closely followed by concerned about the safety of the people living in the disaster area (m=4.10), their psychological status (m=4.10) and also their financial status (m=4.07). Similarly, the average value of the observed variables for the perception of Bonds and Anxieties are also very high. For instance, for the perception of Bonds, on average, most people were touched by the volunteering activities (m=3.80), and the felt the strong bonds in families (3.76) and in the society (m=3.31) from what they saw from media. At the same time, the mean values of the perception of Anxieties show that on average, most people were strongly agreed that they need to prepare for future disasters (m=4.20) and they were quite anxious about future disasters (m=3.99) too.

Finally, moving onto the observed variables of people's intention of carrying out different activities for recovery, it can be seen that, overall most people indeed were quite willing to do something related to the disaster and to support the recovery. For instance, for their intention on Civic Communications, on average, most people were quite eager to find out more about the status and information related to recovery (m=3.99[63]) and to discuss with their family about the recovery status and information (m= 3.99), followed by to discuss these information with their friends (m=3.32) and with their colleagues (m=3.14). Similarly, their intention to prepare for future disasters were also quite high, on average, most of them were intended to prepare for supplies (m=3.80), to learn about the safety procedures (m=3.76) and evacuation procedures (m=3.74). In addition, although not as keen

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[61] Range: 1=Minimum to 5=Maximum.
[62] Range: 1=Minimum to 5=Maximum.
[63] Range: 1=Minimum to 5=Maximum.

as for civic discussions and preparations for future disasters, people were also quite willing to perform altruistic actions to support the recovery, for instance, the intention to make donations has the highest mean of 3.20[64], followed by to support volunteering works (m=2.99), to join charity events (m=2.97), to encourage other people to make donations (m=2.74) and to join volunteering works (m=2.70).

How these different observed variables are related to the latent variables that represent the perception of Bonds, Concerns and Anxieties, the intention of Civic discussions, Altruistic actions and Preparations, and the use of Mass Media and Social Media, as well as how these latent variables are related with one another will be further examined in the result analysis section. Similar to the observations in chapter 5, some variables are non-normally distributed; therefore, in order to meet the joint multivariate normal distribution assumption for CFA and SEM, bootstrap re-sampling method will be employed (Bollen & Stine, 1992).

6.3.1 Media Usage

Differ from the previous chapter which looks into the general use of media (Figure 6-3), this chapter focuses on the use of media specifically for obtaining information related to the disaster and the recovery (Figure 6-4). Comparing the two figures, it can be seen that television is the most frequently used media in both situations. For instance, 90% of the sample had watched television more than a few times a week in general, and 79% of had obtained information about the disaster and the recovery from television for more than a few times a week. On the other hand, for social media, while video sharing sites (e.g., YouTube) were the most frequently used application for both general use and for obtaining disaster and recovery related information that 50% and 29% had used them more than a few times a month respectively, it is interesting to see a different pattern for the second and third most used applications. For general use, blogs and personal homepages and SNS are closely ranked as second and third with 35% and 34% respectively, but for the use of obtaining disaster and recovery information, SNS were used much more frequently with 27% of the samples used them more than a few times a month, which is almost same as the most frequently used applications (video sharing sites at 29%), followed by blogs and personal homepages at 22% and forum and BBS at 20%. Therefore, despite the fact that the usage was not as high as mass media, it can be seen that social media in particular video sharing sites and SNS indeed were indeed very important sources of disaster and recovery related information.

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[64] Range: 1=Minimum to 5=Maximum.
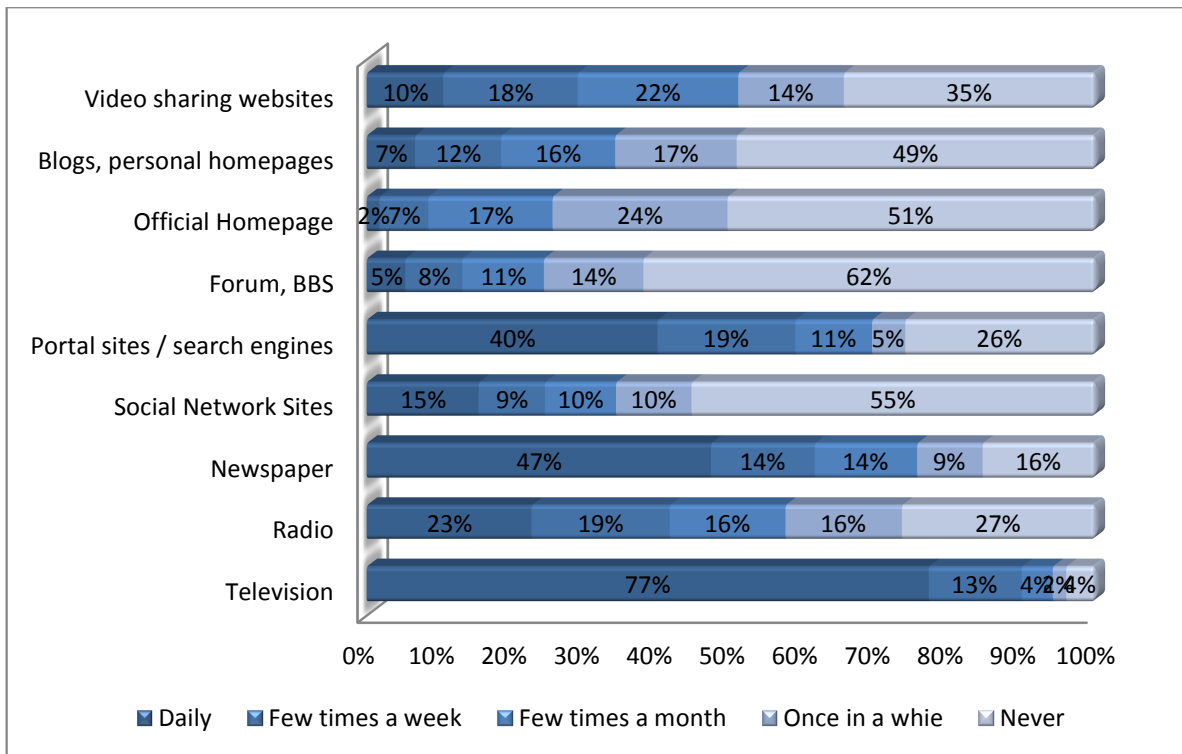
Figure 6-3 Frequency of General Media Use
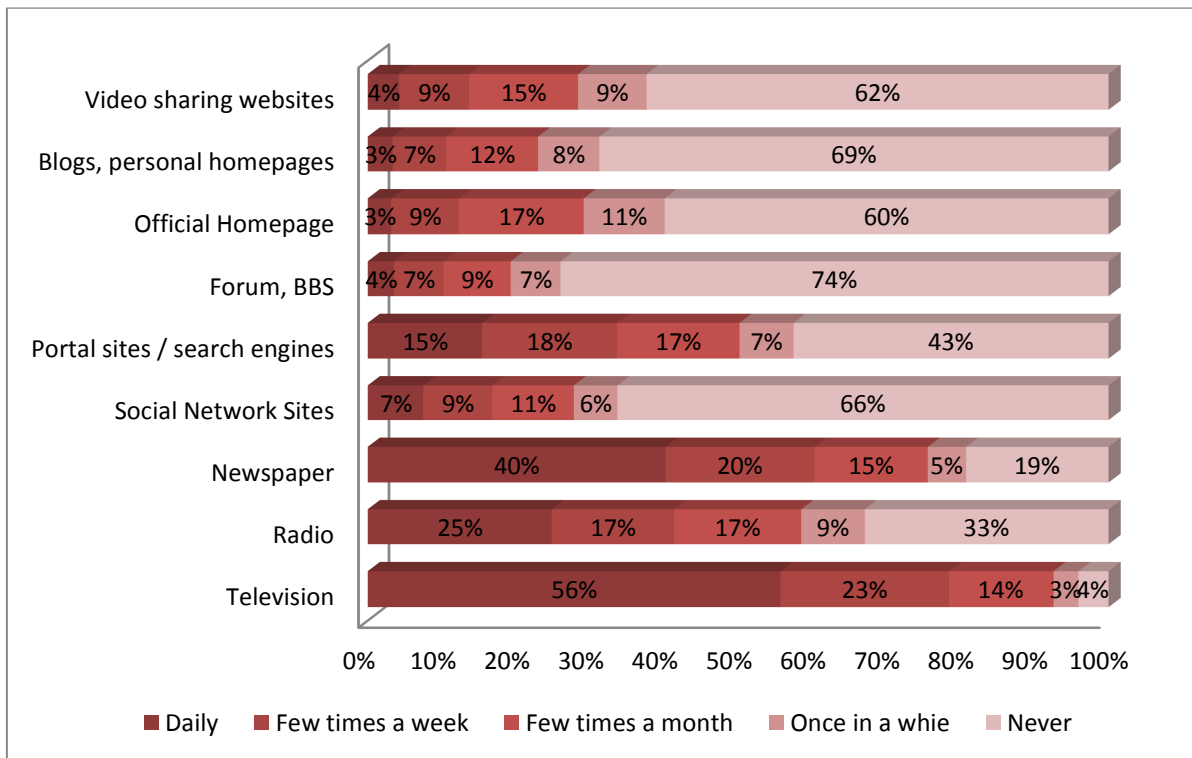
Figure 6-4 Frequency of Media Use for Obtaining/Collecting Disaster Related Information

Furthermore, from chapter 5 (Table 5-5), knowing that the use of media generally is significantly different between different age group that mass media (television, radio, newspaper) were more common among the older people while social media (SNS, Forum,

blogs and video sharing sites) were more widely used among younger. In order to see if this pattern is the same for the use of obtaining disaster and recovery information, one-way ANOVA test was conducted to test the difference of the usage of different media for obtaining disaster and recovery information between different age groups. The results in Table 6-2 below show a similar pattern indeed. Even for obtaining disaster and recovery related information, traditional mass media were more commonly used among older people, and social media (in particular SNS and video sharing sites) were more common among the younger. However, it is worth nothing that there seems to be no significant difference between the usage of official homepage and blogs between different age groups.

Table 6-2 Use of Media for Disaster Related Information of Different Age Groups

Age Group		15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	ANOVA	
													F	Sig.
Television	M	3.9	3.9	4.1	4.1	4.2	4.1	4.2	4.3	4.4	4.6	4.5	7.3	***
	SD	1.0	1.4	1.1	0.9	0.8	1.0	0.8	0.9	0.7	0.9	0.8		
Radio	M	2.4	2.3	2.4	2.7	2.6	2.8	3.0	3.1	3.2	3.4	3.7	15.7	***
	SD	1.2	1.3	1.3	1.5	1.4	1.5	1.6	1.5	1.5	1.4	1.5		
Newspaper	M	2.9	2.8	3.1	3.2	3.5	3.4	3.7	3.9	4.1	4.1	4.2	19.9	***
	SD	1.5	1.5	1.4	1.5	1.4	1.5	1.5	1.4	1.4	1.3	1.2		
SNS	M	2.7	2.4	2.2	2.1	2.0	1.7	1.7	1.6	1.5	1.5	1.5	16.8	***
	SD	1.7	1.7	1.6	1.7	1.6	1.4	1.5	1.4	1.1	1.2	1.0		
Portal sites	M	2.8	2.8	2.7	2.7	2.6	2.7	2.4	2.4	2.6	2.5	2.3	2.2	**
	SD	1.5	1.5	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.6		
Forum, BBS	M	1.9	1.8	1.7	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.6	3.5	***
	SD	1.4	1.5	1.4	1.2	1.2	1.3	1.2	1.1	1.1	1.0	1.0		
Official HP	M	1.7	1.7	1.7	1.8	1.9	1.8	1.8	1.9	1.9	2.0	1.9	1.1	NS
	SD	1.1	1.2	1.0	1.0	1.1	1.0	1.1	1.0	1.0	1.0	0.9		
Blogs, personal HP	M	1.9	1.8	1.6	1.7	1.8	1.7	1.6	1.6	1.7	1.6	1.7	1.6	NS
	SD	1.4	1.4	1.5	1.3	1.3	1.3	1.4	1.2	1.2	1.3	1.0		
Video sites	M	2.2	2.0	1.6	1.7	1.9	1.8	1.7	1.8	1.9	1.9	1.8	3.2	***
	SD	1.5	1.5	1.4	1.4	1.4	1.3	1.4	1.3	1.3	1.3	1.1		
M – Mean; SD – Standard deviation; Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant														

The above observations suggest that the usage of media for general use and for obtaining disaster and recovery related information are quite similar. That is, people will use their most familiar media to collect information regarding the disaster and the recovery. In order to further confirm if they are statistically related, bivariate correlation test was conducted to test the relationships between the general use of different media and the use of different media for obtaining disaster and recovery related information. The results, as shown in Table 6-3 below have shown that the general use of a particular media and the use of it for obtaining disaster and recovery related information are highly correlated. For example, the general use of SNS has a very high correlation coefficient (0.682) with the use of SNS for obtaining disaster and recovery related information. This indicates that people indeed tend to utilise the media that they are most familiar with generally to obtain disaster and recovery information.

Table 6-3 Correlation Between Use of Media (Generally) and Use of Media (Obtain/Collect Disaster Related Information)

		Media use for disaster related information								
		Television	Radio	Newspaper	SNS	Portal	Forum, BBS	Official HP	Blogs	Video sites
General media use	Television	**.453****	.109**	.235**	-.024	.001	-.047*	.023	-.028	-.050*
	Radio	.136**	**.717****	.307**	.039	.108**	.106**	.180**	.124**	.142**
	Newspaper	.250**	.277**	**.664****	-.033	.063**	.007	.140**	.025	.041
	SNS	-.026	.033	-.024	**.682****	.291**	.294**	.171**	.367**	.251**
	Portal sites	-.015	-.040	-.020	.283**	**.447****	.207**	.150**	.250**	.220**
	Forum	-.013	.082**	.027	.374**	.303**	**.563****	.271**	.457**	.349**
	Official HP	.076**	.176**	.162**	.279**	.324**	.347**	**.552****	.385**	.337**
	Blogs	.006	.060**	.047*	.396**	.350**	.375**	.257**	**.539****	.311**
	Video sites	-.017	.032	-.003	.344**	.330**	.322**	.182**	.331**	**.458****

Sig. **P≤0.001; *P≤0.05; NS-Not Significant

Finally, since television was the most commonly used information source for obtaining disaster and recovery related information as shown in the above analysis, the frequency of different disaster related information being conveyed to the people are summarised in Figure 6-5. Similar to the results in Table 6-1, it shows that in 2012[65], on television, information related to the recovery status and the damages caused by the

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[65] The respondents were asked to recall the contents they have seen in the 'past year', since the survey was conducted in Mar 2013, the results therefore represent the year of 2012.

disaster were most frequently seen, with 60% and 58% of the respondents had seen them more than a few times a month respectively, followed discussions on the problems and policies related to the disaster (41%), preparations for future disasters (40%) and events supporting the recovery (39%).
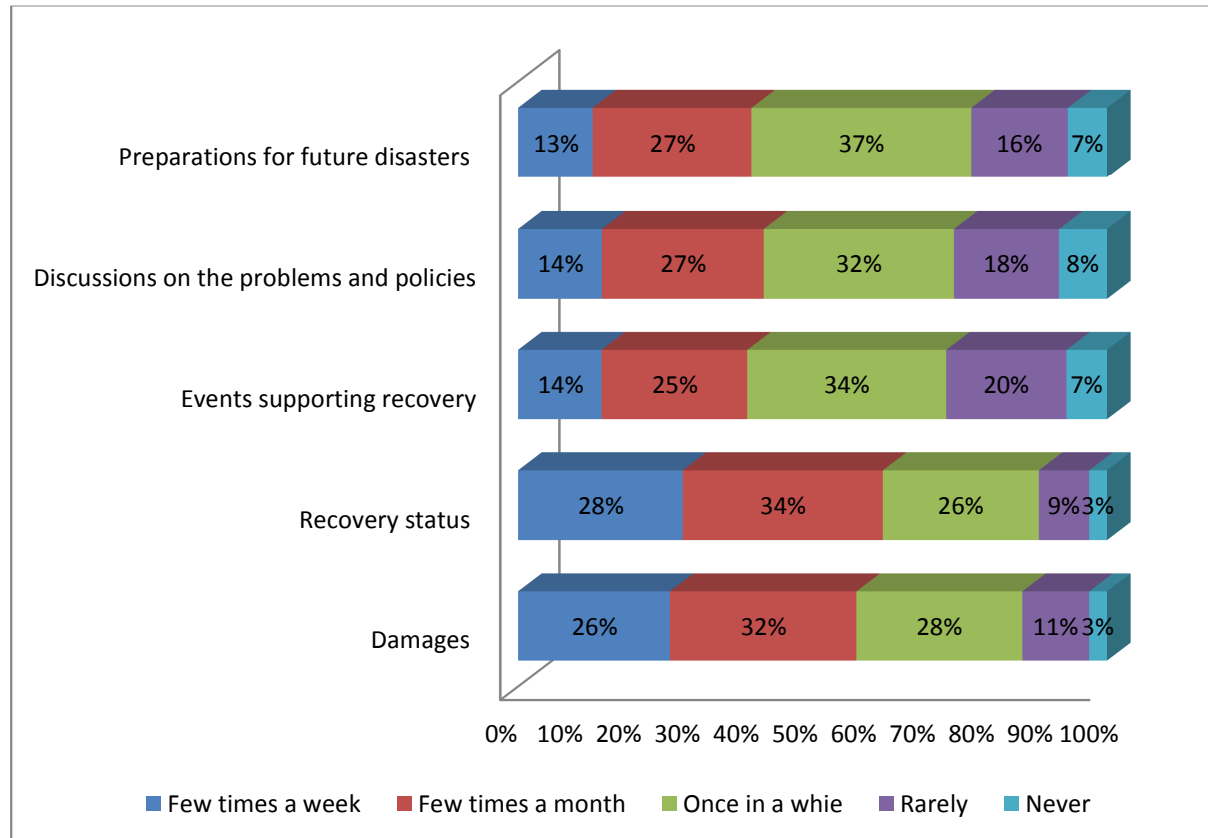
Figure 6-5 Frequency of Different Disaster Related Information Seen on Television

6.4 Result Analysis

The data were analysed with the statistical analysis software SPSS and AMOS. First, Exploratory Factor Analysis (EFA) was performed to test if the observed variables were loaded together as expected. Then Confirmatory Factor Analysis (CFA) was conducted to evaluate the model fit and the factors reliability and validity. Finally, a Structure Equation Modelling (SEM) model was constructed to test the hypotheses stated in section 6.2.1. The latent, observed and control variables are summarised in Table 6-1 with their corresponding code, range, average and standard deviation.

Frist, Exploratory Factor Analysis (EFA)[66] was carried out to test if the factors were loaded together, the first EFA which without specifying the number of factor had resulted in 7 factors instead of 8 which was expected from the path model. Considering the large number of variables involved with the model, it was possible that some variables were

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[66] Using principle component extraction with varimax rotation.

cross-loaded with more than one factor. Therefore, a second EFA which specified for 8 factors was carried out. The 8 factors model had improved the total variance explained from 73% of the 7 factors model to 75.7% and therefore, it was selected. The communalities for all variables were >0.3. The Cronbach's alphas[67], Kaiser-Meyer-Olkin[68] and Bartlett's Test for sampling adequacy were all sufficient. In addition, Linearity[69] and Common Method Bias[70] were also tested and no major concerns were found. Overall, the EFA results indicated that the chosen variables were adequate. The EFA factor loadings and the corresponding Cronbach's alphas are shown in Table 6-4 below.

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[67] The Cronbach's alphas of all factors were >0.7.
[68] The Kaiser-Meyer-Olkin test result was 0.916.
[69] The linearity between the different latent variables were tested using curve estimation regression, all relationships were sufficiently linear with p-values less than 0.001.
[70] Since the data were collected using the same instrument, the Common Method Bias was tested. Using the Harman's single factor test (Podsakoff et al., 2003), the single un-rotated factor accounted for 33.1% of the total variance, indicated that it was not a concern.

Table 6-4 EFA Factor Matrix

Latent Variable	Observed Variable	Factor								Cronbach's alphas
		1	2	3	4	5	6	7	8	
MMMU	MDG		.850							.930
	MRE		.876							
	MAA		.861							
	MDI		.857							
	MPR		.842							
MSMU	SSN						.737			.801
	SBL						.789			
	SBB						.843			
	SST						.767			
PCON	PW1	.769								.921
	PW2	.840								
	PW3	.838								
	PW4	.849								
	PW5	.806								
PBON	PB1	.337						.604		.771
	PB2							.787		
	PB3	.313						.701		
PANX	PA1								.827	.802
	PA2					.371			.738	
ICID	IC1				.720					.899
	IC2				.793					
	IC3				.809					
	IC4			.332	.773					
IALA	IA1			.698						.903
	IA2			.835						
	IA3			.796						
	IA4			.860						
	IA5			.775						
IPRE	IP1					.836				.915
	IP2					.855				
	IP3					.819				

Second, Confirmatory factor analysis (CFA) [71] was performed with bootstrap re-sampling[72] to test the model fit and the factors' validity and reliability. The CFA modification indices were referred to improve the model fit[73]. Overall, the CFA model fit indices (CMIN/DF=4.014, CFI=0.947, GFI=0.951, AGFI=0.937, RMSEA=0.038, PCLOSE=1.00) indicated that the overall goodness of fit of the model was sufficient. In addition, the Average Variance Extracted (AVE) [74] and Composite Reliability (CR) [75] were tested using the model by Gaskin (2012b) and the results were also acceptable. Finally, a SEM model was constructed with references to the modification indices[76] to represent the path model shown in Figure 6-2 to test the hypotheses defined in section 6.2.1. The model fit indices of the SEM (CMIN/DF=5.487, CFI=0.948, GFI=0.922, AGFI=0.905, RMSEA=0.047, PCLOSE=0.999) shown the overall goodness of fit of the model was sufficient. The SEM model is shown in Figure 6-6 and the resultant standardised estimate (Est.) and significance (Sig.)[77] of the factors are summarised in Table 6-5 below.

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[71] Using Maximum Likelihood.

[72] With maximum likelihood. Bootstrap samples=2000; Bias-Corrected Confidence level = 95%.

[73] The observed variables under the some latent variables 1. Mass media, 3. Concerns, 6. Civic discussions and 7. Altruistic actions were co-varied based on the modification indices.

[74] The Average Variance Extracted (AVE) for all factors were >0.5 (the desired threshold, (Hair Jr. et al., 2010)).

[75] The composite reliability for all factors were >0.7 (the desired threshold, (Hair Jr. et al., 2010)).

[76] Based on the modification indices, the errors of some variables were co-varied. For examples, the errors of three perception latent variables i.e., 3. Concerns, 4. Bonds and 5. Anxieties were co-varied, as it is logically to assume that they were interrelated. Similarly, the three intention latent variables i.e., 6. Civic discussions, 7. Altruistic actions and 8. Preparations were also co-varied. Finally, the controls variables were also co-varied with different latent variables.

[77] Obtained with bootstrap re-sampling. Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.

Figure 6-6 Structural Equation Model

Table 6-5 Structural Equation Model Factors' Standardised Estimate and Significance

Parameter			Est.	Sig.	Parameter			Est.	Sig.
3.Concerns	<---	1.Mass Media	0.294	***	6.Civc discussions	<---	AGE	-0.036	*
4.Bonds	<---	1.Mass Media	0.348	***	7.Altruistic actions	<---	AGE	-0.074	***
5.Anxieties	<---	1.Mass Media	0.275	***	8.Preparations	<---	AGE	-0.079	***
3.Concerns	<---	2.Social Media	-0.068	**	6.Civc discussions	<---	GEN	0.084	***
4.Bonds	<---	2.Social Media	0.008	NS	7.Altruistic actions	<---	GEN	0.041	**
5.Anxieties	<---	2.Social Media	-0.093	**	8.Preparations	<---	GEN	-0.006	*
6.Civc discussions	<---	3.Concerns	0.132	**	6.Civc discussions	<---	EMP	0.037	*
7.Altruistic actions	<---	3.Concerns	0.070	*	7.Altruistic actions	<---	EMP	-0.008	NS
8.Preparations	<---	3.Concerns	0.016	NS	8.Preparations	<---	EMP	0.002	NS
6.Civc discussions	<---	4.Bonds	0.453	***	3.Concerns	<---	MNP	0.121	***
7.Altruistic actions	<---	4.Bonds	0.521	***	4.Bonds	<---	MNP	0.105	***
8.Preparations	<---	4.Bonds	0.243	***	5.Anxieties	<---	MNP	0.072	**
6.Civc discussions	<---	5.Anxieties	0.039	NS	3.Concerns	<---	MIP	0.071	**
7.Altruistic actions	<---	5.Anxieties	-0.090	**	4.Bonds	<---	MIP	0.029	NS
8.Preparations	<---	5.Anxieties	0.489	**	5.Anxieties	<---	MIP	0.144	***
MRE	<---	1.Mass Media	0.846	***	EMP	<-->	GEN	0.284	***
MAA	<---	1.Mass Media	0.875	***	2.Social Media	<-->	MIP	0.62	***
MRE	<---	1.Mass Media	0.846	***	1.Mass Media	<-->	MNP	0.433	***
MDI	<---	1.Mass Media	0.834	**	MNP	<-->	AGE	0.303	***
MPR	<---	1.Mass Media	0.847	***	2.Social Media	<-->	AGE	-0.111	***
MDG	<---	1.Mass Media	0.794	**	1.Mass Media	<-->	AGE	0.216	***
SBL	<---	2.Social Media	0.693	***	E03	<-->	E05	0.513	***
SSN	<---	2.Social Media	0.661	***	E03	<-->	E04	0.629	***
SBB	<---	2.Social Media	0.800	***	E04	<-->	E05	0.556	***
SST	<---	2.Social Media	0.696	***	E06	<-->	E07	0.424	***

PW1	<---	3.Concerns	0.797	***	E06	<-->	E08	0.303	***
PW2	<---	3.Concerns	0.837	***	E07	<-->	E08	0.248	***
PW3	<---	3.Concerns	0.817	***	e33	<-->	e34	0.306	***
PW4	<---	3.Concerns	0.860	***	e31	<-->	e33	-0.085	***
PW5	<---	3.Concerns	0.831	***	e31	<-->	e32	0.475	***
PB1	<---	4.Bonds	0.749	***	e72	<-->	e73	-0.948	***
PB2	<---	4.Bonds	0.656	***	e31	<-->	e35	-0.181	***
PB3	<---	4.Bonds	0.761	***	e62	<-->	e64	-0.172	**
PA1	<---	5.Anxieties	0.768	***	e61	<-->	e63	-0.063	NS
PA2	<---	5.Anxieties	0.874	***	e61	<-->	e62	0.042	NS
IC1	<---	6.Civc discussions	0.741	***	e72	<-->	e75	-0.655	***
IC2	<---	6.Civc discussions	0.893	***	e91	<-->	e92	0.553	***
IC3	<---	6.Civc discussions	0.874	***	e91	<-->	e94	-0.016	NS
IC4	<---	6.Civc discussions	0.835	***	e92	<-->	e95	-0.075	**
IA1	<---	7.Altruistic actions	0.704	***	e94	<-->	e95	0.321	***
IA2	<---	7.Altruistic actions	0.919	***	e63	<-->	e64	0.167	**
IA3	<---	7.Altruistic actions	0.887	***	e73	<-->	e75	-0.263	***
IA4	<---	7.Altruistic actions	0.846	***					
IA5	<---	7.Altruistic actions	0.833	***					
IP1	<---	8.Preparations	0.868	***					
IP2	<---	8.Preparations	0.949	***					
IP3	<---	8.Preparations	0.844	***					
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant									

6.4.1 Mainstream Effect

First of all, based on the SEM model described above, the mainstream effects, i.e., the effects of media on people's perceptions (hypotheses H1 to H6) were tested by examining the SEM factors' standardised estimate (Est.) and the bootstrap bias corrected significance[78] (Sig). The results in Table 6-6 show that the use of mass media has a significant positive effect on all three perceptions; Concerns, Bonds and Anxieties. Hence, hypotheses H1, H2 and H3 are all supported. Interestingly, for social media, a very different pattern is revealed, while the use of social media has no significant effect on Bonds, it has a mild but negative effect on perception of Concerns and Anxieties. Thus hypotheses H4, H5 and H6 are not supported. In other words, while the use of mass media can directly affect people's perceptions as the mainstream effect has predicted, on the other hand, the use of social media can slightly reduce the perception of Concerns and Anxieties.

Table 6-6 SEM Standardised Regression Weight and Significance for Hypotheses H1 to H6

Hypothesis	Parameter	Est.	Sig.	Results
H1	3.Concerns <--- 1.Mass Media	0.294	***	Supported
H2	4.Bonds <--- 1.Mass Media	0.348	***	Supported
H3	5.Anxieties <--- 1.Mass Media	0.275	***	Supported
H4	3.Concerns <--- 2.Social Media	-0.068	**	Not Supported
H5	4.Bonds <--- 2.Social Media	0.008	NS	Not Supported
H6	5.Anxieties <--- 2.Social Media	-0.093	**	Not Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant				

6.4.2 Effect of Perceptions on Intentions

Next, the effects of the different perceptions of the disaster on the intention of different post-disaster recovery related activities (hypotheses H7 to H15) were tested by examining the SEM factors' standardised estimate (Est.) and bootstrap bias corrected significance[79] (Sig.), the results are summarised in Table 6-7. First of all, let's look at the effects of the perception of Concerns on the different intentions, the results show that while it has a significant positive effect on Civic Discussions, it has no significant effect on Altruistic Actions as well as Preparations. Hence, H7 is supported but H8 and H9 are rejected. Secondly, for the effects of the perception of Bonds on the different intentions, the results show that it has a significant positive effect on all three of them; Civic Discussions, Altruistic Actions and Preparations, and hence, H10, H11 and H12 are all supported. Finally, for the effects of the perception of Anxieties on the different intentions, while it has strong positive effect on Preparations, it has a mild negative effect on Altruistic Actions. Therefore, hypotheses H13 and H14 are rejected and H15 is supported. In summary, the results show

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[78] Obtained with bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.
[79] Obtained with Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.

that different perceptions have different effects on the different intentions. While the perception of Bonds appear to be the most influential as it can increase the intention of Civic Communications, Altruistic Actions and Preparations. On other hand, the perception of Concerns seems only lead to Civic Discussions but not on the other two. Furthermore, it is interesting to find that the perception of Anxieties has the strongest effect of Preparations as expected, however, at the same time, it has no effect on Civic Communications and it actually reduces the intention to participate in Altruistic Actions.

Table 6-7 SEM Standardised Regression Weight and Significance for Hypotheses H7 to H15

Hypothesis	Parameter	Est.	Sig.	Results
H7	6.Civc communications <--- 3.Concerns	0.132	**	Supported
H8	7.Altruistic actions <--- 3.Concerns	0.070	*(NS) [80]	Not Supported
H9	8.Preparations <--- 3.Concerns	0.016	NS	Not Supported
H10	6.Civc communications <--- 4.Bonds	0.453	***	Supported
H11	7.Altruistic actions <--- 4.Bonds	0.521	***	Supported
H12	8.Preparations <--- 4.Bonds	0.243	***	Supported
H13	6.Civc communications <--- 5.Anxieties	0.039	NS	Not Supported
H14	7.Altruistic actions <--- 5.Anxieties	-0.090	**	Not Supported
H15	8.Preparations <--- 5.Anxieties	0.489	**	Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant				

6.4.3 Resonance Effect

For hypotheses H16 to H21, the resonance effect were examined by comparing the effect of mass and social media on the different perceptions of the disaster between those who were personally affected by the disaster directly and those who were not to see if the media effects are significantly different between the two groups. It was tested by separated the sample into two groups, the affected group and the not affected group (refer to section 4.2.2 for details on moderation effect). The results are shown in Table 6-8., they show that between those who were affected directly from the disaster and those who were not in terms of the effects of mass media on their perceptions, while there is no significant

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[80] Although statistically, it is significant at P≤0.1 level, however, considering the beta coefficient is very close to indifferent (i.e., 0), it is considered not significant in this case.

difference on the perception of Concerns, there is a significant negative difference on the perception of Bonds as well as Anxieties. Hence, H17 and H18 are supported and H16 is rejected. On the other hand, for the effects of social media, the results reveal another pattern, while there is no significant difference on the perception of Concerns and Bonds, for Anxieties there is a significant different between those who were affected by the disaster and those that who were not, and hence, H21 is supported but H19 and H20 are not. In other words, in the case of mass media, those who were not directly affected by the disaster actually were affected by mass media more on their perception of Bonds and Anxieties compare to those who were directly affected by the disaster. Similarly for social media, those who were not affected by the disaster also are affected by social media more on their perception of Anxieties compare to those who were affected by the disaster directly. The results above have shown a very intriguing finding that although the resonance effect predicts that those who had experience the disaster should be subjected to a stronger effect from the media on their perceptions, as the information from the media should resonate with the experience. In contrast, the results have shown the opposite way, it appears those who were not affected by the disaster directly actually were affected by the media more than those that were.

Table 6-8 Moderate Effect of Experience from Disaster for Hypotheses H16 to H21

		Not affected by disaster		Affected by disaster			Results
	Parameter	Estimate	Sig.	Estimate	Sig.	z-score	
H16	3.Concerns <--- 1.Mass Media	0.206	***	0.212	***	0.150	Not Supported
H17	4.Bonds <--- 1.Mass Media	0.333	***	0.236	***	-2.077**	Supported
H18	5.Anxieties <--- 1.Mass Media	0.292	***	0.165	***	-2.81***	Supported
H19	3.Concerns <--- 2.Social Media	-0.018	NS	-0.075	**	-1.126	Not Supported
H20	4.Bonds <--- 2.Social Media	0.040	NS	-0.011	NS	-0.834	Not Supported
H21	5.Anxieties <--- 2.Social Media	-0.013	NS	-0.127	**	-1.912*	Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant							

6.4.4 Interaction Effect

For hypotheses H22, H23 and H24, the interaction effects between the use of social media and mass media were tested by examining the significance[81] (Sig.) of their interaction term[82] (MMMU x MSMU) on the three perceptions variables (Concerns, Bonds and Anxieties) by adding the interaction term to the path model as an independent variable as shown on Figure 6-2 (Refer to section 4.2.2 for details on interaction effect). The results in Table 6-9 show that the interaction term (MMMU x MSMU) has a significant effect on the perception of concerns and also bonds but not the perception of anxieties. Hence, H22 and H23 are supported and H24 is rejected.

Table 6-9 Interaction Effect of Mass and Social Media on Perceptions for Hypotheses H22 to H24

Hypothesis	Parameter	Est.	Sig.	Results
H22	Concerns <--- MMMU x MSMU	-0.025	**	Supported
H23	Bonds <--- MMMU x MSMU	-0.024	**	Supported
H24	Anxieties <--- MMMU x MSMU	-0.012	NS	Not supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant				

The type of interaction effect between the use of mass and social media on the perception of Concerns and Bonds were further examined by plotting the corresponding un-standardised regression coefficients with mass media as the independent variable, social media as the moderator, Mass Media x Social Media as the interaction and concerns as the dependant variable using the model by Gaskin (2012a) as shown in Figure 6-7 and Figure 6-8 respectively.

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[81] Obtained with Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.
[82] The interaction term is 'the joint effects of the two treatment variables in addition to the individual main effects' (Hair Jr. et al., 1998, p. 329). It was generated by standardising and multiplying the two treatment variables together in a path model with composite variables formed by imputing the variables (Gaskin, 2012c).

		Dependent variable Concerns (PCON) (Un-standardised estimate)
Independent variable	Mass Media (MMMU)	0.237
Moderator	Social Media (MSMU)	-0.030
Interaction	MMMU x MSMU	-0.025
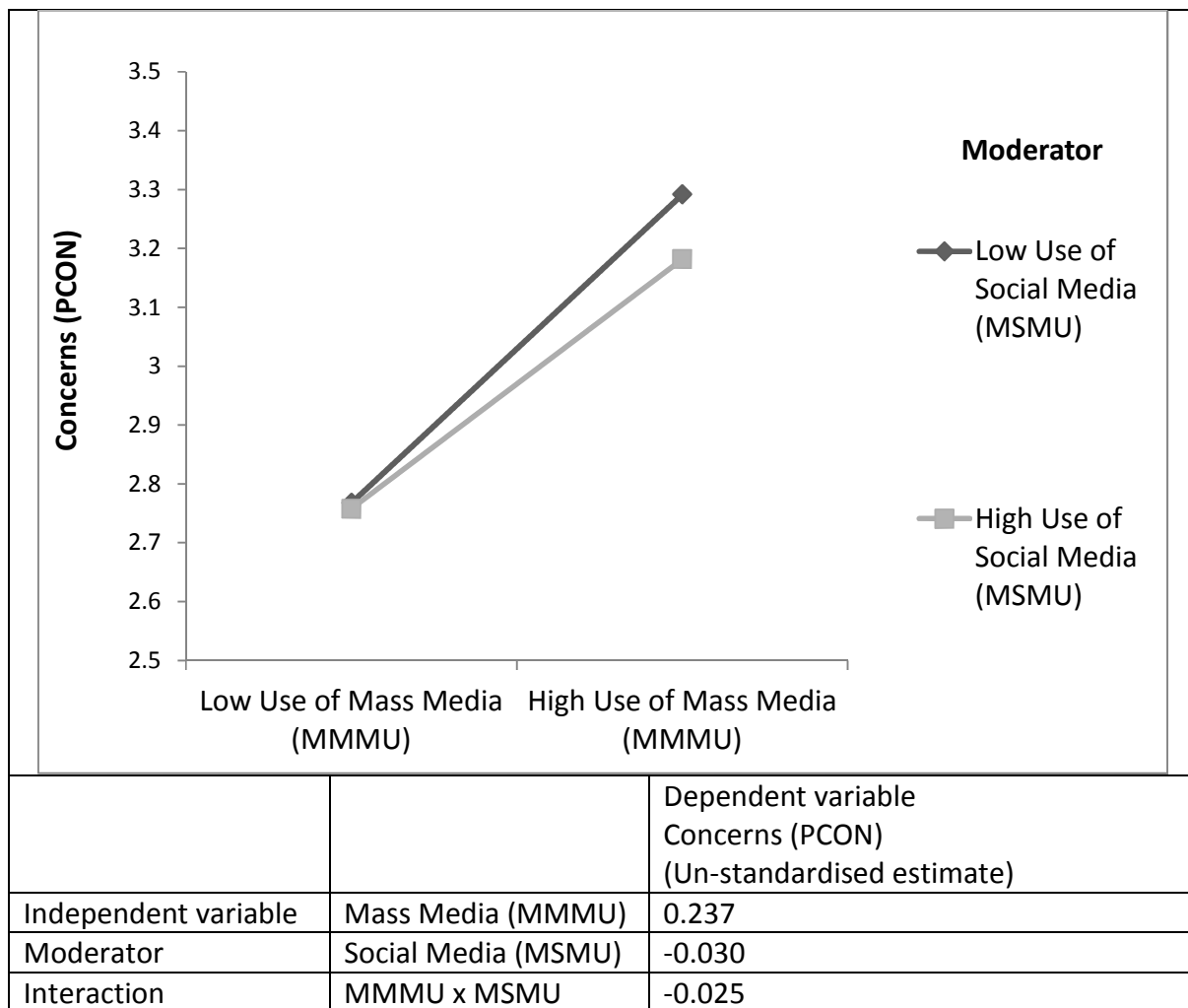
Figure 6-7 Interaction Effect between the Use of Social Media and Mass Media on the Perception of Concerns
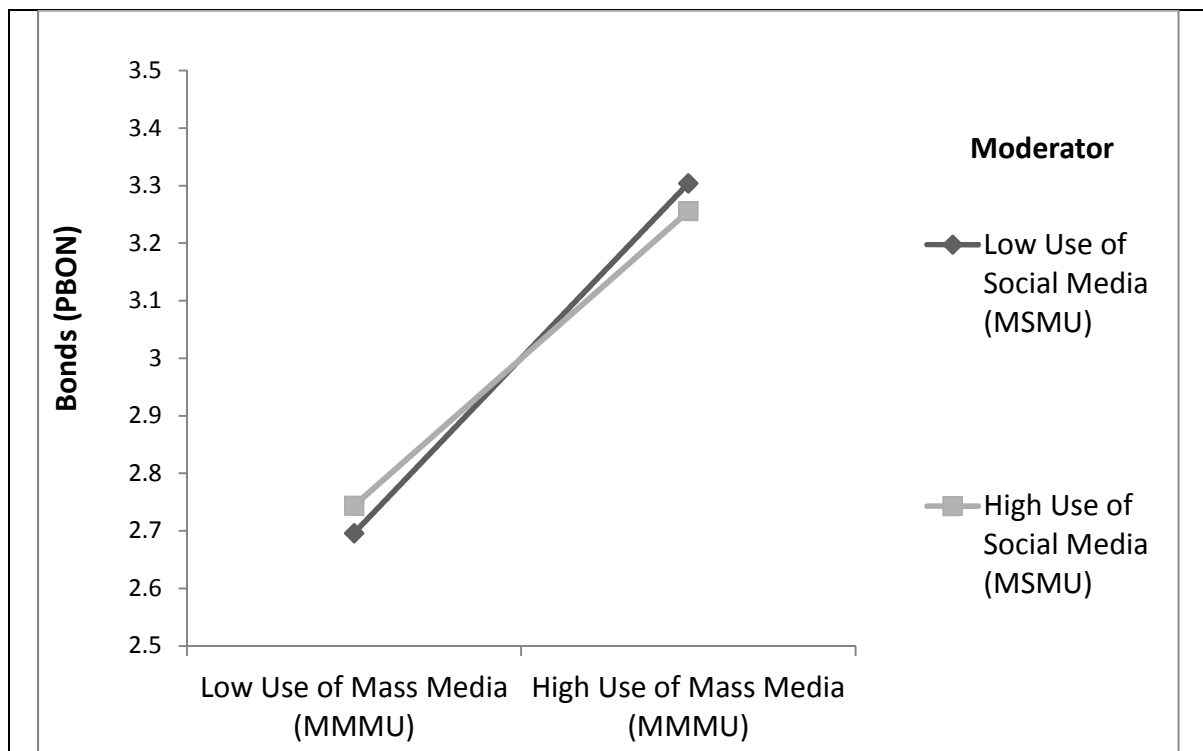
		Dependent variable Bonds (PBON) (Un-standardised estimate)
Independent variable	Mass Media (MMMU)	0.280
Moderator	Social Media (MSMU)	0 (since Social Media has no significant effect on Bonds as shown in H5 is section 6.4.1)
Interaction	MMMU x MSMU	-0.024

Figure 6-8 Interaction Effect between the Use of Social Media and Mass Media on the Perception of Bonds

Despite the fact that both plots (Figure 6-7 and 6-8) show a similar pattern, that the use of Social Media mildly dampens the positive relationship between the use of Mass Media and the perception of concerns as well as bonds. However, it should be noted that, for the interaction effects on the perception of Bonds, since Social Media has no significant effect on Bonds as shown in H5 is section 6.4.1, the interaction effect of mass and social media on Bonds is minimal. This is also reflected in Figure 6-8 that the two lines are almost parallel to each other. Therefore, in other words, the use of social media can slightly reduce the effects of mass media on people's perceptions on Concerns only, or simply put, those who use social media more tend to be less affected by the information from mass media on their perception of Concerns.

6.4.5 Control Variables

Among the control variables, as shown in Table 6-5, age (AGE) appears to be the most influential, it is positively correlated with the use of mass media and negatively correlated with the use of Social Media as the data in section 6.3.1 have identified. Furthermore, age is negatively and mildly related to all three intentions, which indicates that the younger people have slightly lower intention to participate in activities related to post-disaster recovery than the older people. On the other hand, gender (GEN) is positively related to Civic Discussions and Altruistic Actions, i.e., female tends to have stronger intention to discuss with others and to carry out altruistic actions than male. Regarding use of other media, the results show that newspaper (MNP) is strongly correlated with the use of mass media (represented by television in this case) and similarly it has a positive effect on all three perceptions. On the other hand, the use of Internet portal site (MIP) is positively correlated with the use of Social Media, positively related to the perception of concerns and anxieties but not related with bonds. In other words, those who read newspaper also tend to watch television and those who use Internet portal sites also tend to use Social Media. Finally, employment status (EMP) appears to have minimal effects.

6.5 Key Finding

This results presented in the above section have demonstrated the cultivation effects of media on people's perceptions of the disaster and also on their intention to participate in recovery related activities. In essence, the key findings are consolidated into the following four main points:

1. Media's effects on perceptions – as the cultivation theory has predicted, mass media have exerted a strong positive influence on people's perceptions of the disaster, in particular on their perceptions of bonds in families and society, concerns of the disaster victims and anxieties of future disasters. On the other hand, it is interesting to see that social media have worked differently, which the use of social media actually has a mild and negative effect on the perceptions of concerns and anxieties. In other words, social media can slightly reduce the influence from mass media especially on people's perceptions of concerns and anxieties. One possible explanation is that those who use social media more frequently (e.g., the younger people) are simply less care about the disaster. If this was the case, one would expect to see social media to have negative effect on all three perceptions instead of just two. Hence, another possible explanation is that social media provide the additional information and communication channels that can reduce people's concerns and anxieties about the disaster. This is further supported by the results of the interaction effect explained in the following point.
2. Interaction between mass and social media – it can be seen that the use of social media can actually interact with the use of mass media to reduce its influence on people's perceptions of the disaster. In particular, compare with those that do not use social

media to obtain information related to the disaster, those who use social media more frequently actually feel less concerns about the severity of the disaster, one possible reason is that the additional information as well as the additional communication channel provided by social media can ease their level of concerns, this argument is supported by the fact that the perception of concerns is related to the intention to discuss with other as shown in the following point.

3. Perceptions' effects on intentions – as a cognitive process, the forming of the perceptions of the disaster has also altered people's behavioural intentions. For example, the perception of bonds in families and society has the strongest influence, it strongly motivates people to perform altruistic actions such as to join volunteering works and make donations, to engage in civic discussion to discuss status of the recovery with other people, and to make preparations for future disasters such as to prepare for suppliers and to learn more about the evacuation procedures. On the other hand, the perception of concerns about the disaster only increases their intention to engage in civic discussions. Furthermore, the perception of anxieties about future disasters only leads to the urge to make preparations, and at the same time, it reduces people's intention to carry out altruistic actions. One of the possible reasons is that as people become more anxious of future disasters especially about the Fukushima nuclear power plant accident, they refrain from going to the disaster area to join the volunteering works. These findings show that for post-disaster recovery, the influence of positive perceptions such as bonds in family and society are essential to motivate more people to support the recovery.

4. Experience from disaster – it is interesting to find that for those who were not affected by the disaster directly, their perceptions of the disaster actually are influenced more by the media than those who were affected, especially on their perceptions of anxieties and bonds. It is very possible that because for those who were not affected by the disaster directly, their perceptions of the disaster are mainly built based on information from the media. On the surface, this appears to be contradictory to the resonance effect in the cultivation theory (see section 3.1 for details) which has predicted the opposite. However, considering the media environment in Japan, the vividness and abundance of media information can effectively mediated the disaster experience to people even stronger than the real event (Mitomo et al., 2012). This finding does not imply that the media have no resonance effect on those who had experienced the disaster; instead, it demonstrates the media's power to influence people's perceptions of the reality.

6.6 Discussion and Conclusion

In the search of the answer to the research question, this chapter has presented the second part of the core analysis based on the cultivation theory from the passive audience perspective. The key findings described in the above section have identified the effect of the use of mass and social media on people's perceptions of the disaster and their intention to

carry out recovery related activities, as well as the underlying mechanism. In practice, how these analytical findings are connected to the people and what are the implications for post-disaster recovery?

First of all, it should be noted because this study uses the same data set as the one presented in the previous chapter, the subject is also the same, i.e., they are from the three prefectures (Miyagi, Fukushima and Iwate) that were directly hit by the disaster. However, differ from the previous chapter which takes the active audience perspective, this chapter adopts the opposite passive audience perspective, which assumes that most people are passive in terms of media effects[83]. Hence, it is assumed that they are subjected directly to influence from the media. In other words, as the cultivation theory suggests, information from the media can directly cultivate their perceptions of the reality. In the case of the Great East Japan Earthquake, as described in section 2.1.1, the disaster has created substantial impacts to the Japanese society, and many issues from political, economic, social to environmental had arisen. In mass media, for instance on television, many reports and documentaries related to these issues were being featured in different television programmes. For example, in 2012, the year after the disaster, from television, more than 60% of the people had seen information about the disaster such as the recovery status, the damages, the problems and policies, the preparations for future disasters and charity events quite frequently for more than a few times a month[84]. As they came across different information and messages about the disaster and the recovery from television, over time people built up their perceptions of the reality of the disaster. For example, as they saw the devastating damages caused by the tsunami and the struggles faced by the people in the disaster area, many were awed by the severity of the damage, and they became more concerned about the disaster and the victims, such as their livelihood, safety, and their stress and psychological pressure[85], and subsequently their perception of the concerning situation of the disaster was formed. At the same time, many heart-warming stories of how people helped each other selflessly after the disaster were also being featured on television, and many people were touched by these altruistic actions and they felt the strong bonds (kizuna[86]) in families and society[87], and subsequently their perception of a strong bonding society was built. Finally many people became anxious about the risks of future disasters and felt the urge to prepare for them[88] as they saw different information and reports on the

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[83] Refer to section 3.1 for details on the passive audience perspective.

[84] The frequency of people exposing to these television programmes are represented by different measured variables which construct the factor 'mass media' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

[85] These factors are represented the measured variables that construct the factor 'concern' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

[86] See section 2.1.1 for the important meaning of 'kizuna' in the Great East Japan Earthquake.

[87] These factors are represented the measured variables that construct the factor 'bonds' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

[88] These factors are represented the measured variables that construct the factor 'anxieties' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

uncertainties from the Fukushima nuclear plant accident and the possibilities of future large scales earthquakes on television, and subsequently their perception of anxieties of the future was created. While most people obtained their information about the disaster and the recovery from television, at the same time, many of them (especially the younger people) also received information about the disaster and the recovery from social media. Among different social media applications, video sharing sites and SNS were the most frequently used, followed by blogs and personal homepages, and forum and BBS[89]. Indeed, after the disaster, as mentioned in chapter 1, social media had played a special role as the source of alternative and personalised information, many information from different sources were available online that provided different opinions which sometimes were contradictory to the official story presented in the mainstream mass media. Hence, those that obtained these alternative information and opinions from social media, they might perceived the disaster differently. For example, they became less concerned and anxious about the disaster because of the additional information as well as because they could ease their concerns and anxieties by discussing and exchanging information with other people online.

At the same time, for those who were affected by the disaster directly, although they had formed their initial perceptions of the disaster based on their own experience, however, overtime, their perceptions were also affected by the media because from the media, they had gained a wider perspective of the situation from stories both similar and different from their own. On the other hand, for those who were not affect by the disaster directly, these information from the media allowed them to experience the disaster indirectly, and subsequently, their perceptions of the disaster were formed mainly based on the media's information. Either way, as the people formed their own perceptions of the disaster and the recovery in their mind, they also developed their understandings of the situation and changed their attitudes and behavioural intentions towards the disaster accordingly[90]. For instance, as most of them perceived that the society are strongly bonded that people are always willing to help each other, they felt they were part of the society and they should help others as well, and subsequently they became more motivated to do something for the recovery. For example, most of them felt they wanted to learn more about the recovery and to discuss and share these information with others[91], at the same time, as they also became more willing to carry out altruistic actions such as to make donations or to participate in volunteering works and charity events, as well as to encourage

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[89] The usage of different social media is represented by the corresponding measured variables that construct the factor 'social media in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.
[90] As the cognitive process described in section 3.3.
[91] These factors are represented the measured variables that construct the factor 'civic discussion' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

others to do the same[92]. Similarly, as they perceived that the disaster is very concerning, they became more motivated to find out more information about the situation as well as to discuss with other people[93]. However, without perceiving that the society is highly bonded, just being concerned alone was not sufficient to increase their intention to participate in altruistic actions. Last but not least, as people perceived a high level of anxieties of future disasters, they became strongly motivated to prepare for supplies and to learn more about the evacuation and safety procedures[94]. That being said, for those mainly just felt anxious about the situation, they became less willing to carry out altruistic actions probably because they were also very anxious about the potential risks in the disaster area and refrained themselves from going there to participate in volunteering works.

In conclusion, by linking up analytical findings with the people in practice as described above, it can now be seen clearly how the use of mass and social media can contribute to post-disaster recovery by cultivating people's perceptions of the disaster and increasing their intentions to support the recovery. From these observations, two particularly important implications for post-disaster recovery can be drawn. First, knowing that media can effectively influence people's perceptions of the disaster especially for those who did not experience it directly, for NGOs and government authorities that are working on post-disaster recovery, they can further utilise the media to increase the general public's awareness on the recovery work especially focusing on the promotion of positive perceptions such as bonds in the society to motivate more people to participate in post-disaster recovery. Secondly, knowing that mass and social media can interact with one another to alter each other's effect, these organisations can also consider utilising both media in an interactive way to counter the effect from the other media. That said, in order to utilise both media interactively, it is important to understand how there are actually interacting with each other in practice especially in today's complex media environment that the media are converging rapidly. Therefore, the effects of convergence and interactively between mass and social media will be further investigated in the following chapter before these implications can be integrated with results of the first part of the analysis to draw the complete picture in chapter 8.

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[92] These factors are represented the measured variables that construct the factor 'altruistic actions' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.
[93] As in 'civic discussion'.
[94] These factors are represented the measured variables that construct the factor 'preparations' in the path model in Figure 6-2. The average value of these variables is shown in Table 6-1.

Chapter 7 Effects of Convergence between Mass and Social Media

7.1 Introduction

This chapter[95] presents the final part of the three-part empirical analysis. The aim of this part of the analysis is to extend the key findings from the core analysis presented in chapter 5 and chapter 6. Although they have taken a different perspective, both the first and second part of the core analysis have pointed out that mass and social media can work interactively to enhance their effect on post-disaster recovery. Therefore, further understanding on the convergence and interactivity between these two media in practice will provide further insight on the practical implications of the findings from the core analysis in post-disaster recovery. With this mission in mind, this analysis (the extended analysis) is set off to look beyond post-disaster recovery to further investigate how the interactions between mass and social media can be applied to increase people's awareness and knowledge of social issues.

This analysis uses a different data set from the core analysis. It was collected from an Internet panel survey conducted in March 2014[96], 3 years after the disaster. The first question raised when constructing the survey questionnaire was that by 2014, as pointed out by in section 2.1.1, the general public's and the media's attention on the Great East Japan Earthquake was fading away. Indeed, among the Yomiuri Shimbun's[97] list of readers selected top 10 domestic news for 2013 (Yomiuri Online, 2013), none were related to the Great East Japan Earthquake[98], coupling with the fact that surveys (e.g., Dentsu Macromill Insight, 2013) have shown that most in Japan felt that life had returned to normal after the disaster[99]. Hence, it is anticipated that the survey results will be highly skewed if the survey questionnaire focuses only on the Great East Japan Earthquake, and therefore, this analysis takes an alternative approach to focus on people's usage of mass and social media and their knowledge of social issues in general rather than solely on the Great East Japan Earthquake. That said, in order to evaluate if there is any major disparity in terms of media usage between those in the three Tohoku prefectures (Iwate, Miyagi and Fukushima) that were hit directly by the disaster and the rest of the country, half of the sample was selected from these three prefectures and the other half was selected from the Kanto area - the eastern part of Japan which includes the capital city Tokyo and the six prefectures surrounding it

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[95] Part of this chapter is based on the paper 'The Effect of Simultaneous Multi-Screening on the Users' Knowledge of Social Issues in a Highly Mediated Society' (Cheng et al., 2014b) by the author.
[96] The Internet survey in this study was sponsored by the Japan Commercial Broadcasters Association.
[97] The highest circulation national newspaper in Japan (http://www.yomiuri.co.jp/).
[98] The highest ranked news related to the disaster was the news article about the leakage of the contaminated water from the Fukushima nuclear plant, ranked at 18th (Yomiuri Online, 2013).
[99] To illustrate, a survey conducted by Dentsu in 2013 has found that 80% of the people in the Tokyo Metropolitan area felt that their daily life had returned to normal after the disaster (Dentsu Macromill Insight, 2013).

which together make up one third of the total population (MIC, 2010) and represent the economic and political centre of Japan. With this setting in mind, this study looks into one of the recent major trends in the world of media convergence known as 'simultaneous multi-screening', especially how it is related to the people's knowledge and awareness of social issues in general.

7.1.1 Simultaneous Multi-Screening

Literally, the term multi-screening might sound confusing; indeed, it wasn't until recently that it became commonly used in the advertising and marketing sector. In simple terms, as most of the users' media time is now spent in front of a screen e.g., the computer, smartphone or television screen, multi-screening simply means when the user is engaging with multiple media e.g., watching television and using the smartphone. In general, there are two modes of multi-screening; sequential multi-screening – when the user moves from one media to another at different times to complete a task, and simultaneous multi-screening – when the user engages with more than one media at the same time for either related or unrelated activities (Google, 2012).

This study focuses mainly on simultaneous multi-screening for related activities, in particular, when the user is watching television and connecting to social media at the same time because its aim is to look into the interactivity between mass and social media. As a matter of fact, multi-tasking when watching television is not a new idea at all, but what makes simultaneous multi-screening unique is the online capability offered by the portable devices such as smartphone, tablet and notebook computer. These devices enable the users to connect to the Internet and social media as they are watching television, in other words, while they are consuming information from mass media, at the same time, they can react to it by seeking, commenting and/or sharing the related information on social media instantaneously. This new type of interaction between mass and social media has created a new dynamic in the media environment, for instance, study conducted by Google (2012) in the US and by Microsoft (2013) in Australia, Brazil, Canada, the UK and US have found that more than 70% of their samples had used another device to perform activities such as Internet browsing and social networking while they were watching television, in other words, they found that television no longer has the audiences' full attention. That being said, at the same time, they have also found that television is the main catalyst to simulate people to perform related activities on their portable devices such as to visit a website that was mentioned on television, to see what other people were saying online about the television programmes, and to post their comments about the programmes as they were watching them. As one of the most sophisticated media societies in the world, similar trend is also found in Japan, surveys (e.g., SocialTV Lab, 2012; Netasia Research, 2013) have found that more than 50% of social media users in Japan had used social media when they were watching television. Indeed, interaction between mass and social media in the entrainment sector has become a major media trend in Japan, for example, during the television

screening of the movie 'Castle in the Sky' on the 3rd August, 2013, Twitter users in Japan had set the world record of Twitter by sending 143,000 Tweets per second to echo with the main character on Twitter (Krikorian, 2013). This kind of interaction has demonstrated the power of this new form of audience engagement and participation, and has been wildly embraced by the advertising and entertainment sector in the form of interactive commercials and entertainment programmes. However, until now there are no established theoretical models and empirical studies to analyse its effects from a social science perspective. Hence, the first step is to establish the link between this phenomenon and people's civic engagement by reviewing the related literature.

7.1.2 Mass Self-Communication Society

As pointed out in chapter 3, mass and social media are the two of the most widely used sources of information in today's society in Japan. Based on the above observations, it is anticipated that simultaneous multi-screening will further link up these two media in real time. The convergence between mass and social media has created a new form of socialised communication which Castells (2007) envisions as the 'mass self-communication' which is '*self-generated in content, self-directed in emission, and self-selected in reception by many that communicate with many*' (Castells, 2007, p. 428). This new form of communication has created a new generation of audience which some referred as informed citizen, citizen journalist or active audience, that they are audience of mass media as well as user of social media at the same time[100]. This new generation of audience no longer depend on mass media as the sole information source, they actively utilise different alternative media resources online to confirm, contribute and even challenge the information from mass media (See section 3 for details). Under this new media environment, Bruns (2008) has pointed out that for social and political issues, many people in the west have already turned away from mass media to other alternative sources online for news and informed opinion. Furthermore, empowered by the Internet and social media, some people have even taken to their own hand and become part of the media themselves by creating and publishing their own reports and commentaries as a citizen journalist. One of the main driving factors, as Bruns (2008) points out, is that the public is becoming more and more mistrustful of the political and commercial independence of the mass media. In comparison, although Japanese audiences traditionally are tended to be more modest in speaking out on social issues and to challenge the authorities (Takahashi, 2010), however, after the Great East Japan Earthquake, it can also be seen that many people in Japan have begun to make use of social media to seek and share information as well as to question and challenge the information from mass media and government authorities (Slater et al., 2012b).

In the case of simultaneous multi-screening, it is anticipated that this kind of active audience participation will become even more dynamic because people are now connected

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[100] Thus, in this chapter the terms 'audience', 'user' and 'people' are exchangeable.

to both mass and social media simultaneously, and hence the entry barrier and cost for them to react to the information from mass media have become much lower. For instance, even though some might not be aware or interested in a particular topic initially, as soon as they are stimulated by the information from television, they can participate in that particular topic spontaneously. This form of ad-hoc participation has two potential effects on their level of civic engagement. First, it increases people's chances to participate online such as to share and exchange information that they just saw on television. Secondly, it increases the number of media outlets online as everyone in simultaneous multi-screening now can become an information outlet of what is being shown on mass media in real time. Together, these two effects can generate some interesting effects on people's level of knowledge and awareness of the social issues. For instance, while some researchers have anticipated that online participation could increase people's level of social and political knowledge (e.g., Cardoso, 2011; Castells, 2009; 2010), but on the other hand, others (e.g., Webster, 2012; Tewksbury & Rittenberg, 2012) have argued that one of the commonly predicted consequences of the increase of media outlets is the fragmentation of audience and their knowledge.

7.1.3 Knowledge of Social Issues

Traditionally, one of the key functions of mass media is to provide a common set of news information to the public and to maintain a basic level of social and political knowledge in the society, and to reduce the knowledge gap and maintain the society from dividing into polarised opinions (Sunstein, 2007; Tewksbury & Rittenberg, 2012). For example, a study by Kaufhold et al. (2010) has shown that the use of professional news from mass media has a positive effect on the audiences' level of general political knowledge. Interestingly, they have also found that the use of online user generated news has the opposite effect, that it actually reduces the user's level of general political knowledge. One of the reasons they have suggested is that through participating in and consuming of online user generated news, people can selectively expose only to information that are related to their interests and as a result, reduce their exposure and general level of political knowledge, and subsequently they will become fragmented into different groups. Indeed, other studies (e.g., Tewksbury & Rittenberg, 2012; Webster, 2012) have also pointed out that traditionally it has been argued that increases in media outlet will lead to the fragmentation of knowledge and society. In particular with the growing diffusion of the Internet, as Sunstein (2007) argues, the Internet will fuel the fragmentation and polarisation of society[101] due the 'cybercascades' effect – a '*process of information exchange in which a certain fact or point of view becomes widespread, simply because so many people seem to believe it*' (Sunstein, 2007, p. 44). On the other hand, others have counter argued that there is not sufficient evidence to show that the Internet is getting more segregated (Gentzkow & Shapiro, 2011).

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[101] Which he believes in not necessary a bad thing, in fact, certain level of polarisation is necessary for a democratic society (Sunstein, 2007).

Instead, the audience pattern of television and Internet are becoming more and more overlapped because of the media convergence (Webster & Ksiazek, 2012). The argument from both camps seems to be logical and valid, this implies that in this 'mass self-communication' society, effects from the use of media on people's knowledge of social and political issues are not always one-sided. Nonetheless, both sides have agreed that media can affect people's level of civic and political knowledge, and such knowledge is an important driver of civic and political participations, because people's knowledge on a particular civic and political issues will affect their perceived importance of that issues which subsequently affect their level of participation on that (e.g., Galston, 2007; Tewksbury & Rittenberg, 2012).

7.1.4 Trust towards Media

Another key factor that affects media's influence on people's knowledge of political and social issues is their level of trust towards the media. As mentioned by Bruns (2008), being distrustful of the traditional mass media has led some people to turn away from them to alternative media sources online. Although traditionally, trust towards the mass media is known to be positively associated with the usage of news and knowledge of social issues however, in this complex media environment, the relationship is not as straight forward. Indeed, trust has become a key moderator between the usage of media and the level of knowledge, and its effect is somewhat paradoxical (e.g., Jackob, 2010; Kaufhold et al., 2010; Kiousis, 2011). For instance, the study by Kaufhold et al. (2010) have found that those who had a lower level of trust towards mass media tend to have a higher level of political knowledge, while those who had a higher level of trust towards online media appear to have participated more in user generated news online than the others, which as pointed out in the previous section would reduce their level of knowledge instead. Furthermore, as Jackob (2010) has found those that had actively used alternative online information sources actually felt less trustful towards the mass media and vice versa. Therefore, there seems to be no definite causal relationship between trust towards media, participation and knowledge of social issues.

7.1.5 The Research Question

Summing up from the above findings, it can now be seen that the interaction between mass and social media, particularly 'simultaneous multi-screening' in this case offers substantial potential to increase people's level of participation as part of the media. Such kind of interactive participation can potentially affect their level of knowledge of social issues, at the same time, this relationship is also closely related to their level of trust towards the media. Based on these observations, the main research question of this study is set to investigate what is the effect of simultaneous multi-screening on the users' level of general knowledge of social issues, and how it is related with their level of trust towards mass and social media.

This chapter is arranged as follows; section 7.2 provides an overview of the theoretical model and the hypotheses, followed by section 7.3 which describes the detail of the data analysis including the construction of the questionnaire and the characteristics of the sample data. Then in section 7.4, the hypotheses are tested and the results are analysed and the key findings are then consolidated in section 7.5. Finally, the results derived from the analytical model are linked up with the people in practice in section 7.6 to derive the implications and to conclude this chapter.

7.2 Theoretical Model

Based on the literature review in the above sections, a two-step analysis is constructed to investigate the research question of what is the effect of convergence between mass and social media, specifically, what is the effects of simultaneous multi-screening on the users' level of general knowledge of social issues, and how it is related with their level of trust towards mass and social media. The first step of the analysis adopts a confirmatory approach to examine the causal effect of simultaneous multi-screening on people's level of knowledge of social issues. The second step of the analysis employs an exploratory approach to further explore the relationship between people's level of trust towards mass and social media and their usage of media, multi-screening activities, as well as their level of knowledge of social issues without a present assumption. In order to maintain the consistence of the analysis, both steps of the analysis will use the same set of variables.

7.2.1 Confirmatory Approach

The first step of the analysis is to examine the effect of simultaneous multi-screening on the users' level of general knowledge of social issues, in particular with the consideration of the influence from both mass and social media. In order to represent this, a path model is constructed with the use of mass media and social media as independent variable, simultaneous multi-screening as the mediator[102], and the users' level of general knowledge of social issues as dependent variable. First of all, since the focus of this study is on social issues, television news and current affairs programmes are selected to represent the mass media and it is anticipated that,

- Hypothesis H1: The use of mass media has a positive effect on the users' level of general knowledge of social issues.
- Hypothesis H2: The use of mass media has a positive effect on the level of simultaneous multi-screening.

At the same time, knowing that social media are just a communication platform, it is therefore assumed that merely using social media alone will not directly contribute to the

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[102] Refer to section 4.2.2 for details on mediation effect.

users' level of knowledge. That being said, social media still can encourage simultaneous multi-screening activities because they provide the platform for the users to perform activities such as searching, confirming, commenting, sharing and acting on the related information online, therefore, it is anticipated that,

- Hypothesis H3: The use of social media has a positive effect on the level of simultaneous multi-screen activities.

Next, as pointed out in section 7.1.2, online interactions and participations (i.e., simultaneous multi-screening in this case) will lead to increases in knowledge, hence, it is anticipated that,

- Hypothesis H4: Simultaneous multi-screening has a positive effect on the users' level of general knowledge of social issues.

Furthermore, as it is assumed that simultaneous multi-screening is triggered by the use of mass and social media, therefore, it is anticipated that it will mediate their effects on the users' level of general knowledge of social issues. Specifically, given that the viewing of television news and current affair programmes is expected to have a direct effect on the users' knowledge of social issues, it is expected the simultaneous multi-screening will partially explain the effect of mass media on knowledge of social issues. On the other hand, since the use of social media is expected to have no direct effect on knowledge, it is anticipated that simultaneous multi-screening will only indirectly explain the effect of social media on knowledge of social issues. Thus, it is anticipated that:

- Hypothesis H5: Simultaneous multi-screening partially mediates the effect of the viewing of television news and current affair programmes on the users' level of general knowledge of social issues.
- Hypothesis H6: Simultaneous multi-screening indirectly mediates the effect of the use of social media on the users' level of general knowledge of social issues.

In order to examine if there is any disparity in terms of media usage between those who were living in the three Tohoku prefectures (Iwate, Miyagi and Fukushima) and in the Kanto area (Tokyo and the surrounding six prefectures), it is assumed that geographic location will moderate[103] the effect of mass and social media and also of simultaneous multi-screening. Therefore, it is assumed that,

- Hypothesis H7: The effect of mass media on the users' level of general knowledge of social issues is different between people from the Kanto area and from the Tohoku area.
- Hypothesis H8: The effect of mass media on the level of simultaneous multi-screening is different between people from the Kanto area and from the Tohoku area.

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[103] Refer to section 4.3.2 for details on moderation effect

- Hypothesis H9: The effect of social media on the level of simultaneous multi-screening is different between people from the Kanto area and from the Tohoku area.
- Hypothesis H10: The effect of simultaneous multi-screening on the users' level of general knowledge of social issues is different between people from the Kanto area and from the Tohoku area.

As found in both chapter 5 and 6, the usage of mass and social media is closely related to users' age. Hence, it is expected that age will also moderate the effects of mass and social media, and also the effects of simultaneous multi-screening. Therefore, it is anticipated that,

- Hypothesis H11: The effect of mass media on the users' level of general knowledge of social issues is different between the younger and older people.
- Hypothesis H12: The effect of mass media on the level of simultaneous multi-screening is different between the younger and older people.
- Hypothesis H13: The effect of social media on the level of simultaneous multi-screening is different between the younger and older people.
- Hypothesis H14: The effect of simultaneous multi-screening on the users' level of general knowledge of social issues is different between the younger and older people.

Finally, it is expected that people's social background such as their age, gender, level of education, geographic area, level of trust towards mass and social media, as well as usage of other media will also affect their level of general knowledge of social issues, and therefore these factors are added as control variables. Based on the above hypotheses, a path model is constructed as shown in Figure 7.1.
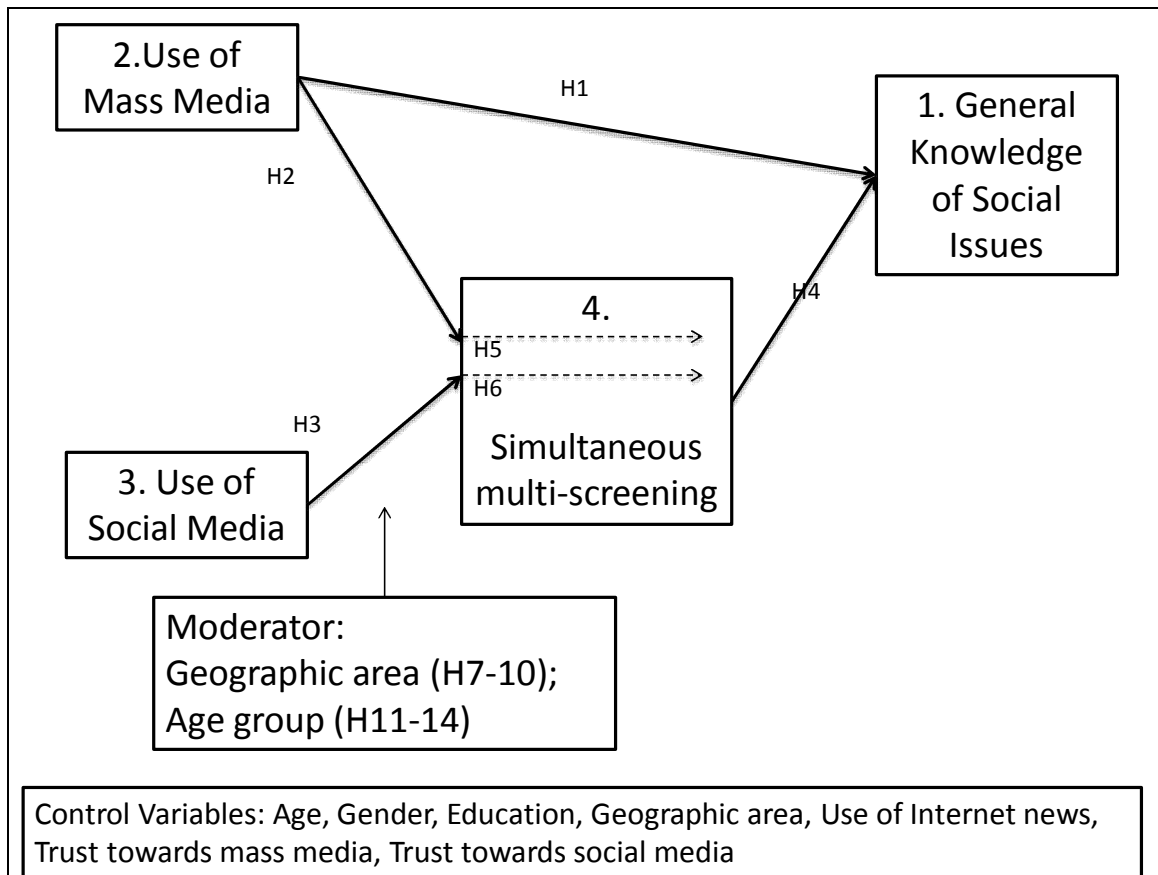
Figure 7-1 Path Model

7.2.2 Exploratory Approach

The second part of the analysis is to explore the relationship between people's level of trust towards mass and social media regarding social issues, their usage of mass and social media, their level of simultaneous multi-screening, as well as their level of general knowledge of social issues. As pointed out in section 7.1.3, there seems to be no definite causal relationship between the use of media, participation (simultaneous multi-screening in this case) and trusts toward media, hence, an exploratory approach is taken to explore their relationship without a set of presumed hypotheses. A two-step cluster analysis[104] is used to explore their relationships with people's level of trust towards television and towards social media regarding social issues as the predictor variables to reveal if there are any natural groupings within the sample that would otherwise not be apparent. Then the difference between different groups will be further evaluated using the evaluation variables such as the use of mass media, use of social media, level of simultaneous multi-screening and level of general knowledge of social issues.

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[104] '*The clustering algorithm is based on a distance measure that gives the best results if all variables are independent, continuous variables have a normal distribution, and categorical variables have a multinominal distribution*' (Norusis, 2005, p. 375)

7.3 Data Analysis

A survey questionnaire was constructed to collect data from the samples about their level of general knowledge of social issues, their usage of mass and social media as well as simultaneous multi-screening, and also their level of trust towards the mass and social media to represent the variables shown in the path model in Figure 7.1 as follows:

1. General knowledge of social issues – in this model, social issues refers to the news and current affairs that happened in the past year (i.e., 2013), it is represented by asking the respondents how much do they know about the 10 news articles selected from the Yomiuri Shimbun's[105] list of top readers' selected news for 2013 (Yomiuri Online, 2013). Specifically, they were asked '*How much do you know about the following news topic? For 1. Tokyo awarded as the hosting city for the 2020 Summer Olympics, 2. Establishment of the act on the Protection of Specially Designated Secrets and discussion on the public's 'right to know', 3. Sales tax to increase from 5% to 8% in April 2014, 4. Liberal Democratic Party and Komeito Party won the majority in the House of Councillors election and ended the divided Diet, 5. Prime Minister Abe declared to participate in TPP negotiation, 6. 300 tons of contaminated water leaked from the tanks in Fukushima first nuclear power plant, 7. Tokyo governor Inose received 50 million yen donation from the Tokushukai Group, 8. Mt. Fuji selected as one of the world's heritages, 9. Japanese hostages killed in the Amenas hostage crisis, 10, China's decision to establish the East China Sea Air Defence Identification Zone' including the Senkaku Islands*' in a 5 levels Likert scale (1= do not know, 2= just heard about it, 3= just a little, 4= know about it, 5= know in details). The level of knowledge of each one of these 10 news topics is represented as an observed variable and together they represent the latent variable Knowledge in the confirmatory analysis and individually as the evaluation variable in the exploratory analysis.

2. Use of mass media – the use of mass media is represented by the use of television, in particular television news and current affairs programmes. It is represented by asking the respondents '*How frequently do you watch the following programmes on television? for 1. News programmes and 2.Current affairs programmes*' in a 5 levels Likert scale (1= never, 2= once in a few months, 3= few times a month, 4= few times a week, 5= almost daily). The frequency of watching each one of these two television programmes is represented as an observed variable, and together they represent the latent variable Mass Media in the confirmatory analysis and individually as the evaluation variable in the exploratory analysis.

3. Use of social media – it is represented by asking the respondents '*How frequently do you use the following social media applications? for 1. Facebook, 2. Twitter, 3. LINE and 4. Others*' in a 5 levels Likert scale (1= never, 2= once in a few months, 3= few times a month, 4= few times a week, 5= almost daily). The frequency of using each one of these

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[105] One of the five national newspapers in Japan with the highest circulation (http://www.yomiuri.co.jp/)

four social media applications is represented as an observed variable, and together they represent the latent variable Social Media in the confirmatory analysis and as individually the evaluation variable in the exploratory analysis.

4. Simultaneous multi-screening – as mentioned in section 7.2.1, there are two main types of simultaneous multi-screening, multi-screening on unrelated tasks (multi-tasking) and on related tasks (complementary use), since this study focuses on the interactivities between mass and social media, only simultaneous multi-screening on related tasks is selected. It is operationalised by asking the respondents '*How frequently do you do the following activities when you are watching television? for 1. Search for more information about the contents seen on television, 2. Check the truthfulness of the contents seen on television, 3. Make comments about the contents seen on television, 4. Share the contents seen on television and 5. Take actions (such as 'Like' on Facebook or 'follow' on Twitter) in response to the contents seen on television*' in a 5 levels Likert scale (1= never, 2= once in a few months, 3= few times a month, 4= few times a week, 5= almost daily). The frequency of using each one of these five simultaneous multi-screening activities is represented as an observed variable, and together they represent the latent variable Simultaneous Multi-Screening in the confirmatory analysis and individually as the evaluation variable in the exploratory analysis.

5. Trust on mass media – it is represented by asking the respondents '*How much do you trust the news and social issues information from television?*' in a 5 levels Likert scale (1= not trust, 2= mostly do not trust, 3= neutral, 4= mostly trust, 5= fully trust). The level of trust towards mass media will be used as a control variable in the confirmatory analysis and predictor variable in the exploratory analysis.

6. Trust on social media – it is represented by asking the respondents '*How much do you trust the news and social issues information from social media? for 1. Facebook, 2. Twitter, 3. LINE and 4. Others*' in a 5 levels Likert scale (1= not trust, 2= mostly do not trust, 3= neutral, 4= mostly trust, 5= fully trust). The level of trust towards each of these social media applications are summed up and averaged to create a single observed variable which will be used as a control variable in the confirmatory analysis and predictor variable in the exploratory analysis.

7. Use of other media – is represented by asking the respondents '*How frequently do you use the following media? for 1. Internet (Homepage, portal sites etc.), 2. Newspaper and 3. Radio*' in a 5 levels Likert scale (1= never, 2= once in a few months, 3= few times a month, 4= few times a week, 5= almost daily). The frequency of the use of these media are used as a control variable in the confirmatory analysis

Finally, other social background information such as age, gender, education level and geographic location will be collected and used as control variables.

The target was to collect 2,000 samples with half from the three prefectures in Tohoku that were hit directly by the disaster and the other half from the Kanto Area. The

samples were collected with an Internet panel survey conducted in March 2014. The survey was commissioned by a professional Internet survey company Macromill Inc., detail of the data collection procedures are described in section 4.1.4. In total, 2,060 samples were collected. In data screening, 87 unengaged observations were identified and removed, resulted in a total of 1,973 effective samples with 997 (50.5%) from Iwate, Miyagi and Fukushima and 976 (49.5%) from the Kanto area. It should be noted that differ from the core analysis, since one of the aims of this analysis is to investigate the effect of simultaneous multi-screening, hence, only the age group of 20-60 is selected because this group is expected to be more familiar with Internet and social media as they have the highest level of Internet penetration (MIC, 2013). Furthermore, as another aim of this analysis is to compare the effect of media and simultaneous multi-screening between those from the Tohoku area (Iwate, Miyagi and Fukushima) and those from outside (Kanto area), samples are selected specifically from these two regions. However, because the three Tohoku prefectures have a much smaller population (around 5.7 million) compared with the Kanto area (around 42 million), considering the survey time and budget limitations, in order to maintain a reasonable sample size for quantitative analysis, equal size sample (50-50) was drawn from the three Tohoku prefectures and from the Kanto area. Therefore, it should be noted that this sample group is aimed to represent a specific group instead of the total population and hence, differ from the core analysis; post-stratification weighting was not carried out. The latent, observed, predictor, evaluation variables are listed in Table 7-1 with their corresponding code, maximum and minimum value, mean and standard deviation, and the original questions in Japanese are listed in Appendix C.

Table 7-1 Observed, Latent, Predictor, Evaluation and Control Variables

	Code	Description	Min	Max	M	SD
1	**Knowledge**	Knowledge (Dependent Variable - step 1 / Evaluation Variable - step 2)				
1.1	fQ10_1	Tokyo awarded as the hosting city for the 2020 Summer Olympics	1	5	4.03	0.88
1.2	fQ10_2	Establishment of the act on the Protection of Specially Designated Secrets and discussion on the public's 'right to know'	1	5	3.13	1.23
1.3	fQ10_3	Sales tax to increase from 5% to 8% in April 2014	1	5	4.35	0.71
1.4	fQ10_4	Liberal Democratic Party and Komeito Party won the majority in the House of Councillors election and ended the divided Diet	1	5	3.35	1.32
1.5	fQ10_5	Prime Minister Abe declared to participate in TPP negotiation	1	5	3.55	1.17
1.6	fQ10_6	300 tons of contaminated water leaked from the tanks in Fukushima first nuclear power plant	1	5	3.49	1.15
1.7	fQ10_7	Tokyo governor Inose received 50million yen donation from the Tokushukai Group	1	5	3.85	1.03
1.8	fQ10_8	Mt. Fuji selected as one of the world's heritages	1	5	4.14	0.85
1.9	fQ10_9	10 Japanese hostages killed in the Amenas hostage crisis	1	5	3.03	1.36
1.10	fQ10_10	China's decision to establish the East China Sea Air Defence Identification Zone' including the Senkaku Islands	1	5	3.26	1.32
2	**TVNewsCA**	Use of Mass Media (Independent Variable - part 1 / Evaluation Variable - part 2)				
2.1	TVNews	News programmes	1	5	4.54	0.84
2.1	CurrentA	Current affairs programmes	1	5	3.28	1.19
3	**SocialMedia**	Use of Social Media (Independent Variable - step 1 / Evaluation Variable - step 2)				
3.1	Facebook	Facebook	1	5	2.14	1.57
3.2	Twitter	Twitter	1	5	1.97	1.51
3.3	LINE	LINE	1	5	2.58	1.79
3.4	Others	Others	1	5	1.72	1.26
4	**MultiScreen**	Simultaneous Multi-Screening				

		(Independent Variable - step 1 / Evaluation Variable - step 2)				
4.1	MSSearch	Search for more information about the contents seen on television	1	5	2.41	1.35
4.2	MSCheck	Check the truthfulness of the contents seen on television	1	5	2.22	1.29
4.3	MSComment	Make comments about the contents seen on television	1	5	1.52	1.02
4.4	MSShare	Share the contents seen on television	1	5	1.53	0.99
4.5	MSAct	Take actions (such as 'Like' on Facebook or 'follow' on Twitter) in response to the contents seen on television	1	5	1.43	0.90
5	**TrustTV**	Trust towards the mass media (Control Variable - step 1) / Predictor variable - step 2)	1	5	3.51	0.98
6	**TrustSMedia**	Trust towards the social media (Control Variable - step 1) / Predictor variable - step 2)	1	5	2.54	0.87
7.1	**ITNews**[106]	Usage of Internet News (Control Variable - step 1 / Evaluation variable - step 2)	1	5	3.97	1.23
7.2	NEWP	Usage of Radio	1	5	2.45	1.44
7.3	RADIO	Usage of Newspaper	1	5	3.01	1.76
8	Age	Age (Control Variable - step 1 / Evaluation variable - step 2)	20	60	40.03	10.28
9	Education	1=Junior high school, 2=Senior high school, 3=College or equivalent, 4=University, 5=Post-graduate (Control Variable - step 1)	Categorical 1=2.5%; 2=27.7%; 3=27.5%; 4=38.8%; 5=3.4%			
10	Geographic Area	2=Tohoku, 3=Tokyo Metropolitan (Control Variable - step 1)	Categorical 2=50.5%; 3=49.5%			
11	Gender	1=Male, 2=Female (Control Variable - step 1)	Categorical 1=42.2%; 2=57.8%			
M=Mean; SD=Standard Deviation						

From Table 7-1, first of all, it can be seen that the overall level of general knowledge of social issues of this group is quite high, in a 5 levels Likert scale from 1 to 5, all ten news topics have an average value of 3 or above. Among them, topics that are more related to people's daily lives have the highest mean value, for example 'Sales tax to increase from 5% to 8% in April 2014' (m=4.35), 'Mt. Fuji selected as one of the world's heritages' (m=4.14) and 'Tokyo awarded as the hosting city for the 2020 Summer Olympics' (m=4.03). On the

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[106] Internet news is the second most used news source after television news, hence it is used to represent the use other new sources.

other hand, foreign and political issues appear to be less well known, for example, '10 Japanese hostages killed in the Amenas hostage crisis' has the lowest mean of 3.03, followed by 'Establishment of the act on the Protection of Specially Designated Secrets and discussion on the public's 'right to know'' (m=3.13) and 'China's decision to establish the East China Sea Air Defence Identification Zone including the Senkaku Islands' (m=3.26).

Next, regarding their usage of media, the findings are quite similar to the previous two chapters that informative television programmes such as television news and current affair programme were quite commonly watched that their mean value is 4.54[107] and 3.27 respectively. On the other hand, in comparison social media were not as frequently used, among different social media applications, LINE was the most frequently used with a mean value of 2.58[108], followed by Facebook (m=2.14), Twitter (m=1.97) and Others (m=1.72). Since simultaneous multi-screening is mainly based on social media, therefore, its usage level is also quite low, among different simultaneous multi-screening activities, search for more information about the contents seen on television was the most frequently performed with a mean value of 2.41[109], followed by check the truthfulness of the contents seen on television (m=2.22), share the contents seen on television (m=1.53), make comments about the contents seen on television (m=1.52) and take actions in response to the contents seen on television (m=1.43). Similarly, on top of the usage, in terms of trust, mass media also appear to be more trusted (m=3.51[110]) than social media (m=2.54). Therefore, it can be seen that mass media, in particular television is still the most used and trusted source in particular regarding social issues and current affairs. In addition, among other information sources for news information other than television and social media, Internet news was the most frequently used (m=3.97), followed by newspaper (m=3.01) and radio (m=2.45). Therefore, Internet news is included in the model as a control variable to represent the influence of other media[111].

How these different observed variables are related to the latent variables that represent Knowledge, Simultaneous Multi-Screening, Usage of Mass Media, Usage of Social Media, Trust towards Mass Media and Trust towards Social Media as well as how these latent variables are related with each other will be further examined in the result analysis in section 7.4. Furthermore, it should be noted that mean of some observed valuables (e.g., those under 3. Social media and 4. Multi-screening) appears to be relatively low, which indicate potential floor effect[112] and it is also reflected in their relatively high skewness and

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[107] Range: 1 (minimum) to 5 (maximum).
[108] Range: 1 (minimum) to 5 (maximum).
[109] Range: 1 (minimum) to 5 (maximum).
[110] Range: 1 (minimum) to 5 (maximum).
[111] The data also shown that those who used Internet news also used newspaper and radio for news information.
[112] Floor effect refers to the issue when many subjects in the study have scores on a variable that are at or near the lower limit and reduces the possible amount of variation in the variables (Everitt, 2002).

kurtosis. Hence, acknowledging that some variables are non-normally distributed, in order to meet the joint multivariate normal distribution assumption for CFA and SEM, bootstrap re-sampling method will be employed (Bollen & Stine, 1992).

7.3.1 Data Description

The basic data of the sample group is summarised in Table 7-2 below, which shows that the Internet and media exposure of this group was quite high, their ownership of television, portable devices[113] as well as the usage of both television and social media were all around 90%. On top of that, their levels of multi-screening were also similar to the findings from other studies[114] that around 60% of them had performed other online tasks (e.g., emailing, Internet browsing and social networking) while watching television. Furthermore, there seems to be no major difference between those from the three Tohoku prefectures and those from the Kanto area except education, which there is higher percentage of university graduates in the Kanto area (45.5%) than in the three Tohoku prefectures (38.8%). This is not too surprising because the Tohoku area is known to be the agricultural region of Japan, while the Kanto area is the political and financial centre. Furthermore, because of the sample selection, it should be noted that this group is relatively young, the average age was 40 while the average age of the total population of Japan was 43.3 in 2010 according to the national census (MIC, 2010), and female (57.8%) also appears to be over-represented comparing with the 2010 census data which 51.2% of the total population of Japan was female in 2010 (MIC, 2010).

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[113] Electronic portable devices that is capable to connect to the Internet, e.g., smartphone, notebook pc and tablet pc.
[114] For example, Google (2012); Netasia Research (2013); SocialTV Lab, (2012).

Table 7-2 Observed Samples

	Tohoku[115]	Kanto	Total
N	997 (50.5%)	976 (49.5%)	1973 (100%)
Average Age	39.3	40.8	40.0
20-24	9.6%	5.5%	7.6%
25-29	12.4%	10.1%	11.3%
30-34	13.8%	11.9%	12.9%
35-39	15.7%	16.2%	16.0%
40-44	15.5%	19.2%	17.3%
45-49	12.6%	16.1%	14.3%
50-54	10.9%	12.1%	11.5%
55-60	9.4%	8.8%	9.1%
Gender			
Male	42.5%	41.9%	42.2%
Female	57.5%	58.1%	57.8%
Education Level			
Junior high school	3.7%	1.3%	2.5%
Senior high school	35.0%	20.3%	27.7%
College or equivalent	27.5%	27.6%	27.5%
University	32.2%	45.5%	38.8%
Post-graduate	1.6%	5.3%	3.4%
ICT Device			
Owned a television set	91.9%	89.2%	90.6%
Owned a portable device (notebook PC, smartphone, Tablet)	88.1%	92.0%	90.0%
Media Usage			
Watch television regularly (more than a few times a week)	92.9%	92.1%	92.5%
Watch television news regularly (more than a few times a week)	91.2%	89.0%	90.0%
Use Internet regularly (more than a few times a week)	94.0%	94.5%	94.3%
Read news on the Internet regularly (more than a few times a week)	71.2%	74.3%	72.8%
Use Social Media (Facebook, Twitter, LINE and others) regularly (more than a few times a week)	55.8%	53.2%	54.5%
Simultaneous Multi-screening – Performed the following tasks while watching television regularly (more than a few times a week)			
Emailing	47.9%	45.9%	46.9%
Internet browsing	69.6%	66.9%	68.3%
Social networking	35.6%	33.3%	34.0%

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[115] Only Iwate, Miyagi and Fukushima are included. Other Tohoku prefectures such as Akita, Aomori and Yamagata are not included.

Detail of their level of simultaneous multi-screening activities are shown in Figure 7-2 below, it shows that the general use of simultaneous multi-screening (i.e., for both related and not-related tasks) was quite high, approximately 68% of the sample had browsed the Internet as they were watching television for more than a few times a week, followed by social networking (35%) and watching video sharing sites (20%). In terms of simultaneous multi-screening specifically on related tasks, the most common performed task was to search for more information on the contents they saw on television that approximately 24% had done it more than a few times a week, following by checking the truthfulness of the contents (19%), making comments on the contents (19%), sharing the contents (8%) and take actions in response to the information from television (7%).
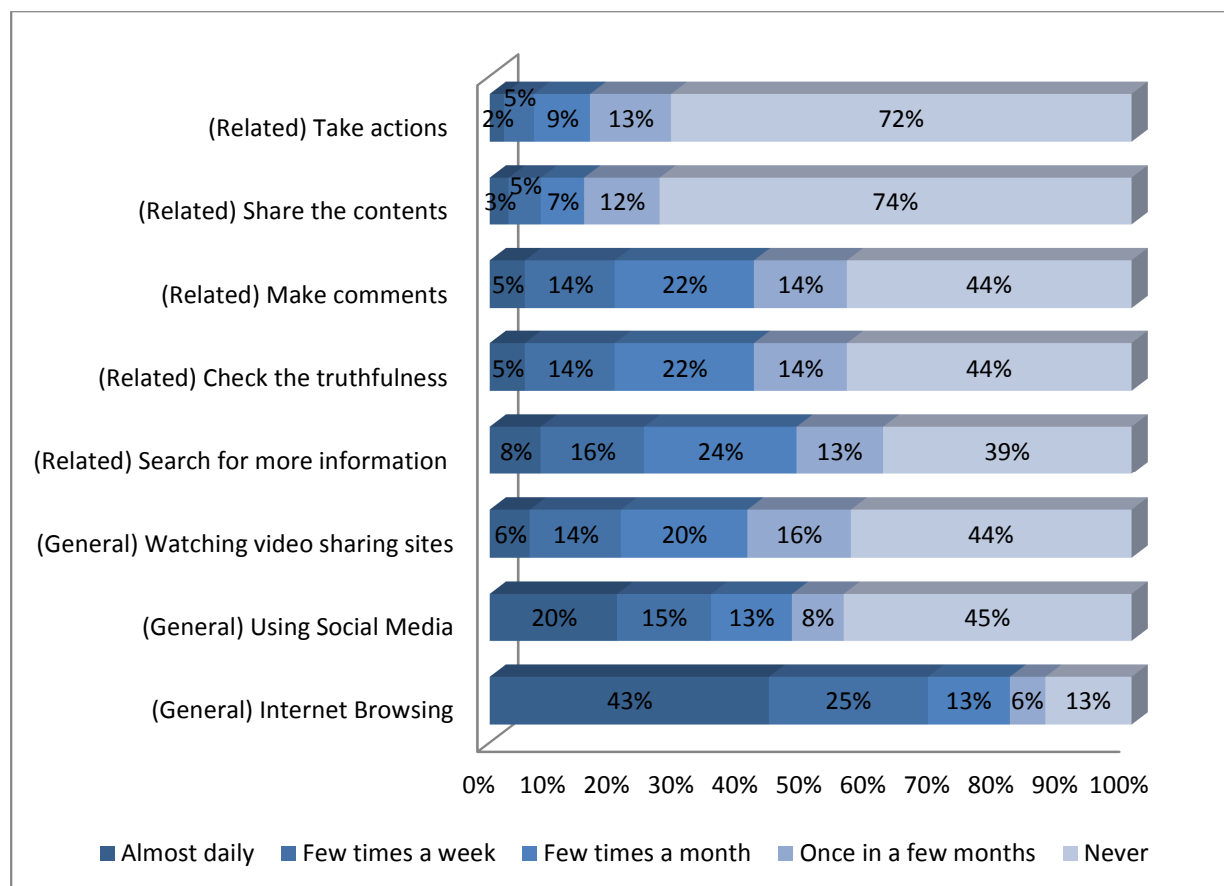
Figure 7-2 Frequency of Simultaneous Multi-Screening

The difference in simultaneous multi-screening between people from the three Tohoku prefectures and the Kanto area were further examined by comparing their mean values using ANOVA test. The results in Table 7-3 below show that there is no significant difference on their usage of Internet browsing and social networking, and the difference of other activities are significant but not too high. In fact, it appears that people from the three Tohoku prefectures were slight more active in simultaneous multi-screening than those from the Kanto area, which might be caused by the bias from the sample selection.

Table 7-3 Simultaneous Multi-Screening Activities between Different Geographic Areas

	Total		Tohoku (Iwate, Miyagi, Fukushima)		Kanto area		ANOVA	
	M	SD	M	SD	M	SD	F	Sig.
(General) Internet Browsing	3.79	1.397	3.83	1.394	3.76	1.399	1.042	NS
(General) Using Social Media	2.57	1.621	2.62	1.633	2.51	1.606	2.054	NS
(General) Watching video sharing sites	2.23	1.308	2.32	1.350	2.14	1.258	9.022	**
(Related) Search for more information	2.41	1.347	2.46	1.370	2.35	1.321	3.287	*
(Related) Check the truthfulness	2.22	1.291	2.28	1.318	2.16	1.261	4.131	**
(Related) Make comments	1.52	1.019	1.56	1.043	1.48	0.993	3.132	*
(Related) Share the contents	1.53	0.986	1.59	1.043	1.47	0.920	8.299	**
(Related) Take actions	1.43	0.901	1.47	.950	1.39	0.847	3.896	**
M – Mean; SD – Standard Deviation Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant								

7.4. Result Analysis

The data were analysed with statistical analysis software SPSS and AMOS. For the first step - the confirmatory approach, first, Exploratory Factor Analysis (EFA) was performed to test if the observed variables were loaded together as expected, then Confirmatory Factor Analysis (CFA) was conducted to evaluate the model fit and the factors reliability and validity. Finally, Structure Equation Modelling (SEM) was employed to model the path diagram in Figure 7-1 to test the hypotheses in section 7.2.1. For the second step - the exploratory approach, two-step cluster analysis was employed to divide the samples into groups based on the predictor variables. The mean and variance of the predictor and evaluation variables were then examined. The variables for both analyses are common and are summarised in Table 7-1.

7.4.1 Confirmatory Analysis

EFA was first carried out and the results[116] had resulted in four factors as expected. The communalities for all variables were >0.3. However, the observed variable 'Twitter' under the latent variable the use of social media (SocialMedia) was found to be also loaded with another latent variable simultaneous multi-screening (MultiScreen) with almost equal

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[116] With principle component and varimax rotation.

weight, this implies that Twitter probably was the most used social media application in simultaneous multi-screening[117], and therefore in order to avoid collinearity in the model, the observed variables 'Twitter' was removed. The Cronbach's alphas for all latent variables were greater than 0.7 except for the use of mass media (TVNewsCA) and the use of social media (SocialMedia) which were at around 0.6. The KMO was 0.895 and Bartlett's Test for sampling adequacy was sufficient. The total variance explained by the four factors model was 63.7%. Overall, the results indicated that the chosen variables were adequate and common method bias (CMB)[118] was also tested with no major concern found. The EFA factor loadings and the corresponding Cronbach's alphas are shown in Table 7-4 below.

Table 7-4 EFA Factor Matrix

Latent Variables	Observed Variables	Factor				Cronbach's alphas
		1	2	3	4	
TVNewsCA	TVNews				.701	0.593
	CurrentA				.745	
MultiScreen	MSSearch		.699			0.867
	MSCheck		.743			
	MSComment		.842			
	MSShare		.852			
	MSAct		.816			
SocialMedia	Facebook			.706		0.664
	Twitter*		.467	.501		
	LINE			.699		
	Others			.570		
Knowledge	fQ10_1	.627			.338	0.921
	fQ10_2	.785				
	fQ10_3	.562		.300	.361	
	fQ10_4	.832				
	fQ10_5	.882				
	fQ10_6	.816				
	fQ10_7	.804				
	fQ10_8	.689			.374	
	fQ10_9	.717				
	fQ10_10	.835				

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[117] This is in line with the findings by (Netasia Research, 2013).
[118] CMB was with tested using the Harman's single factor test (Podsakoff et al., 2003), the single un-rotated factor accounted for 31% of the total variance, indicated that CMB was not a concern.

Confirmatory factor analysis (CFA) was then carried out to test the overall model fit and the factors' validity and reliability, the modification indices were referred to improve the model fit[119]. Overall, the CFA model fit indices (CMIN/DF=5.426, GFI=0.957, AGFI=0.942, CFI=0.967, RMSEA=0.047, PCLOSE=0.914) shown that the overall goodness of fit of the model was satisfactory. The average variance extracted (AVE) and composite reliability (CR) was also tested and some concerns were noted for the latent variables 'TVNewsCA' and 'SocialMedia'[120]. Finally, a SEM model was constructed[121] based on the path model shown in Figure 7-1. The SEM model fit indices (CMIN/DF=5.893, GFI=0.934, AGFI=0.917, CFI=0.937, RMSEA=0.050, PCLOSE=0.550) shown the overall goodness of fit of the model was sufficient. The overall SEM model in shown in Figure 7-3 and the resultant standardised estimate (Est.) and significance (Sig.)[122] of the factors are summarised in Table 7-5 below.

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[119] 'MSSearch' and 'MSCheck' under 'Multi-screening' had a very high modification index for covariance. It was probably due to the fact that both questions were similar in nature and therefore, their error terms were co-varied. In addition, several news topics under 'Knowledge' also had a relative high modification index for covariance and their error terms were co-varied accordingly.

[120] Using the model by Gaskin (2012b), the AVE and CR for all latent variables were acceptable except for the AVE for both 'SocialMedia' and 'TVnewsCA' which were below the desired level of 0.5 (Hair Jr. et al., 2010) at 0.38 and 0.47 respectively, in addition, their CR were also below the desired level of 0.7 (Hair Jr. et al., 2010) at 0.55 and 0.63 respectively. This was probably related with the different usage pattern of different social media tools and television programmes. In this case, since the standardised regression weight of all their observed variables were >0.5 with p=0.001, they were considered as admissible with caution.

[121] The controlled variables were added with direct relationship assumed to the latent variable 'knowledge', and they were co-varied with the other variables according to the modification indices.

[122] Obtained with bootstrap re-sampling. Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%
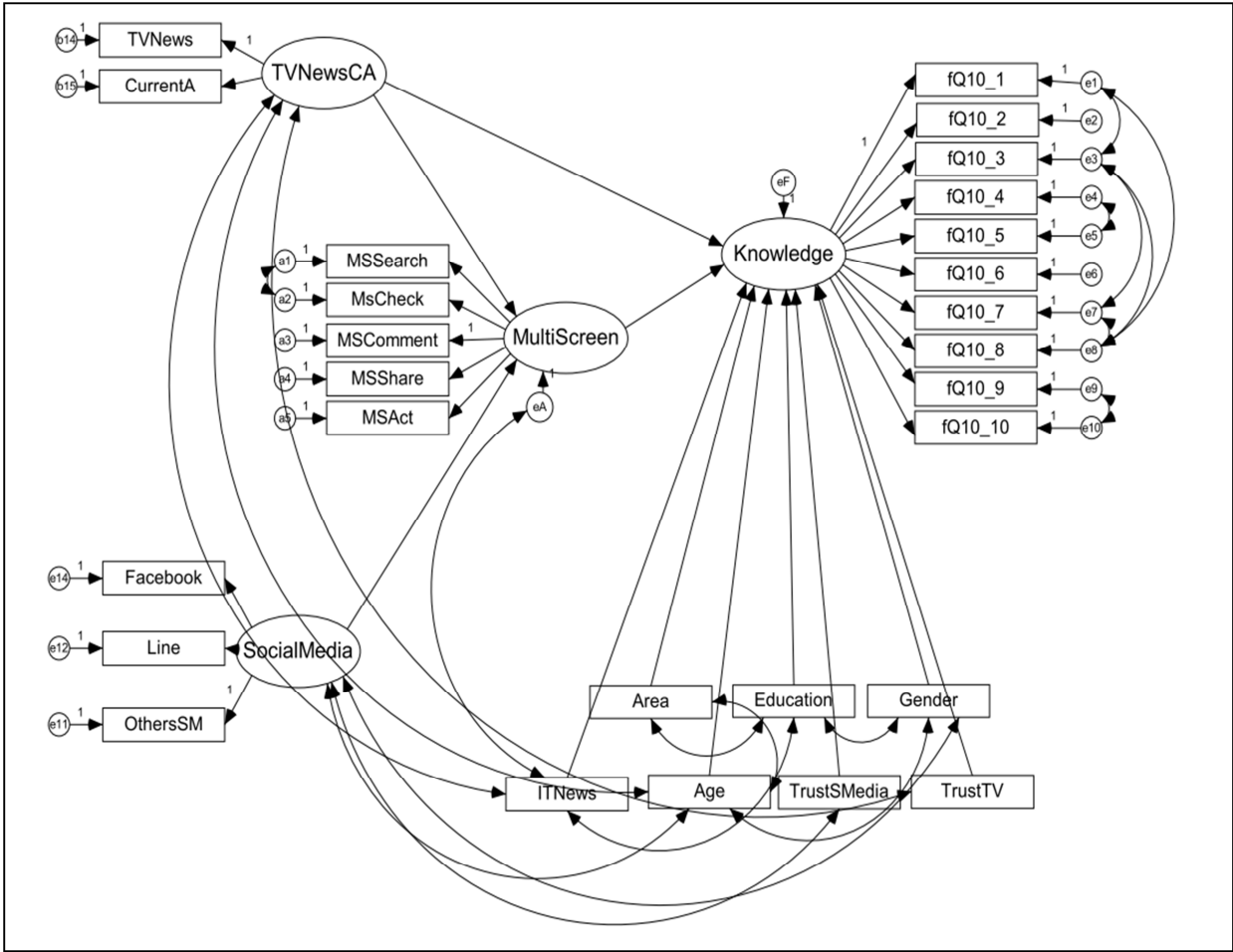
Figure 7-3 SEM Model

Table 7-5 Structural Equation Model Factors' Standardised Estimate and Significance

Parameter			Est.	Sig.	Parameter			Est.	Sig.
Mutliscreen	<---	TVNewsCA	0.098	**	Knowledge	<---	AREA	-0.003	NS
Mutliscreen	<---	SocialMedia	0.532	***	Knowledge	<---	Education	0.174	***
Knowledge	<---	Mutliscreen	0.042	*	Knowledge	<---	Gender	-0.260	***
Knowledge	<---	TVNewsCA	0.385	**	Knowledge	<---	TrustTV	-0.144	**
TVNews	<---	TVNewsCA	0.709	***	Knowledge	<---	TrustSMedia	-0.010	NS
CurrentA	<---	TVNewsCA	0.630	***	TrustTV	<-->	TVNewsCA	0.292	***
OthersSM	<---	SocialMedia	0.526	***	AGE	<-->	TVNewsCA	0.220	***
Line	<---	SocialMedia	0.606	***	ITNews	<-->	TVNewsCA	0.194	***
Facebook	<---	SocialMedia	0.591	**	AGE	<-->	AREA	0.086	***
MSShare	<---	Mutliscreen	0.868	***	AREA	<-->	Education	0.211	***
MSComment	<---	Mutliscreen	0.884	***	ITNews	<-->	Education	0.130	***
MSAct	<---	Mutliscreen	0.836	***	AGE	<-->	Gender	-0.332	***
MSSearch	<---	Mutliscreen	0.596	***	Education	<-->	Gender	-0.124	***
MsCheck	<---	Mutliscreen	0.542	***	Gender	<-->	SocialMedia	0.180	***
fQ10_1	<---	Knowledge	0.581	***	SocialMedia	<-->	TrustSMedia	0.360	***
fQ10_2	<---	Knowledge	0.758	***	AGE	<-->	SocialMedia	-0.442	***
fQ10_3	<---	Knowledge	0.486	***	eA	<-->	ITNews	0.129	***
fQ10_4	<---	Knowledge	0.817	***	a1	<-->	a2	0.613	***
fQ10_5	<---	Knowledge	0.875	***	e1	<-->	e3	0.404	***
fQ10_6	<---	Knowledge	0.799	***	e1	<-->	e8	0.246	***
fQ10_7	<---	Knowledge	0.784	***	e3	<-->	e7	0.219	***
fQ10_8	<---	Knowledge	0.632	***	e3	<-->	e8	0.433	***
fQ10_9	<---	Knowledge	0.667	**	e4	<-->	e5	0.256	***
fQ10_10	<---	Knowledge	0.819	***	e7	<-->	e8	0.427	***
Knowledge	<---	ITNews	0.111	***	e9	<-->	e10	0.281	***
Knowledge	<---	AGE	0.164	***					
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant									

Based on the SEM model, hypotheses H1 to H4 were tested by examining the standardised estimate (Est.) and corresponding significance (Sig.)[123] of the different paths shown on Figure 7-1, the results are summarised in Table 7-6 below.

Table 7-6 SEM Standardised Regression Weight and Significance for Hypotheses H1 to H4

Hypothesis	Parameter	Est.	Sig.	Result
H1	Knowledge <- TVNewsCA	0.385	***	Supported
H2	MultiScreen <- TVNewsCA	0.098	*	Supported
H3	MultiScreen <- SocialMedia	0.532	***	Supported
H4	Knowledge <- MultiScreen	0.042	**	Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant				

The results indicate that all 4 hypotheses are supported. First of all, the use of mass media (TVNewsCA) has a strong positive effect on the level of general knowledge of social issues (Knowledge), hence H1 is supported. At the same time, it also has stimulated the level of simultaneous multi-screening (MultiScreen), thus H2 is also supported, however it should be noted that effect is quite mild as the standardised estimate is quite low and the significance is only at the 0.1 level. In comparison, the use of social media (SocialMedia) has a much more salient effect on the level of simultaneous multi-screening (MultiScreen), hence H3 is supported. Finally, simultaneous multi-screening (MultiScreen) appears to have a mild but positive effect on the users' level of general knowledge of social issues (Knowledge), and hence H4 is also supported. It is worth noting that the mild effect of mass media on simultaneous multi-screening implies that probably only a small portion of multi-screening activities was triggered by the viewing of television news and current affairs programme. In other words, these simultaneous multi-screening activities were very likely related with other topics such as sports, entertainment or commercial instead of news and current affairs. Furthermore, the effect of simultaneous multi-screening on the level of knowledge of social issues is also quite weak especially when compare with the direct effect from the use of mass media. These findings indicate that, in the context of social issues and current affairs, although the effect of the use of mass and social media on simultaneous multi-screening and subsequently on the user's level of general knowledge of social issue is present but it is very limited.

This observation is further confirmed by the tests on the mediation effect of simultaneous multi-screening (hypotheses H5 and H6). It was tested by comparing the standardised estimate (Est.) and its significance (Sig.) [124] between the independent variables (the use of mass media (TVNewsCA) and social media (SocialMedia) in this case) and the dependent variable (level of knowledge of social issues (Knowledge)) in three different

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[123] Obtained with bootstrap re-sampling. Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.

[124] Obtained with bootstrap re-sampling. Bootstrap Samples=2,000; Bias-Corrected Confidence level=95%.

conditions; 1. directly without the mediator (Simultaneous multi-screening (MultiScreen)), 2. directly with the mediator, and 3. indirectly with the mediator. The results are summarised in Table 7-7 below (See section 4.2.2 for details on mediation effect).

Table 7-7 Mediation Effect of Simultaneous Multi-Screening for Hypotheses H5 and H6

Hypothesis	Condition	1. Direct without Mediator (Est. / Sig.)	2. Direct with Mediator (Est. / Sig.)	3. Indirect with Mediator (Est. / Sig.)	Mediation Type	Result
H5 - Partial mediation	Knowledge <- MultiScreen <- TVNewsCA	0.395 ***	0.388 ***	0.006 **	No mediation	Not supported
H6 – Indirect mediation	Knowledge <- MultiScreen <- SocialMedia	NS	NS	0.032 *	Indirect	Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant						

First of all, for the mediation effect[125] of simultaneous multi-screening (MultiScreen) on the use of mass media (TVNewsCA), i.e., H5, as shown in Table 7-7, although the significance value between TVNewsCA and Knowledge for all three conditions are significant. However, noting that the beta coefficient for indirect with mediator is very close to zero (0.006), the mediation effect is considered to be negligible and therefore, H5 is not supported. In other words, simultaneous multi-screening has no mediation effect of the use of mass media on the users' level of general knowledge of social issues. On the other hand, for H6, the mediation effect of simultaneous multi-screening (MultiScreen) on the use of social media (SocialMedia), the significance level between SocialMedia and Knowledge of the first two conditions (1. direct without mediator and 2. direct with mediator) has changed from insignificant to significant in the third condition (3. indirect with mediator). Thus, simultaneous multi-screening has indirectly mediated the effect of the use of social media on the knowledge of social issues, and therefore, H6 is supported. However, it should be noted that, the mediation effect is quite weak as the beta coefficient in the condition of indirect with mediator is quite low and the significant level is only at P<0.1. Summing up the results of the mediation effects (H5 and H6), it can be seen that the most of the effect on the users' level of general knowledge of social issues comes directly from the viewing of television news and current affairs programmes. That being said, albeit the effect is mild, simultaneous multi-screening still can indirectly mediate some of the effect from the use of

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[125] Refer to section 4.2.2 for detail of mediation effect.

social media on the users' level of general knowledge of social issues, which otherwise has no direct effect on it at all.

Next, moving on to hypotheses H7 to H10 - the moderation effect[126] of geographic area on the effects of media, or in simple words, is the media's effect different between those from the three Tohoku prefectures and those from the Kanto area. The moderation effect is examined by separating the sample into two groups based on their geographic location and then compare the standard score (z-score) of the standardised estimate and their corresponding significances to see if the effect between the two groups is statistically different. The results in Table 7-8 show that the difference between the two groups on the effect of mass media (TVNewsCA) on the level of general knowledge of social issue (Knowledge) i.e., H7, and the effect of mass media on simultaneous multi-screening (MultiScreen) i.e., H8 are not significant. Hence, hypotheses H7 and H8 are rejected. In addition, the effects of social media (SocialMedia) on simultaneous multi-screening (Multiscreen), i.e., H9 and the effect of simultaneous multi-screening (MultiScreen) on the level of general knowledge of social issue (Knoweldge) i.e., H10 are also not significant. Hence, hypotheses H9 and H10 are also rejected. In other words, in terms of the effects of mass and social media on simultaneous multi-screening and level of general knowledge of social issues, there are no significant differences between people from the three Tohoku prefectures and from the Kanto area.

Table 7-8 Moderation Effect of Geographic Location for Hypotheses H7 to H10

				Iwate, Miyagi, Fukushima		Kanto Area				
				Est.	Sig.	Est.	Sig.	z-score	Sig.	Result
H7	Knowledge	<---	TVNewsCA	0.285	***	0.366	***	1.255	NS	Not Supported
H8	Mutliscreen	<---	TVNewsCA	0.087	*	0.216	***	1.551	NS	Not Supported
H9	Mutliscreen	<---	SocialMedia	0.699	***	0.742	***	0.440	NS	Not Supported
H10	Knowledge	<---	Mutliscreen	0.024	NS	0.026	NS	0.099	NS	Not Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant										

Similarly, for hypotheses H11 to H14 - the moderation effect of age on the effects of media (i.e., if the media effects are different between different age groups) were examined by separating the sample in two groups by the average age (40), group 1 - those are 40 years old and below and group 2 - those are above 40 years old, and then compare the standard score (z-score) of the standardised estimate and their corresponding significances to see if

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[126] Refer to section 4.2.2 for detail of moderation effect.

the effect between the two groups is different statistically. The results in Table 7-9 have revealed a very interesting finding. Despite the fact that it is expected that the use of media is directly related to age, in terms of their effect on simultaneous multi-screening and on the level of general knowledge of social issues, similar to the effect of geographic area tested above, there is no significant difference between those who were 40 years old and under and those who were above, thus H11, H12, H13 and H14 are all rejected. In other words, summing the results of the moderation effect – hypotheses H7 to H14, neither geographic area nor age has affected the effects of media on simultaneous multi-screening and level of general knowledge of social issues.

Table 7-9 Moderation Effect of Age for Hypotheses H11 to H14

				40 and under		Above 40				
				Est.	P	Est.	P	z-score	Sig.	Result
H11	Knowledge	<---	TVNewsCA	0.318	***	0.370	*	0.719	NS	Not supported
H12	Mutliscreen	<---	TVNewsCA	0.169	**	0.095	NS	-0.895	NS	Not Supported
H13	Mutliscreen	<---	SocialMedia	0.753	***	0.803	***	0.439	NS	Not supported
H14	Knowledge	<---	Mutliscreen	0.033	*	0.031	NS	-0.052	NS	Not Supported
Sig. ***P≤0.001; **P≤0.05; *P≤0.1; NS-Not Significant										

Finally, regarding the effect of the control variables as shown in Table 7-1, first of all, in line with the findings from tests on moderation effects, age 'Age' appears to be the most influential, it has a positive influence on the level of general knowledge of social issues (Knowledge 0.164***), and is positively correlated with the use of mass media (TVNewsCA 0.220***) as well as negatively correlated with the use of social media (SocialMedia -0.442***). In simple words, older people tend to be more knowledgeable of social issues, use more mass media and less social media and vice versa for younger people. In addition, level of education (Education 0.174***) is positively and gender (Gender -0.160***) is negatively associated the level of general knowledge of social issues, i.e., those with a higher level of education and male also tend to know more about social issues. On the other hand, geographic area (Area) seems to have no direct relationship with the level of general knowledge of social issues, the use of mass media, and social media. Finally, it is interesting to note that although the level of trust towards social media (TrustSmedia) and the level of trust towards mass media (TrustTV) are positively correlated with the use of social media (SocialMeida 0.360***) and the use of mass media (TVNewsCA 0.292***) respectively, at the same time, trust towards social media (TrustTV) has no effect on the level of general knowledge of social issues and the level of trust towards mass media (TrustSmedia) is

actually negatively (-0.144**) related to the users' level of general knowledge of social issues (Knowledge). How trusts towards media are related with the usage of media, simultaneous multi-screening and knowledge of social issues is further explored in the following section.

7.4.2 Exploratory Analysis

For the second part of analysis, two-step cluster analysis was performed with trust towards the mass media (TrustTV) and social media (TrustSM) as the predictor variables. It had resulted in 3 groups, the average silhouette was 0.6 indicates a reasonable partitioning of the data. The characteristics of the three groups are analysed as follows. First of all, the mean value of the evaluation variables for each group is calculated, they are represented by the observed variables under the latent variables TVNewsCA (the use of mass media), SocialMedia (the use of social media), MultiScreen (simultaneous multi-screening), Knowledge (level of general knowledge of social issues) as well as Age (age). Then, the difference between the mean values of each evaluation variables for each group was examined. The ANOVA results indicate that they were significantly different (except for 'fQ10_9'). The resultant groups and the mean of the predictor and evaluation variables are summarised in Table 7-10 below.

Table 7-10 Two-Step Cluster Analysis Results

		Group	1	2	3
		Mean	Mean	Mean	Mean
Predictor variables	TrustTV	3.51	3.79 (H)	3.84 (H)	1.70 (L)
	TrustSM	2.54	3.16 (H)	1.66 (L)	2.38 (L)
Size	% (N)		52.1% (1027)	33.5% (660)	14.5% (256)
Evaluation variables	1. Knowledge				
	fQ10_1	4.03	4.01 (L)	4.13 (H)	3.84 (L)
	fQ10_2	3.13	3.02 (L)	3.19 (H)	3.40 (H)
	fQ10_3	4.35	4.33 (L)	4.43 (H)	4.24 (L)
	fQ10_4	3.55	3.27 (L)	3.39 (H)	3.52 (H)
	fQ10_5	3.55	3.44 (L)	3.63 (H)	3.77 (H)
	fQ10_6	3.49	3.43 (L)	3.50 (H)	3.69 (H)
	fQ10_7	3.85	3.79 (L)	3.96 (H)	3.85 (L)
	fQ10_8	4.14	4.11 (L)	4.23 (H)	4.02 (L)
	fQ10_9[127]				
	fQ10_10	3.26	3.14 (L)	3.35 (H)	3.48 (H)
	2. TVNewsCA				
	TVNews	4.54	4.59 (H)	4.63 (H)	4.18 (L)
	CurrentAffairs	3.28	3.43 (H)	3.30 (H)	2.74 (L)
	3. SocialMedia				
	Facebook	2.14	2.41 (H)	1.75 (L)	2.10 (L)
	Twitter	1.97	2.09 (H)	1.58 (L)	2.41 (H)
	LINE	2.58	2.89 (H)	2.31 (L)	2.10 (L)
	Others	1.72	1.88 (H)	1.45 (L)	1.73 (H)
	4. MultiScreen				
	MSSearch	2.41	2.56 (H)	2.22 (L)	2.34 (L)
	MSCheck	2.22	2.34 (H)	2.03 (L)	2.21 (L)
	MSComment	1.52	1.66 (H)	1.27 (L)	1.59 (H)
	MSShare	1.53	1.65 (H)	1.32 (L)	1.59 (H)
	MSAct	1.43	1.54 (H)	1.22 (L)	1.51 (H)
	5. Age	40.03	39.79 (L)	40.75 (H)	39.27 (L)

(the mean value of the predictor and evaluation variables of each group that are higher than the total group's mean are shaded as grey)
H=Higher than total mean; L=Lower than total mean

From the results in Table 7-10, first of all, it is interesting to note that instead of forming into four groups as one would logically expect from two predictor variables, only three distinctive groups were formed; 1) high level of trust towards both mass media and social media, 2) high level of trust towards mass media and low level of trust towards social

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[127] Since the results of ANOVA results show that the mean of this variable between different groups are not significantly different hence, it is excluded from the analysis.

media and 3) low level of trust towards both mass media and social media. The forth group, low level of trust towards mass media but high level of trust towards social media did not turn out to be statistically significant probably due to the fact that when it comes to social issues and current affairs, the overall trust towards the television is much higher than social media and hence, such group barely exists. The characteristic of each group is further analysed based on the observations of the evaluation variables as follows:

- Group 1 (the neutrals) – this group has a relatively high level of trust towards both mass and social media regarding news information and social issues. Surprisingly, they also have the relatively lowest level of general knowledge of social issues compare with the other groups despite the fact that they have a relatively high level of usage of both mass and social media. In addition, their levels of simultaneous multi-screening are also quite high too, hence, considering their relatively low level of knowledge of all social issues, one can logically argue that their multi-screening activities were probably not related to news and social issues. In other words, although this group has a relatively higher level of trust towards both media as well as level of usage, similar to most people in Japan, they were not too interested in social issues and current affairs (Takahashi, 2010). This group makes up slightly more than half of the total sample population (52.1%) and they are therefore classified as the 'neutrals' – the majority who rely on media for information but not very keen on social issues and current affairs.
- Group 2 (the traditionalists) – this group has the relatively highest level of trust towards the television and the lowest level towards the social media regarding social issues. Similarly, they have a relatively high level of viewing of television news and current affairs programmes but a relatively low level of usage of all social media as well as multi-screening. In addition, this group has the highest level of knowledge of all social issues, this pattern concurs with the findings by Kaufhold et al. (2010) that the use of mass media news is positively associated with the level of general knowledge. Given that their average age is relatively higher, this group is therefore classified as the 'traditionalists' who mainly rely on traditional mass media for news information. This is second largest group which makes up approximately 34% of the total sample population.
- Group 3 (the sceptics) – this group has the relatively lowest level of trust towards mass media and is also doubtful of the social media regarding social issues. Their usage of mass media is also relatively low. Nonetheless, their usages of social media and simultaneous multi-screening as well as their level of knowledge of social issues have revealed some interesting insights. First, looking into their usage of social media, it appears that while their usage of Facebook and LINE are relatively low, they utilise Twitter relatively more than other groups. Second, looking closely into their simultaneous multi-screening activities, it can be seen that while they have a relatively lower level of searching and confirming, their level of commenting, sharing and acting are quite high relatively. Finally, their level of knowledge of social issues is also very interesting, instead of an across the board high or low as the other two groups have,

they tend to know relatively more on some issues and less on others, which implies certain level of knowledge fragmentation. Coupling these observations with the fact this group is doubtful of both media in terms of social issues and their average age is the youngest, they do match closely with the new generation of active audiences that is described in section 7.1.1. Therefore, this group is classified as the 'sceptic', as Kaufhold et al. (2010) and Jackob (2010) have pointed out, distrust of the media can lead to online participation and hence reduce the level of general knowledge because of selective exposure. This group is the smallest among the three and they represent approximately 14% of the total sample population.

7.5 Key Finding

ICT advancements such mobile Internet and smartphones have changed the media environment by enabling mass media providers to interact with their audiences, as well as allowing the audiences to participate as part of the media in real time. Known as 'simultaneous multi-screening', this new form of media interaction has presented new potentials to increase audience awareness and knowledge of social issues. However, in order to realise these potentials, three basic conditions are deemed necessary. First, obviously, the audiences should be receiving information from mass media (i.e., watching television in this case). Second, they should be able to access the Internet and social media as they are watching television. Third and most importantly, they needed be motivated by the information from mass media (e.g., television) to act online (e.g., on social media). In this case study which focuses on social issues and current affairs, the first two conditions are well met, for instance, more than 90% of the samples watched television news regularly and owned at least one portable device that can connect to the Internet, and 54% of them were regular social media user. However, regarding the third condition, it seems to be not as straight forward as explained in the following 2 key findings.

1. First of all, although the confirmatory analysis in the first part has shown that the viewing of television news and current affair programmes has a positive effect on simultaneous multi-screening, however, the effect is relatively mild. Furthermore, the effect of simultaneous multi-screening on the users' level of general knowledge of social issues is also relatively weak. Instead, most of the effect comes directly from the use of television news and current affairs programmes. These observations imply that only a small portion of these multi-screening activities are triggered by television news and current affairs programmes. Having said that, at the same time, it can also be seen that simultaneous multi-screening can indirectly mediate the effects of social media on the user's level of knowledge of social issues, this indicates that some social media users are actually motivated by the news information from television to respond simultaneously online, and they have extended their knowledge of social issues through multi-screening. In addition, both age and geographic location have no significant effect on the effect of simultaneous multi-screening, in other words, for people from either the Tohoku or the

Kanto area, as long as they are connected to the media, they can participate as part of the media as long as they are motivated. Then one must wonder, regarding social issues and current affairs, what are the factors that can affect people's motivation to react online in multi-screening?

2. The second part of the analysis – the exploratory analysis has shed some light on the above question by further investigating the characteristics of different groups of people based on their level of trust towards mass and social media. First of all, it has shown that the 'traditionalists' – the relatively older people who mainly rely on the mass media for news information do not utilise much of social media nor multi-screening. Hence, it can be argued that they are not related to nor affected by simultaneous multi-screening. That being said, they do have the relatively highest level of knowledge of these issues compare to the other. At the same time, the 'neutrals' – the majority of the samples, although they trust and rely on both mass and social media for news information as well as active in simultaneous multi-screening, surprisingly, they have the relatively lowest level of knowledge of social issues. Does this imply that simultaneous multi-screening is not related to people's knowledge of social issues at all? The third group provides some interesting insight, this group - the 'sceptics' - the relatively younger people who are doubtful of the information from both mass and social media, comparing with the other groups, they tend to share and comment on the some of the social issues on social media (in particular on Twitter) as they saw them on television possibility driven by their doubts, and they have a higher level of particular social issues.

Linking up the findings from the first and second analyses, it can be seen that for those who obtain their news information from mass media, simultaneous multi-screening has very limited direct effect on their level of knowledge of social issues as in the case of the 'naturals' and 'traditionalists'. On the other hand, for those that are less dependent on mass media and more familiar with social media, simultaneous multi-screening provides the platform for them express themselves and increase their knowledge of some specific issues, especially for those who are doubtful of the information from media. In other words, while mass media provide the general knowledge of social issues, through simultaneous multi-screening, social media allow some people to gain additional information on specific issues that are of interest to them. However, it should be noted that, currently television news and current affairs programmes appear to be not a strong catalyst to trigger most people to react online.

7.6 Discussion and Conclusion

Findings from the first and second part of the core analysis presented in chapter 5 and 6 have shown a consistent pattern that the use of mass and social media can create positive effect for post-disaster recovery. The results of both analyses have pointed out the importance of the interactivity between mass and social media in the creation of these effects. Therefore, in order to derive some practical implications for post-disaster recovery,

the extended analysis presented in this chapter is set off to investigate the effects of convergence between mass and social media, specifically the interactivity between the two media. This chapter has looked into one of the most popular trends in media convergence recently known as 'simultaneous multi-screening' and examined its relationship with people's level of general knowledge of social issues, as well as their level of trust towards mass and social media. As described in the above section, the empirical analysis results have shown that in a highly mediated society such as Japan, many people indeed do utilise more than one media simultaneously such as watching television and using social media to response to the content they saw on television at the same time. Through these interactivities, some of them have extended their knowledge of social issues. However, the effects are mainly depended on if they are motivated by the information from television in the first place, and it is found that currently television news and current affairs programmes are not a strong catalyst for simultaneous multi-screening in terms of social issues. In practice, how these analytical findings are connected to the people?

First of all, it should be noted that the subject of this analysis is different from the core analysis presented in the previous two chapters. Instead of focusing solely on people who were living in the three prefectures that were hit directly by the Great East Japan Earthquake (Fukushima, Iwate and Miyagi), this analysis focuses on adults between the ages of 20 to 60 who were living in these three prefectures plus the Kanto area. Despite the fact that the samples are from two different regions, the results show that there are no significant difference between their levels of media usage, that around 90% of them owned a television and a portable device such as smartphone or notebook pc that is capable to connect to the Internet, and more than 60% of them had accessed the Internet while they were watching television to perform tasks such as checking email, browsing the Internet or using social media. As described in section 7.1.1, referred as 'simultaneous multi-screening', such simultaneous connection of both mass and social media offers a new dimension for marketers to engage their customers and indeed, cross-media entertainment programmes and commercials are no stranger to people in Japan at all. So one must wonder, when it comes to social issues such as government policies, environmental problems or domestic affairs, do people also make use of the possibilities offered by 'simultaneous multi-screening'?

In this case study, it can be seen that most of the people obtained their news information from mass media, such as newspaper, television and Internet news websites. Among them, television, specifically news and current affairs programmes[128] are the most commonly used sources, for example more than 90% of them watched television news regularly (more than a few times a week). At the same time, for those of them who were

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[128] The frequency of watching News and current affairs programmes on television are measured by the corresponding observed variables and together they represent the variable 'Mass Media' in the model. The average value of these variables is shown in Table 7-1.

more familiar with social media such as Facebook, LINE, and Twitter etc.[129], when they were motivated or stimulated by the information from television, for example, when they wanted to learn more, to see what others were saying, to express their opinion or to discuss with others, then could and many in fact did get online to response instantly. For instance, while they were watching television, more than 50% of them had shared the related information online, around 40% of them had checked the truthfulness of the information and made comments online, and approximately 30% of them had shared the related information online with others and acted according to what they saw on television[130]. However, despite that fact that more than 90% of them did watch news and current affair programmes on television regularly, only a small portion of these simultaneous multi-screening activities were actually trigged by the information they saw on these programmes, and most of their simultaneous multi-screening activities were related to other television programmes instead. That being said, although most of them just learned about what was going on around them from television directly, some people actually were triggered by some of the information they seen on television news and current affairs programmes and reacted in simultaneous multi-screening, and they actually did gained more knowledge of social issues or in other words, what was going in the society. For instance, 2013 was a year of change in Japan, the country just began to move away from the shadow of the Great East Japan Earthquake, the economy started to regain momentum after being staggered for decades, and at the same time many controversial policies were being proposed by the new ruling party. For example, almost all of the people were well aware of the good news that Tokyo was elected as the host city for the 2020 Olympic Games and Mt. Fuji was enlisted as a world cultural heritage, and they also knew well about the rise of the consumption tax that was directly related to their daily life. At the same time, some of them were also aware of some political and controversial issues such as the Liberal Democratic Party gained the majority in the Diet, the beginning of the TPP negotiation, the leakage of contaminated water in the Fukushima nuclear power plant, the corruption case of the Tokyo governor and the establishment of the Protection of Specially Designated Secrets act. On the other hand, foreign issues such as the tragedy of the 10 Japanese hostages killed in Amenas and Japan's dispute with China's establishment of the East China Sea Air Defence Identification Zone[131] were less well aware by them. Although these issues comprise a diverse range of topics, they more or less can represented people's level of general knowledge of what was going on around them as

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[129] Their frequency of using these social media applications are measured by the corresponding observed variables and together they represent the variable 'Social Media' in the model. The average value of these variables is shown in Table 7-1.

[130] Their frequency of using these actions are measured by the corresponding observed variables and together they represent the variable 'Multi-Screening' in the model. The frequency of these activities is shown on Figure 7-2. The average value of these variables is shown in Table 7-1.

[131] The level of knowledge of these 10 issues selected from Yomiuri Shimbun's 2013 list of top 20 readers-selected news are measured by the corresponding observed variables and together they represent the variable 'Knowledge' in the model. The frequency of these activities is shown on Figure 7-2. The average value of these variables is shown in Table 7-1.

these news topics were selected from the Yomiuri Shimbun's 2013 list of top readers-selected news. As people saw the reports and stories regarding these issues on television news, for those who felt motivated, they utilised social media to react online instantly such as to further check the truthfulness or to see what other were saying, and through these activities, they extended their knowledge of social issues. At the same time, for those who were not so interested in these issues initially, through these simultaneous multi-screening activities, they had also extended their knowledge of what was going on around.

As mentioned earlier, most of the people obtained their knowledge of social issues from television directly, one might then wonder, who were those that felt the need to share or discuss these information with others online? First of all, knowing that social media are mainly used by the younger people, and despite the fact that most of them were savvy in social media and simultaneous multi-screening, not all of them were interested in these social issues. Just as most people in Japan, media are an integral part of daily life, and most people just accepted what they learnt from the media and were not too interested to explore further. That being said, for those who were sceptical of the news information from the media, social media, in particular Twitter[132] where they can remain anonymous, offered a great platform for them to check, comment and share these information online as they saw them on television, especially on the more controversial issues such as the establishment of the Protection of Specially Designated Secrets act, Liberal Democratic Party control over the Diet, the TPP negotiations, the leaking problem of contaminated water in the Fukushima power plant as well as Japan's dispute with China's Air Defence Identification zone[133].

By linking up the analytical findings and people's behaviours in practice as described above, it has become clear now how simultaneous multi-screening is related to people's general knowledge of social issues. The next question is - how these observations can be related back to post-disaster recovery? Frist of all, from the previous two chapters, it can be seen that in the case of the Great East Japan Earthquake, many people were touched by the stories and information from the media, and both mass and social media had influenced their perceptions as well as behaviours. With this background in mind, the findings from this chapter can be linked up as follows. First of all, as pointed out in chapter 1, despite the fact that media have a strong influence on people's behaviour and perception, often their effects are also very short lasting, especially in a highly mediated society as Japan that information from the media comes and goes rapidly. This is best illustrated by the fact that by the end of 2013, only two years after the disaster, none in the top 10 of the Yomiuri Shimbun's readers selected news of 2013 was related to the disaster[134]. Of course, there is

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[132] The most commonly used social media application among the sceptics as shown in Table 7-11.

[133] As shown in Table 7-11, it can be seen that the 'sceptics' had reported a higher than average level of knowledge on these particular social issues.

[134] Refer to section 7.1 for details on the Yomiuri Shimbum's list.

no doubt that the Great East Japan Earthquake is one of the most remarkable events for Japan in recent history, however, as time passes, other more imminent issues for the general public as well as political leaders had and will continue to rise and occupy the news headlines. Unavoidably, issues related to post-disaster recovery had become just another 'general social issues' for most people in the general public. Therefore, in order to maintain people's awareness of the disaster and to maintain the momentum to support the recovery continuously in the long run, it is important for NGOs and government authorities that are working on the recovery to maintain the general public's awareness on the recovery by utilising both mass and social media. Therefore, knowing that many people (in particular the younger people) are actively utilising both mass and social media, and as long as they are motivated, they will respond and react instantly online and subsequently become more engaged. It is essential for these organisations to consider what kind of social media platform is suitable and also what kind of television programmes can trigger people's interest. In particular, it can be seen that currently news are current affairs programmes on television apparently is not a strong catalyst to trigger multi-screening action, in fact, interactive news are current affair programmes are not very common in Japan at all[135].

In conclusion, examine the effects of convergence of mass and social media, this chapter has shown that mass and social media indeed are highly interactive in today's society in Japan. Such interactivity offers new potential to increase people's knowledge and awareness of social issues and current affairs. However, the key is that they needed to be motivated by the information from television in the first place. The understanding on the dynamic of the interactivity between the use mass and social media from this chapter has provided the important insight to support the derivation of how to apply the findings from the core analysis for post-disaster recovery, and it will be discussed in detail in the next chapter.

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[135] As of April 2014, although all of the five public television channels in Japan offer news and current affair programmes, but only 2 of them offers 'interactive' news and current affairs programme that has a dedicated Twitter hashtag for viewers to send in comments, and both programmes are shown in the 11pm time slot. The two programmes are the News Web by NHK http://www3.nhk.or.jp/news/newsweb/about.html [Accessed 04-Sep-2014] and News23 by TBS http://www.tbs.co.jp/news23/feature/ [Accessed 04-Sep-2014].

Chapter 8 Discussion – Fitting the Pieces Together

This chapter brings all the pieces together as follows. First, the key findings from the three empirical analyses presented in chapter 5, 6 and 7 are summarised into a coherent whole to answer the research question in section 8.1, and then these key findings are put into context with practical implications for post-disaster recovery in section 8.2. The academic contributions of these findings are then discussed in section 8.3, followed by section 8.4 which reviews the limitations. This chapter concludes by looking into the future works in section 8.5.

8.1 Key Finding

First of all, in order to find out if mass and social media can contribute to post-disaster recovery, this thesis began with a simple question 'what are the effects (if any) of mass and social media in post-disaster recovery and how do they work?' However, the answer was found to be much more complicated than the question might have sounded. The first challenge was how to evaluate the effects of mass and social media which by nature are very different but at the same time are highly intertwined as it was seen in the case of the Great East Japan Earthquake. In order to address this question, a theoretical framework was developed to integrate the uses and gratification and cultivation theories from the active and passive audience perspectives with the social cognitive theory to analyse the combined effect of mass and social media on social capital which is selected as the proxy to represent the capacity for post-disaster recovery.

Based on this framework, the core analysis is developed. It consists of a two part analysis to investigate media's effects on post-disaster recovery from the active and passive audience perspectives respectively. Although they have taken a different perspective, the findings from both parts of the core analysis have shown a consistent pattern that the use of mass and social media can lead to some positive effects on social capital for post-disaster recovery. Furthermore, both of them have pointed to same key point that the use of mass and social media can interact with each other to enhance their effect on post-disaster recovery. Therefore, it is deemed that further understanding of the interactivity between these two media in practice is necessary to gain further insight on how to apply these findings in practice. Thus, the third part of the analysis – the extended analysis is constructed to look beyond post-disaster recovery into the convergence of mass and social media, in particular the interactivity between them. As a result, the empirical analysis of this thesis consists of three parts in total; part one – the effects of mass and social media on social capital based on the audience perspective, part two – media effects of people's perceptions and intentions based on the passive audience perspective and part three – the extended analysis, effects of convergence between mass and social media. They are presented in details in chapter 5, 6 and 7 respectively, and their key findings are summarised in the following sections. It should be noted that despite these are called the

active and passive 'audience' perspective, in practice, as mentioned in chapter 2, driven by media convergence, the target is not only limited to audience of mass media, it also include the user of social media, thus the term 'audience', 'user' and 'people' are interchangeable in the discussion.

8.1.1 Part One – Effects of Mass and Social Media on Social Capital

The first part of the analysis presented in chapter 5 has investigated the research question 'what are the effects of mass and social media in post-disaster recovery and how do they work' based on the active audience perspective. Acknowledging the importance of social capital in post-disaster recovery as identified in section 2.3, it is selected as the proxy to represent the capacity for post-disaster recovery. Hence the aim of this analysis is to investigate the effects of mass and social media on the development of the three key social capital elements that are important for post-disaster recovery - bonding trust, bridging networks and offline civic participation. Based on the communication mediation model, this analysis hypothesises that the use of mass and social media will have positive but indirect effects on the level of social capital, and these effects are mediated by online civic participation. This analysis uses a data set collected from an original Internet panel survey conducted in March 2013 with approximately 2,000 samples from the three prefectures (Iwate, Miyagi and Fukushima) that were hit directly and sustained the most damages from the Great East Japan Earthquake. Analysed with structural equation modelling, the key findings are summarised in the following three points.

1. Media's effect on social capital - The use of mass and social media can create positive effect on the development of key social capital elements for post-disaster recovery include bonding trust, offline civic participation and bridging networks. However, it appears that social media have no direct effect on the level of bonding trust. This finding shows that just the use of social media alone is not sufficient to develop social capital, rather it is the context of the media use that is important.

2. Online civic participation as the mediator - The effects from the use of mass and social media on social capital are mediated by online civic participation such as the discussion and sharing of disaster related information online. These online civic activities can fully mediate the effect from social media, and partially mediate the effect from mass media. This finding stresses the importance of online civic participation as it can act as the bridge to link up the two different media and mediate their effects on social capital.

3. Interaction between mass and social media - The use of mass and social media can interact with one another to strengthen each other's effects, for instance, the use of mass media can encourage social media users to participation more in civic activities online. This finding stresses the importance of the interactivity of mass and social media in the development of social media for post-disaster recovery.

In practice, these findings imply that enabled by ICT and driven by information from television, some people had utilised social media to collect, share and exchange information regarding the disaster and recovery with others, and through these online interactions, they obtained additional information as well as established new contacts with others. Subsequently because of these interactions, they became more trustful towards the local organisations and communities that were supporting the recovery, and expanded their connection network as well as became more active to participate in various civic activities to support the recovery in real life. In other words, they have built up their level of social capital that is essential for post-disaster recovery in a long run. Therefore, for NGOs and government organisations that are working on the recovery, it is important to consider utilising both mass and social media interactively, in particular to increase the level of online civic participation.

8.1.2 Part Two – Media's Effects on People's Perceptions and Intentions

Similar to the first part of analysis but taken from a different perspective, the second part of the analysis presented in chapter 6 explores the research question from the passive audience perspective. Specifically, it adopts the cultivation theory to investigate media's cultivation effect on people's perceptions of the disaster and their intention to participate in civic activities for post-disaster recovery. It assumes that mass media can exert a great influence on people's perceptions of disaster such as their perceptions of 'concerns' about disaster, 'bonds (kizuna)' in families and society and 'anxieties' about future disasters. Furthermore, it anticipates that as people build up their perceptions of the disaster, their behavioural intentions will also be affected, for example, their intention to carry out civic discussions with others about the disaster and recovery, to perform altruistic actions such as volunteering works and to make preparations for future disasters. In addition, it also anticipates that media will have a stronger effect on those who were directly affected by the disaster than those who were not. This analysis uses the same data set as the first part. Analysed with structural equation modelling, the key findings are summarised in the following four key points.

1. Media and perceptions - while mass media (television) have exerted a strong positive influence on all three perceptions of the disaster (concerns, anxieties and bonds) as predicted. On the other hand, the effects of social media are quite different, although the use of social media has no direct effect on the perception of 'bonds', it can slightly reduce people's perception of 'concerns' and 'anxieties'.
2. Interaction between mass and social media – supported by the last point, the use of social media can reduce the effect of mass media on people's perceptions of the disaster in particular on the perception of 'concerns'. This finding demonstrates the dynamics between the two media, while mainstream information from mass media can change people's perceptions of the disaster, social media can reduce or regulate the effects

from mass media by letting people to ease their concerns through addition information or through discussion with others online.

3. Perceptions and intentions - the perception of 'bonds' in families and society appears to be the most influential. Those who felt a strong level of bonds in the society have a higher intention to discuss with others about the disaster, to participate in altruistic actions and to prepare for future disasters. On the other hand, the perception of 'concerns' about the disaster only increases people's intention to discuss with others. In addition, the perception of 'anxieties' about future disasters mainly increase their intention to prepare for future disasters but at the same time reduces their intention to participate in altruistic actions. This finding stresses importance to strengthen people's positive perceptions such as 'bonds' as it can effectively motivate them to support the recovery than the other perceptions.

4. Experience from disaster - contrary to what the cultivation theory has predicted, it is very interesting to find that both mass and social media have a stronger effect on those who were not affected directly by the disaster than those who were. This does not imply that media have no effect on those who were affected by the disaster, rather it demonstrates the power of media to people's perceptions of the disaster even they had not experienced it directly.

In practice, these findings imply that since media are ubiquitous in today's society, most people are subjected to their influence directly. For instance, as people saw the images and information about the disaster and the recovery from television, they built up their perceptions of the disaster. Especially for those who were not affected by the disaster directly, their perceived reality was formed mainly by the information from mass media. That being said, at the same time, the alternative information and communication channel from social media allowed some people to see the other side of the story than the one presented by mass media, and changed the effect from mass media. Either way, as people felt concerned, heart-warmed and anxious about the disaster from these media information, their intention to carry out activities related to the recovery were also affected. For example, they became more intended to discuss with others, to help others as well as to prepare for future disasters. Such intentions are critical to maintain their motivation to support the recovery in the long run, thus for NGOs and government organisations that are working on the recovery, it is important to consider how to utilise both mass and social media interactivity to increase people's awareness on the recovery, especially for those who were not affected by the disaster.

8.1.3 Part Three – Effects of Convergence of Mass and Social Media

Both the first and second parts of the core analysis have pointed out that mass and social media can work interactively to enhance their effect on post-disaster recovery. Hence, the third part of the analysis attempts to look beyond post-disaster recovery into the effects of the convergence between the two media. It focuses on one of the recent major trends in

media convergence known as 'simultaneous multi-screening' which literally means that the user is engaging with more than one media (screen) at the same time e.g., watching television (mass media) and using smartphone (social media) simultaneously. This trend is the perfect illustration of how mass and social media are interacting together driven by media convergence in today's highly mediated society. The aim of this analysis is set to investigate how this kind of media convergence is related with the key elements for civic participation - knowledge of social issues and trust towards media. This analysis hypothesises that, driven by television news and enabled by social media, simultaneous multi-screening will increase people's level of general knowledge of social issues. In addition, it also assumes that trusts toward mass and social media are closely related to the usage and also the effects of the media. This analysis uses a different data set collected from another Internet panel survey conducted in March 2014 with approximately 2,000 samples which half was from the three prefectures that were hit directly by the disaster (Iwate, Miyagi and Fukushima) and the other half was from the Kanto area to examine if there is any disparity in terms of media usage between these two groups. Analysed with structural equation modelling and cluster analysis, the key findings are summarised in the following two key points.

1. Effects of simultaneous multi-screening on knowledge of social issues – despite the fact that simultaneous multi-screening is indeed quite common among the sample, it has only a mild effect on their level of general knowledge of social issues. It appears that although television news and current affairs programmes are people's main source of knowledge of social issues, these programmes are not a very strong catalyst to motivate people to take multi-screening activities online. Nonetheless, for those who were motivated, by sharing and discussing the information on social media as they were watching it on television, through simultaneous multi-screening they had increased their level of knowledge of social issues. This demonstrates the potentials offered by the convergence of mass and social media (i.e., simultaneous multi-screening) to increase people's knowledge and awareness of social issues, provided that they are motivated by the information from mass media in the first place.

2. Trust towards media - trust towards media is closely related to people's usage of media, their level of participation in simultaneous multi-screening and their knowledge of social issues. It appears for the majority of people, although they do have high level of trust towards both mass and social media, their level of general knowledge are relatively lower than those that are doubtful of both mass and social media. Indeed, for those who are doubtful of both media in terms of news and current issues, simultaneous multi-screening provides the platform for them to express themselves as well to share the news information with others as they saw it on television, and subsequently increase their level of knowledge of social issues.

In practice, these findings show that in a highly mediated society such as Japan, mass and social media are indeed highly converged and interactively, as people were motivated by the information from television, they could and many did react online instantly through social media. Through this real time interaction, some had gained additional knowledge on some social issues, however, it should be noted that currently in terms of social issues and current affairs, most people are not motivated by television news and current affairs programmes. Linking this findings to the case of the Great East Japan Earthquake which can be seen that people's as well as the media's attention on the recovery are fading away as time passes, for NGOs and government authorities that are working on the recovery, in order to fully utilise the positive potentials from mass and social media identified in the core analysis, it is important for them to consider what kind of television programmes can stimulate people's motivation to react on social media or vice-versa, how social media can increase people's interest on television news and current affair programmes. Especially among the younger generations, who offer the most potential to be involved in civic activities because they are embracing the new media environment.

8.1.4 Answer to the Research Question

Summing up the key findings from these three analyses (Table 8-1), the answer to the research question 'what are the effects of mass and social media on post-disaster recovery and how do they work' can be drawn as follows.

First of all, as the first part of the analysis has found, the key effect of the use of mass and social media is that they can encourage the development of social capital, one of the key elements for post-disaster recovery. Secondly, the second part of the analysis has demonstrated that mass and social media can increase people's intention to participate in activities related to post-disaster recovery. These effects are driven by online civic participation enabled by social media as well as by people's perceptions of the disaster cultivated by mass media. Furthermore, both analyses have shown that mass and social media can interact with one another and strengthen their effects, for instance, messages from television can encourage social media users to participate more in activities related to post-disaster recovery online, and at the same time, additional information from social media can regulate the effects of mass media on people's perceptions of the disaster. That being said, although it can be seen that both mass and social media indeed offer great potentials for post-disaster recovery, however, as time passes, unavoidably the public's attention on the disaster will fade away. Hence, one of the key questions is how to maintain their attention and to stimulate their interest through the use of mass and social media coherently. As it can be seen in third part of the analysis, despite the fact that both mass and social media are indeed highly interactive, in order to fully utilise their potentials to increase the level of civic participation and social capital, it is important that information from the media can trigger people's interest of social issues and current affairs.

In practice, how these analytical findings can be connected to the people? First of all, it should be noted that the empirical analysis is constructed in two separate perspectives for analytical purpose. In reality, considering that most people in today's highly mediated society are surrounded by different media both willingly and unwillingly, thus in practice, the effects from both perspectives shall be considered in parallel. For instance, as it can be seen in this case study, most people had actively chosen their use of media based on their personal background and preferences, for example, while most of them had used informative television programmes such as news and current affairs to learn about what was going on around them, others, especially the younger people had also made use of social media such as Facebook and Twitter as an alternative source of information[136]. That being said, at the same time, most people were also directly influenced by the messages and information from media especially from television, for example, despite the fact that its usage is on a decreasing trend, television was still the main source of information for most people that than 77% of them watched it daily. In fact, after the disaster, through television, many people had seen the shocking images of the damages caused by the disaster, the heart-breaking stories on how the victims had struggled, the touching stories of how people helped other selflessly, the reports and debates on different policies related to the disaster, and the information of possible future disasters[137]. Overtime, these images and information from media created a shared experience among the people and directly influenced how they perceived the disaster. For example, as they saw the images and reports on the damages caused by the disaster, many people became more concerned about the disaster and changed how they perceived its severity. At the same time, as they saw the stories on how people helped each other, many were touched by these stories and perceived the society is tightly bonded that people are always willing to help each other. Furthermore, as they came across the reports on the potential of future earthquakes as well as the uncertainties associated with the Fukushima nuclear power plant accident, they became more anxious about the risk of future disasters[138]. Together these perceptions of concerns, bonds and anxieties made up their understanding of the disaster. That being said, that is only one side of the story, because at the same time, empowered by social media, many people had created their own understanding of the disaster by obtaining as well as exchanging information regarding the disaster online. For instance, some of them had utilised different social media applications such as SNS, Blogs and personal homepages, video sharing sites and Forum and BBS[139] to discuss with their family and friends about different issues related to the disaster, to express their own opinion, to share information

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[136] Refer to section 5.3.2 in chapter 5 (the first part of the analysis) for the details of their usage of different media.
[137] Refer to Figure 6-5 in chapter 6 (the second part of the analysis) for the details of these television contents.
[138] Refer to section 6.4.1 in chapter 6 (the second part of the analysis) for the details of how people's perceptions of disaster are affected by the media.
[139] Refer to Figure 5-3 in chapter 5 (the second part of the analysis) for the details people's usage of different social media applications.

related to the disaster to others, to support the recovery by making donations, as well as to encourage others to join together to support the recovery[140]. Through these interactions online, some of them they had gained additional information and contacts, as well as extra opportunities to exchange information and to deliberate with other people. However, not everyone was equally keen on the disaster and the recovery, that being said, since most people were surrounded by the media, the more they were exposed to the media, the more likely they became aware of the disaster and the recovery. For example, for those who had a higher exposure to mass media, it was more likely that they became motivated because of the information they saw on television, at the same time, if they were also familiar with social media, they would became more likely to join the discussion online to exchange and express their opinion because they had access of information from both mass and social media[141]. At the same time, information from social media had also motivated them to contemplate what they saw on television and to develop a different view of the story than the one presented on television. Either way, the use of mass and social media together had enhanced their understanding of the disaster and the recovery.

As people built up their understanding of the disaster either through the information and mages from mass media and/or from social media, along the way, their attitudes and behaviours toward the disaster and the recovery were also affected[142]. For instance, for those who had become more concerned about the disaster, they also became more intended to share the related information with other people. At the same time, if they had developed a strong feeling that the society was tightly bonded together, they also became more motivated to participate in volunteering activities and to make donations to support the recovery in the future. Finally, as they became more anxious about future disasters, they became much more motivated to make preparations such as to prepare supplies and to learn more about evacuation and safety procedures[143]. In parallel, for those who utilised social media to obtain and exchange information about the disaster and the recovery, through these online interactions they had learned more about different recovery activities carried out by different organisations such as the local governments and NGOs, and they became more trustful towards these organisations and more supportive to their activities. At the same time, these online interactions had also allowed them to establish contacts with these organisations and expanded their connection network of obtaining information and resources for post-disaster recovery. Furthermore, the information and resources they gained from these online interactivities had reduced the entry barrier and subsequently encouraged them to become more active in participating in civic activities in real life such as

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[140] Refer to Figure 5-5 in chapter 5 (the first part of the analysis) for the details of these online civic participation activities.

[141] Refer to section 5.4.3 in chapter 5 (the first part of the analysis) for the details of the interaction effect between mass and social media on online civic participation.

[142] As described by the cognitive process in section 3.3.

[143] Refer to section 6.4.2 in chapter 6 (the second part of the analysis) for the details of the effect of perceptions of the disaster on people's intentions.

to join volunteering works and charity events, to encourage others to do similar as well as to request the government for more supports[144]. Collectively referred as social capital, a stronger intention to support the recovery, higher level of trust towards the local organisations, wider connection networks and higher level of civic participation will keep people motivated to continue to support the recovery and to fuel the engine for post-disaster recovery in the long run. That being said, it's not all that simple, as it can be seen in chapter 7, despite the fact that both media were widely used among the people, and many people do utilise them interactively, it is important that they needed to be motivated by the information from media before they are willing to interact online and offline. Therefore, as time passes and the media's attention on the disaster is fading away, it is important to consider how to utilise both media to maintain people's attention on the recovery that is still on going.

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[144] Refer to section 5.4.1 in chapter 5 (the first part of the analysis) for the details of the effect of online civic participation on social capital (bonding trust, bridging networks and offline civic participation).

Table 8-1 Summary of Key Findings of the Three-Part Empirical Analysis

Core analysis	*Part one – Effects on social capital*	*Part two – Effects on perceptions and intentions*
What are the effects?	Develop of social capital such as bonding trust, civic participation and bridging networks that are important for recovery	Increase the intention to participate in civic activities such as civic discussion, altruistic actions and preparations for future disasters
How do they work?	Mediated by online civic activities such as discussing and sharing information related to post-disaster recovery online	Through the cultivation of perceptions of the disaster such as concerns, bonds and anxieties.
Role of mass media	Encourage social media users to participate in civic activities more online	Cultivate perception of concerns, bonds and anxieties
Role of social media	Enable and facilitate online civic participation	Reduce the influence of mass media on people's perceptions
Key findings	1. Online civic participation is an effective mediator to mediate media's effect on social capital 2. Social media facilitate online civic participation 3. Mass media can encourage social media users to participate online by increase the awareness	1. Media can influence people's perceptions disaster in particular people had not experience the disaster directly 2. These perceptions affect people's intention to participate in civic activities to support the recovery 3. Social media provide alternative information source to regulate the influence of mass media on people's perceptions
Key questions	In practice, how exactly do the two media interact together?	
Extended analysis	*Part 3 – Effects of convergence between mass and social media*	
What are the effects?	Increase people's level of general knowledge of social issues	
How do they work?	Simultaneous use of mass and social media – e.g., watching television and using social media on smartphone at the same time	
Role of mass media	Trigger mass media audience to act on social media	
Role of social media	Facilitate online participation e.g., sharing and discussion of information seen on television in real time	
Key findings	1. Simultaneous multi-screening offers great potential to increase people knowledge and awareness. 2. However, current television news programmes are not strong catalyst to trigger simultaneous multi-screening.	

8.2 Implication

The above section has illustrated the effects and also the mechanism of how mass and social media can work together to change people's perceptions and behaviours to contribute to post-disaster recovery both analytically and practically, the next step now is to derive their implications for post-disaster recovery.

By now, more than three years have passed since the Great East Japan Earthquake. Most of the social infrastructures such as schools, hospitals and transportations that were destroyed by the disaster are restored (Reconstruction Agency, 2014a) and for the general public that are living outside the disaster area, life has returned to normal[145]. Naturally, people's attentions on the disaster are fading away and the media's headlines are being replaced by other more imminent social issues[146]. However, from the social and human aspect, in particular for the disaster victims are still living in the disaster area and the quarter of a million that are still living in evacuation zones because of the tsunami damage or the Fukushima nuclear power plant accident (Reconstruction Agency, 2014a), the road of recovery is still very long. Indeed, recent studies have begun to reveal that many disaster survivors are also suffering from 'secondary damage' such as stresses and depressions which led to physical and even mental illnesses (e.g., Ishikawa, 2013; Imai, 2014; Yokoyama et al., 2014; Yabe et al., 2014). In addition, a recent survey conducted by NHK in 2014 has also shown that 44% of the people in the disaster area still feel that there was no progress on the recovery at all and another 36% feel the progress was slower than they have expected (NHK Newsweb, 2014). Compared with previous disasters, one of the main challenges this time is the rapidly aging and shrinking population of the disaster area as many researchers (e.g., Deguchi, 2011; Otani, 2012; Hirano, 2013; Hamamatsu, 2014) have critically pointed out. In other words, as the population of these local communities is shrinking, their high level of inward bonding social capital that lead Japan to bounce back again and again from numerous disasters previously (Nishide, 2009; Ogawa, 2009) is also depleting. Although aging population is a national issue for Japan, however, these three prefectures are some of the 'oldest' regions in Japan with more than 30% of the population are 60 years old and above (MIC, 2010). This group, as Tanaka et al. (2012) called the 'disaster disadvantaged and information disadvantaged' are affected the most by the disaster and at the same time are also much less connected to the Internet, let alone social media.

So one must wonder how the positive effects from the use of mass and social media identified in the previous section can contribute to the recovery, especially to this group of disaster victims. To answer this question, first of all, acknowledging the fact that one of the

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[145] To illustrate, a survey conducted by Dentsu in 2013 has found that 80% of the people in the Tokyo Metropolitan area felt that their daily life had returned to normal after the disaster, and it is on an increasing trend (Dentsu Macromill Insight, 2013).

[146] For instance, among the Yomiuri Shimbun's top 10 readers selected domestic news of 2013, none were related to the Great East Japan Earthquake (Yomiuri Online, 2013).

main challenges this time is the depleting level of social capital, let's revisit the concept once again. In social capital, as Halpern (2005) points out, instead of depleting, actually it can be transformed from one form to another. In addition, Putnam (2007) in his later works, has also pointed out the importance of the continue evolution of social capital. Therefore, social capital can be rebuilt and replenished through transformation. With this concept in mind, one can then draw the link that ICT – one of main strengths of Japan can be the solution. Specifically, utilising ICT's capability to close geographical gap and to reduce information cost, both mass and social media can be used to transform as well as replenish the depleting social capital in the disaster area via the promotion of civic participation online and the creation of virtually civic community. That is, to bridge the local community with the online civic communities through online civic activities that can be encouraged and facilitated by the use of mass and social media as demonstrated in the first and second part of the analysis. Although the disaster victims themselves (the elderlies) might not be familiar with or connected to the Internet, the NGOs - who have been playing the key role in the recovery (Sakamoto, 2012) can act as the bridge, provided that they are equipped with the necessary skills and resources. Specifically, considering that as the core analysis has shown, both mass and social media can work in parallel to encourage online civic participation and subsequently increase the level of social capital that can be used to support the recovery. Therefore, they offer substantial potentials to assist the recovery by raising the public's awareness on the recovery over the Internet, and to bridge the local communities with the online communities, as well as to motivate more people to participate in activities related to the recovery both online and offline. In the long run, these activities can replenish the depleting social capital as more people becoming involved in the activities to support the recovery as well as to build up the resilience for future disasters.

This proposition has some important implications for NGOs, local communities as well as government authorities that are working on post-disaster recovery. For instance, for the NGOs and local communities, while they can utilise mass media to increase the public's awareness on the recovery, at the same time, they can also utilise social media to facilitate people to participate in post-disaster recovery activities online. This approach can expand the reach and size of the online civic communities, to link them with the local communities in the disaster area and subsequently to increase the level of social capital to support the aging and shrinking population in the long term recovery process. That being said, it is not that simple, despite the fact that many scholars (e.g., Nishide, 2009; Aldrich, 2012a; Shaw, 2014) have long been stressing the importance of the development of social capital in post-disaster recovery. They have found that in many cases, including the Great East Japan Earthquake this time, the recovery focus of governments is mainly on the reconstructions of social and economic infrastructure, which are important, but not sufficient for the long term recovery without the development of social capital in parallel. It is often left to the local communities and NGOs to initiate projects to explore different ways to develop social capital by themselves. In the case of the Great East Japan Earthquake, although some NGOs

and local communities have begun to utilise the Internet to engage and recruit volunteers online (Yamamoto, 2013), however, most of them are not specialised in ICT and media, some are still relying on traditional technology such as community radio and many of them do not have the necessary resources (Shaw, 2014). Hence, if the government authorities can realise the importance of social capital[147] in post-disaster recovery and the role media can play in its development, in order increase the efficiency of the recovery, policy maker shall also establish the relevant policies and programmes to support these organisations to further utilise different media and ICT tools e.g., to provide them the resources and trainings as well as the guidelines on how to handle and manage online information such as data privacy and security. At the same time, knowledge on the potential offered by both mass and social media is also critical for NGOs and local communities to lobby for the policy changes such that they can obtain more supports from the government in this aspect.

In terms of policy changes to support post-disaster recovery, it is known that cataclysmic event such as large scale natural disasters often lead to dramatic social changes, because both the government and the public usually are more open to changes in such situation. Hence, it is said that crises offer politicians and political leaders the golden opportunity to promote changes in policy (Samuels, 2013). It seems that there is no exception in the case of the Great East Japan Earthquake, driven both directly or indirectly by the disaster, many policy changes have been proposed and/or executed. For example, disaster response policy (e.g., Central Disaster Management Council Committee, 2012), reconstruction policy (e.g., Hirano, 2013; Murakami et al., 2014; Cho, 2014), NGOs policy (e.g., Nanba, 2011; Sakamoto, 2012; Hasegawa, 2014), local government policy (e.g., Mimaki & Shaw, 2014; Shaw, 2014), energy policy (e.g., Uchida, 2013; DeWit et al., 2012), education policy (e.g., Takeuchi & Shaw, 2014), personal data protection policy (e.g., Cabinet Office, 2013) and gender equality policy (e.g., Cabinet Office, 2012; 2014). Some of these changes were driven top down from government authorities and some were bottom up from the public, local communities and NGOs that are working in the frontline. Either way, one of the key success factors for a successful policy change and implementation is how it is communicated to the stakeholders, in many case is the general public (Samuels, 2013). In other words, how the story – the needs and benefits of the change is being effectively articulated to the public become crucial and it is this exact point that the media can play the critical role. In fact, similar to other developed countries, it is not new in Japan that mass media played a major part in policy change (Campbell, 1996), but this time, with the rise of social media, the role and effects of media become much more complex, in particular considering that media are known to be main source of power but as well as counter-power in social changes (Castells, 2007; 2010). In this regard, the findings of this thesis also have some profound implications for policy makers as well as NGOs and local communities to

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[147] Actually, the cabinet office of the government had commissioned a study on the benefits of social capital in the society in 2002 (Cabinet Office, 2002).

promote or to lobby for policy change to support the recovery. In particular the key findings from the core analysis have demonstrated how mass and social media can interact with each other to affect people's perceptions of the disaster. For instance, while mass media can effectively influence the public's perceptions of the disaster and the recovery even though they were not directly affected by it, social media can counter the effect from mass media. Together both media provide the information and platform for people to discuss and to participation in the policy change related to the disaster recovery and subsequently increase their sense of ownership as well as encourage them to participation in the recovery. Therefore, understanding of the dynamic between mass and social media regarding post-disaster recovery is crucial for both government authorities and NGOs in terms if policy changes for the recovery.

8.3 Academic Contribution

As Shrum (2002) points out, most scholars agree that today the media more or less present a distorted version of reality, be it is out of commercial, political or entertainment purpose. Through such distortion media have the power to shape people's perceptions and alter their behaviours. In order to harness and to tame this power, it is important for scholars and researchers to understand the underlying mechanisms and particulars of media's effects on the people. Such knowledge becomes even more important in times of crisis and emergency such as a major natural disaster in this case, because in these situations most of the public do not process the experience or knowledge to handle the sudden changes and confusions, and they can only rely on the media information to assess the reality and to make critical decision. In these situations, with appropriate use, media information can bring people together in difficult times. However, in media studies, it is often said that study of media effects is like shooting a moving target because media are such an integrated part of modern society and at the same time, driven by the rapid advancements of ICT, it is changing in an accelerating pace. Therefore, how to capture and evaluate the effects of media in this 'mass self-communication'[148] society has become a major challenge for scholars and researchers, especially on their applications in post-disaster recovery because as mentioned in chapter 1, suitable case studies are few and far between. Therefore, by capturing a snap shot of the effects of mass and social media in one of the most remarkable natural disasters in recent history – the Great East Japan Earthquake using a theoretical model that syntheses the key media theories under the common theme of post-disaster recovery. The empirical evidence of the effects and mechanisms of mass and social media in post-disaster recovery provided by this thesis have extended the knowledge in media studies especially on the dynamic between mass and social media, and their relationship in the application of post-disaster recovery, as well as established the foundation for future researches.

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[148] *'self-generated in content, self-directed in emission, and self-selected in reception by many that communicate with many'* (Castells, 2007, p. 428). Refer to section chapter 3 for details.

8.4 Limitation

There are two main limitations that one shall keep in mind when interpreting the results and the findings.

8.4.1 Causal Relationship

As mentioned in section 3.6, the theoretical framework of this thesis is derived based on the key theories in media studies such as the cultivation and uses and gratifications. Based on these theories, the framework assumes a causal relationship that the use of media will lead to the changes in people's perceptions and behaviours. Although all these three theories have suggested that the use of media as the precondition theoretically, in practice, however, the possibilities of a reverse or spurious relationship cannot be eliminated (Beaudoin, 2007). One of the most direct ways to address this issue is to examine the causal direction with time series longitudinal data. However, such data are not easily available because of the high cost and time requirement. Nonetheless, based on the findings from the limited number of studies that employed longitudinal time series data in the US (e.g., Eveland Jr. et al., 2005; Shah et al., 2005; Beaudoin, 2007; Gil de Zúñiga et al., 2007) as well as in Japan (Miyata & Kobayashi, 2008; Miyata et al., 2008) to investigate the effects of media on civic and political participations, it can be argued that the causal direction is indeed more likely to flow from the use of media to changes in people's behaviours and perceptions as the theories have predicted. Boulianne (2009) has further explored this question using a meta-analysis approach, she has investigated 38 individual studies that investigated the relationship between media and civic engagement and has found that in comparison with the studies which assumed the media as the precondition, findings from the studies that assumed the reverse or reciprocal causal relationship are indeed less significant. Therefore, it can be argued that the causal direction assumed in this theoretical framework is supported by solid theoretical and empirical evidence. That being said, it will be too arbitrary to assume that this is the only possible direction, especially the sample data used in the analyses in this thesis were collected from a single survey, therefore, causal ambiguity should be kept in mind when interpreting the results. In fact, as the social cognitive theory suggests, people are both products and producers of their environment, hence, it is acknowledged that the reverse relationship do exist, but it is just not as significant as the one proposed by the theoretical framework.

8.4.2 Sampling Bias

Despite the fact that the sample size of the data sets used in this study are sufficiently large, sampling bias should still be taken into consideration. In particular because the data were collected from Internet panel survey which is known to inherit a certain level of sampling and coverage bias (see section 4.1.1 for details). In short, it is because in Internet survey, as the survey is conducted over the Internet, literally the sample population can only cover those who had access to the Internet. Furthermore, in this case

study, since the survey panel consisted only of people between 15-69 years old, therefore, although the surveys were randomly selected from a panel with more than a million people across by a professional survey companies, and post-stratification weighting was also applied to weight the sample with the national census data. Strictly speaking, instead of the whole population, the samples can only represent a certain group – adults between 15-69 years old who had Internet access. Furthermore, since it was a self-administrated questionnaire, biases caused by self-reporting error shall also be taken into consideration especially some questions were related to 'public good' such as altruistic activities that people might tend to over-report. Therefore, potential sample biases shall be kept in mind when interpreting the results. That being said, in this digital age, in particular in a highly mediated society such as Japan, it is exactly this group – adults who are familiar with the Internet that processes the greatest potential to utilise ICT for post-disaster recovery and to assist the aging population in the area. Therefore, in this respect, although the sample of this study is somewhat biased, the findings are still very applicable, especially in the context of this study – the effects of media in post-disaster recovery.

8.5 Future Work

As Samuels (2013) points out, historically, other than war, natural disasters and technology innovations are two of the main driving forces for social changes. In the case of the Great East Japan Earthquake, both of these forces were presented. Indeed, many in Japan saw this event as the turning point to reignite the country's will and motivation after the two 'lost decades'[149]. For instance, Fujita (2011) has emphasised that in order for Japan to overcome the disaster, it is important for the government and all members of the Japanese society to share the vision for a true 'restoration' for a new Japan rather than just 'rehabilitation' to the original state.

From a social science perspective, especially in terms of civic participation, many researchers and scholars (e.g., Slater et al., 2012b; Manabe, 2013; Ogawa, 2013; Tamura & Hamada, 2013) have noticed the numerous large scale anti-nuclear demonstrations organised over social media after the disaster and related them as a sign of the revival of civic awareness in Japan, especially for the younger generations who are often portrayed as de-politicised and social disconnected (e.g., Kingston, 2004; Kotani, 2004). Therefore, what can trigger these younger generations who are embracing the new media environment to participate in social and political issues has become an intriguing question for researchers. For instance, as Rheingold (2008) referred as the 'activation gap', the majority of American youth actually are actually convinced that they should support a social cause; however, there is a strong disparity between their interest and engagement. He suggests that participatory media can be bridge to close this gap. That is, if they can participate in the

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[149] Refer to the period in Japan since the early 1990 after the burst of the economy bubble that lead to deflation, unemployment and many other social problems (Kingston, 2004).

media and let their voice be heard, their motivation to participate will increase. His suggestion actually echoes with the findings in the third part of analysis which clearly demonstrated that in Japan, although the ICT conditions for simultaneous multi-screening are very well met, and it is widely adopted by the young people. However, in terms of social issues and current affairs, current television programmes cannot really motivate them to take action online even though they are well capable with their portable devices, whereas in constant, in the case of the Great East Japan Earthquake, the analysis results have clearly demonstrated that people are willing to participate both online and offline if they felt motivated or compelled. This observation has an important implication for future research to extend from this thesis by further investigate how to utilise the interactivity between mass and social media to close the 'activation gap' mentioned above and to further increase the younger generations' interest on social issues and civic participation, as well as to build up the social resilience to prepare for future disasters.

Chapter 9 Conclusion – the Role and Effects of Mass and Social Media in Post-Disaster Recovery

This thesis began from a simple question – 'what can mass and social media contribute to post-disaster recovery?' In short, the simple answer is – 'they can contribute to the recovery by changing people's perceptions and behaviours to increase their level of social capital – a critical element of disaster resilience'. However, in order to be able to make this precise answer, a lot more questions were asked and answered along the way.

First of all, the main research question is to investigate 'what are the effects (if any) of mass and social media in post-disaster recovery and how do they work?'. Looking into existing literatures, it is found that there is no direct answer because of two main problems. First, natural disaster in such scale does not occur too frequently, and second, the media environment is changing in a rapid rate, thus, suitable case studies are few and far between. As mentioned in the beginning in this thesis, the Great East Japan Earthquake was the first time in history that a large scale disaster being mediated by the media across the world in real time. Therefore, in order to answer this question of 'what' and 'how', a theoretical framework is developed to investigate the effect of media for the post-disaster recovery using the Great East Japan Earthquake as case study. In the course of the development of this framework, it is found that despite the fact that by nature mass and social media are very different but in the case of the Great East Japan Earthquake, they are highly converged. Therefore, it would be counterintuitive to separate and analyse their effects independently, and at this point, conventional media theories has reached their limitation. In order to address this question, the theoretical framework has incorporated the uses and gratification theory and the cultivation theory from the two rivalry perspectives in media studies, the active and passive audience perspectives to represent the characteristics of social media and mass media together with the social cognitive theory to model their effects. Based on this framework, the three-part empirical analysis is established.

The first two parts of the analysis have shown a consistent pattern that the use of mass and social media can create positive effects on the development of social capital – an important capacity for post-disaster recovery. For instance, taken from the active audience perspective, the first part of the analysis has found that the use of both media can encourage people to participate in civic activities online, which in turn these online civic participations can effectively mediate the effects of the media to the development of social capital elements that are critical for post-disaster recovery. At the same time, taken from the passive audience perspective, the second part of the analysis has demonstrated that the media can cultivate people's perceptions of the disaster, and these perceptions can increase their intention to participate in civic activities to support the post-disaster recovery. Furthermore, both analyses have pointed out that mass and social media can interact with one another to strengthen and regulate each other's effect. For instance, while the use of

mass media can encourage social media users to participation more in online civic activities, on the other hand, information from social media can regulate the cultivation effect of mass media on people's perceptions of the disaster. This finding has led to the third part of the analysis – the extended analysis to look beyond post-disaster recovery to further investigate effects of convergence of mass and social media, in particular the dynamic of the simultaneous use of mass and social media. The third part of the analysis has found that in the case of Japan, mass and social media indeed are highly interactive, for example, known as 'simultaneous multi-screening', many people do watch television and access social media at the same time. Such interactivity between mass and social media offers great potential to increase people's awareness and knowledge of social issues, provided that they are motivated by the information from television to take action online. That being said, it has also found that current television news programmes in Japan are not strong catalyst to trigger people to react online for social issues. In other words, despite the fact that both media are highly interactive, however, unlike in the case of post-disaster recovery, current mass media cannot stimulate people to participate in civic activities online except for a small group of younger users who are sceptical of the information from both media.

These findings have profound implications for post-disaster recovery, in particular for NGOs and local communities who are working on the recovery on how the use of mass and social media coherently can tackle one of the main challenges for the recovery – the aging and shrinking population in the disaster area by developing social capital through the promotion of online civic participation. Hence, policy maker shall consider establishing the related policy to support these organisations in the utilisation of media and ICT tools for post-disaster recovery. In addition, many policy changes related to the recovery are being proposed after the disaster, hence, in order to gain public support on these policy changes, knowledge on how the two media can interact with each other to influence people's perceptions of the disaster is also essential for government authorities to promote their policy top down as well as for NGOs and local communities to lobby for policy change bottom up. Furthermore, findings from this thesis have contributed to the academia by extending the knowledge on the dynamic between mass and social media with empirical evidence from one of the biggest natural disasters in recent history. Finally, based on these findings, future works are proposed to further investigate how to utilise both mass and social media to bridge the activation gap between people's interest on social issues and their actual participation in civic activities not only for the recovery of the Great East Japan Earthquake, but also to build up the resilience for the future disasters. The overall flow of how these three parts of the analysis have led to the finally answer is summarised in Figure 9-1.
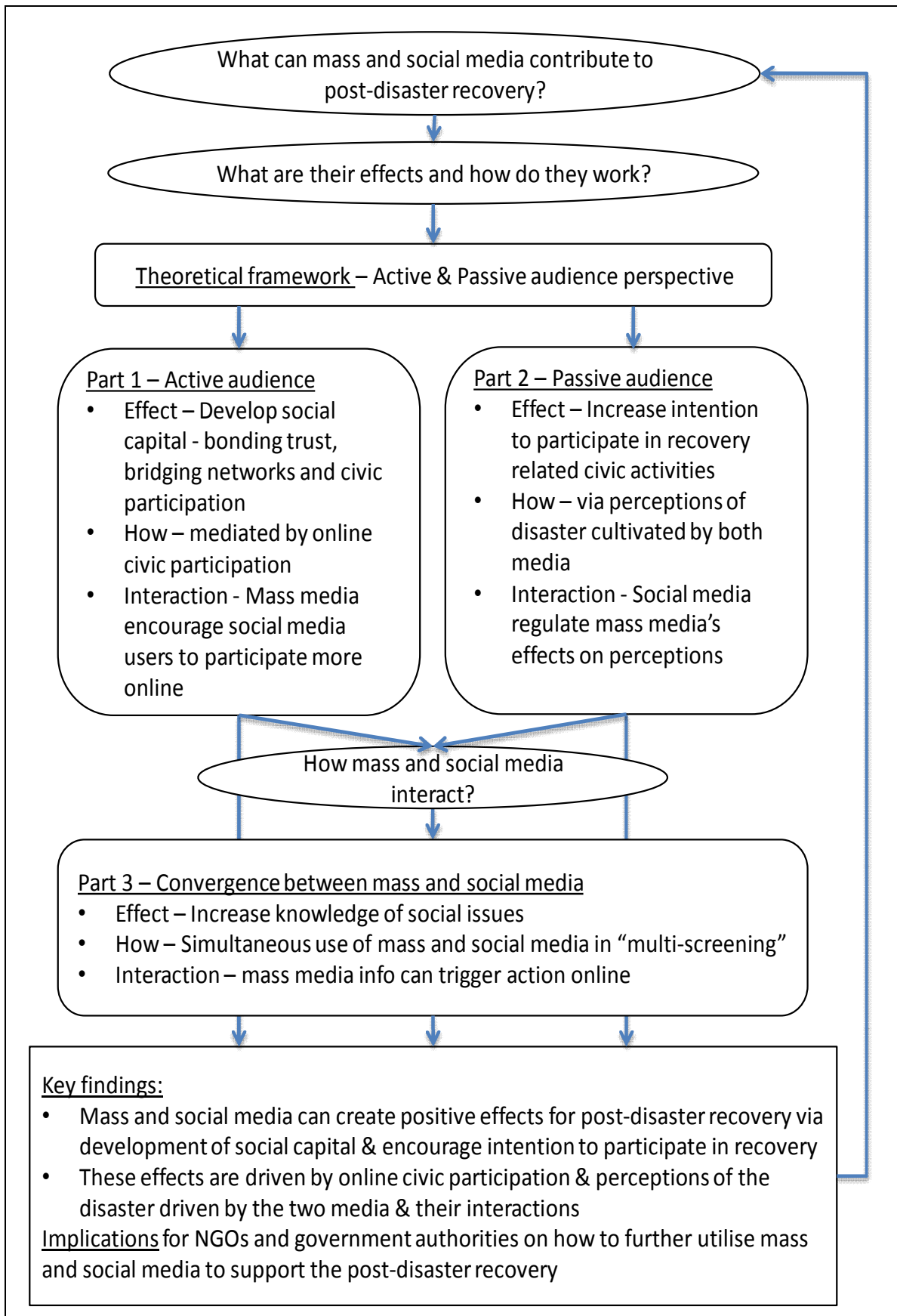
Figure 9-1 Flow Chart of Research Question and Answer

In conclusion, by deriving the practical implications for post-disaster recovery and extending the knowledge in media studies, the purpose of this thesis is fulfilled. However, for researchers, our effort shall not stop, as the old Japanese proverb 'tensai wa wasuretakoro ni yattekuru 天災は忘れた頃にやってくる' says, disaster will strike again when we forget, which unfortunately is often true. Hence, we shall keep learning from past disasters so that we can become more resilient for the next one.

-END-

References

Aizu, I., 2011. *The Role of ICT During the Disaster – A Story of How Internet and Other Information and Communication Services Could or Could Not Help Relief Operations at the Great East Japan Earthquake.* [Online]
Available at: http://wsms1.intgovforum.org/sites/default/files/EarthquakeICT0825.pdf
[Accessed 4 September 2014].

Aldrich, D. P., 2012a. *Building Resilience: Social Capital in Post-disaster Recovery.* Chicago: University of Chicago Press.

Aldrich, D. P., 2012b. Network for power : institutions and local residents in post-Tohoku Japan. In: *Japan : response and recovery after Japan's 3/11.* New York: Routledge, pp. 127-139.

American Red Cross, 2012. *Social Media in Disaster and Emergencies.* [Online]
Available at:
http://a1881.g.akamai.net/7/1881/26640/v0001/redcross.download.akamai.com/26640/PollData/Social-Media-Disasters-Emergencies.pptx
[Accessed 2014 September 4].

Appleby, L., 2013. *Connecting The Last Mile - The Role of Communications in The Great East Japan Earthquake. Internews Europe..* [Online]
Available at:
http://www.internews.org/sites/default/files/resources/InternewsEurope_Report_Japan_Connecting%20the%20last%20mile%20Japan_2013.pdf
[Accessed 4 September 2014].

Bandura, A., 2002. Social Cognitive Theory of Mass Communication. In: J. Bryant & D. Zillmann, eds. *Media effects: Advances in theory and research (2nd ed.).* Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, pp. 121-153.

Barboza, I. & Williams, R., 2005. *Post-stratification and Response Bias in Survey Data with Applications in Political Science.* [Online]
Available at: https://www.msu.edu/~barbozag/Web/poststrat.pdf
[Accessed 4 September 2014].

BBC News Asia, 2011. *"Japanese public chooses 'kizuna' as kanji of 2011" BBC News Asia. 24 December 2011.* [Online]
Available at: http://www.bbc.co.uk/news/world-asia-16321999
[Accessed 4 September 2014].

Beaudoin, C. E., 2007. Mass Media Use, Neighborliness, and Social Support : Assessing Causal Links With Panel Data. *Communication Research,* Dec, 34(6), pp. 637-644.

Biocca, F. A., 1988. Opposing conceptions of the audience: The active and passive hemispheres of mass communication theory. *Communication yearbook, 11(648),* pp. 51-80.

Blood, R., 2000. *Weblogs: A History And Perspective.* [Online]
Available at: http://www.rebeccablood.net/essays/weblog_history.html
[Accessed 4 September 2014].

Blunch, N. J., 2008. *Introduction to structural equation modelling using SPSS and AMOS.* Los Angeles ; London: SAGE.

Bollen, K. & Stine, R. A., 1992. Bootstrapping Goodness-of-Fit Measures in Structural Equation Models. *Sociological Methods & Research,* Nov, 21(2), pp. 205-229.

Boulianne, S., 2009. Does Internet Use Affect Engagement? A Meta-Analysis of Research. *Political Communication, 26:2,* pp. 193-211.

Boyd, D. M. & Ellison, N. B., 2007. Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication,* pp. 210-230.

Bruns, A., 2005. *Gatewatching : collaborative online news production.* New York: P. Lang.

Bruns, A., 2008. The active audience: Transforming journalism from gatekeeping to gatewatching. In: C. Paterson & D. Domingo, eds. *Making online news: The ethnography of new media production.* New York: Peter Lang.

Byrne, D., 1998. *Complexity Theory and The Social Sciences - An Introduction.* London: Routlegde.

Cabinet Office, 2002. *Sōsharu Kyapitaru : Yutakana Ningen Kankei To Shimin Katsudō No Kōjunkan O Motomete, Naikakufu Kokumin Seikatsukyoku, Shiminkatsudosokushinka (In Japanese) (「ソーシャル・キャピタル：豊かな人間関係と市民活動の好循環を求めて」内閣府国民生活局; 市民活動促進課).* [Online]
Available at: https://www.npo-homepage.go.jp/data/report9_1.html
[Accessed 4 September 2014].

Cabinet Office, 2012. *Danjo kyōdō sankaku hakusho, 2011. Gender Equality Bureau Cabinet Office (In Japanese) (内閣府男女共同参画局, 男女共同参画白書 平成 23 年版), Gender Equality Bureau.* [Online]
Available at:
http://www.gender.go.jp/about_danjo/whitepaper/h24/zentai/pdf/h24_001.pdf
[Accessed 4 September 2014].

Cabinet Office, 2013. *Saigaiji Yōengosha No Hinan Shien Ni Kansuru Kentōkai Hōkokusho (In Japanese) (災害時要援護者の避難支援に関する検討会報告書).* [Online]

Available at:
http://www.bousai.go.jp/taisaku/hisaisyagyousei/youengosya/h24_kentoukai/houkokusyo.pdf
[Accessed 4 September 2014].

Cabinet Office, 2014. *Learning from Adversity, Gender Equality & Disaster Risk Reduction, Gender Equality Bureau.* [Online]
Available at:
http://www.gender.go.jp/policy/saigai/shishin/pdf/learning_from_adversity.pdf
[Accessed 4 September 2014].

Campbell, J. C., 1996. Media and Policy Change in Japan. In: S. J. Pharr & E. S. Krauss, eds. *Media and Politics in Japan.* Honolulu: University of Hawai'i Press, pp. 187-201.

Cardoso, G., 2011. From Mass to Networked Communication. In: S. Papathanassopoulos, ed. *Media perspectives for the 21st century.* Abingdon, Oxon ; New York: Routledge, p. 117.

Castells, M., 2007. Communication, Power and Counter-power in the Network Society. *International Journal of Communication 1,* pp. 238-266.

Castells, M., 2009. *Communication power.* Oxford ; New York: Oxford University Press.

Castells, M., 2010. *The rise of the network society.* 2nd ed. Chichester, West Sussex ; Malden, MA: Wiley-Blackwell.

Central Disaster Management Council Committee, 2012. *Committee for Policy Planning on Disaster Management, Final Report, Toward the reconstruction for sound and unwavering Japan.* [Online]
Available at:
http://www.bousai.go.jp/kaigirep/chuobou/suishinkaigi/english/pdf/Final%20Report.pdf
[Accessed 4 September 2014].

Cheng, J. W., 2014. The Effects of the Use of Mass and Social Media on Post-Disaster Recovery – A Theoretical Framework. *Journal of the Graduate School of Asia-Pacific Studies, No. 28,* pp. 45-64.

Cheng, J. W., Jeon, S. Y., Ostuka, T. & Mitomo, H., 2014a. The Effects of the Use of Web 2.0 Applications and Television on Social Capital in Post-Disaster Recovery – A Case Study of the Great East Japan Earthquake. *Journal of Information & Communication Research No.111 (Vol. 32 No. 2),* pp. 51-66.

Cheng, J. W., Ostuka, T. & Mitomo, H., 2014b. *The Effect of Simultaneous Multi-Screening on the Users' Knowledge of Social Issues in a Highly Mediated Society.* Brussels, 25th International Telecommunication Society (ITS) European Conference, 22nd - 25th June 2014.

Cheng, X., Dale, C. & Liu, J., 2007. Understanding the characteristics of internet short video sharing: YouTube as a case study. *arXiv preprint arXiv:0707.3670.*

Cheung, G. W. & Lau, R. S., 2008. Testing Mediation and Suppression Effects of Latent Variables: Bootstrapping with Structural Equation Models. *Organizational Research Methods,* 11(2), pp. 296-325.

Cho, A., 2014. Post-tsunami recovery and reconstruction: governance issues and implications of the Great East Japan Earthquake. *Disasters, 38(s2),* pp. 157-178.

Couper, M. P., 2000. Web surveys. A review of issues and approaches. *Public Opinion Quarterly Volume 64,* p. 464–494.

Coyle, D., 2005. *The Role of Mobiles in Disasters and Emergencies. GSM Association.* [Online]
Available at: http://www.enlightenmenteconomics.com/disasterreport.pdf
[Accessed 6 September 2014].

Cribbie, R., 2012. *Introduction to Structural Equation Modeling (SEM). Quantitative Methods Program - Department of Psychology.* [Online]
Available at:
http://www.psych.yorku.ca/cribbie/SEM%20Course%202012/Intro%20to%20SEM_day%202_nov2012.pdf
[Accessed 4 September 2014].

Deguchi, K., 2011. *Koreika To Jinko Gensho To Iu Hisaichi No kibishii Joken (In Japanese) (* 出口恭子, 高齢化と人口減少という被災地の厳しい条件*). National Graduate Institute for Policy Studies.* [Online]
Available at: http://www.grips.ac.jp/docs/security/files/prof.deguchi.pdf
[Accessed 4 September 2014].

Dennis, J. M. et al., 2005. *Data collection mode effects controlling for sample origins in a panel survey: Telephone versus internet.* Miami Beach, FL., 60th Annual Conference of the American Association for Public Opinion Research.

Dentsu Macromill Insight, 2013. *Seikatsusha ishiki teiten kansoku chōsa dai 11kai: Sinsai 2nengo no ishiki chōsa (In Japanese) (*生活者意識定点観測調査 第 11 回：震災 2 年後の意識調査*). Dentsu Macromill Insight Inc.* [Online]
Available at: http://www.dm-insight.jp/release/20130304-2
[Accessed 4 September 2014].

DeWit, A., Tetsunair, I. & Masaru, K., 2012. Fukushima and the political economy of power policy in Japan. In: *Natural disaster and nuclear crisis in Japan : response and recovery after Japan's 3/11.* Milton Park, Abingdon, Oxon ; New York, NY: Routledge, pp. 156-172.

Donaldson, S. I. & Grant-Vallone, E. J., 2002. Understanding self-report bias in organizational behavior research. *Journal of Business and Psychology, 17(2),* pp. 245-260.

Dutta-Bergman, M. J., 2004. Complementarity in Consumption of News Types Across Traditional and New Media. *Journal of Broadcasting & Electronic Media,* 48(1), pp. 41-60.

Dutta-Bergman, M. J., 2006. Community Participation and Internet Use after September 11: Complementarity in Channel Consumption. *Journal of Computer-Mediated Communication,* Volume 11, p. 469–484.

Ellison, N. B., Steinfield, C. & Lampe, C., 2007. The Benefits of Facebook "Friends" Social Capital and College Students' Use of Online Social Network Sites. *Journal of Computer-Mediated Communication, article 1,* 12(4).

Ellison, N. B., Steinfield, C. & Lampe, C., 2011. Connection Strategies: Social Capital Implications of Facebook-enabled Communication Practices. *New Media Society. Published online 27 January 2011,* pp. 1-20.

Endo, K., 2013. Social journalism in the inter-media society: results from the social survey on the great East Japan earthquake and the Fukushima nuclear power plant disaster. *Journal of Contemporary Eastern Asia. 12(2),* pp. 5-17.

Eveland Jr., W. P., Hayes, A. F., Shah, D. V. & Kwak, N., 2005. Understanding the Relationship Between Communication and Political Knowledge: A Model Comparison Approach Using Panel Data. *Political Communication,* 22(4), pp. 423-446.

Everitt, B., 2002. *The Cambridge dictionary of statistics.* 2nd ed. Cambridge ; New York: Cambridge University Press.

Field, J., 2008. *Social Capital.* 2nd ed. New York: Routledge.

Fujita, M., 2011. *"Post-Quake Restoration Policy for East Japan from the Viewpoint of Spatial Economics"; RIETI Report No.1; 29 April 2011.* [Online]
Available at: http://www.rieti.go.jp/en/rieti_report/129.html
[Accessed 4 September 2014].

Fujita, M. & Hamaguchi, N., 2011. *Japan and Economic integration in East Asia: post-disaster scenario,* : RIETI Discussion Paper Series 11-E-079; The Research Institute of Economy, Trade and Industry.

Galston, W. A., 2007. Civic knowledge, civic education, and civic engagement: A summary of recent research. *International Journal of Public Administration, 30(6-7),* pp. 623-642.

Gaskin, J., 2012a. *2 Way Interactions, Stats Tools Package.* [Online]
Available at: http://statwiki.kolobkreations.com
[Accessed 4 Sept 2014].

Gaskin, J., 2012b. *ValidityMaster, Stats Tools Package.* [Online]
Available at: http://statwiki.kolobkreations.com
[Accessed 4 September 2014].

Gaskin, J., 2012c. *Interaction, Gaskination's StatWiki.* [Online]
Available at: http://statwiki.kolobkreations.com
[Accessed 4 September 2014].

Gaskin, J., 2012d. *Model fit metrics.* [Online]
Available at:
http://statwiki.kolobkreations.com/wiki/Confirmatory_Factor_Analysis#Model_Fit
[Accessed 4 September 2014].

Gentzkow, M. & Shapiro, J. M., 2011. Ideological Segregation Online and Offline. *Quarterly Journal of Economics. 126(4).*

Gerbner, G., 1988. *Violence and terror in the mass media.* Paris, France : Unesco Lanham, MD: UNIPUB.

Gerbner, G., Gross, L., Morgan, M. & Signorielli, N., 1980. The "mainstreaming" of America: Violence profile no. 11. *Journal of communication, 30(3),* pp. 10-29.

Gerbner, G. et al., 2002. Growing up with television: Cultivation processes. In: J. Bryant & D. Zillmann, eds. *Media effects: Advances in theory and research (2nd ed.).* Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, pp. 43-67.

Gil de Zúñiga, H., Jung, N. & Valenzuela, S., 2012. Social Media Use for News and Individuals' Social Capital, Civic Engagement and Political Participation. *Journal of Computer-Mediated Communication,* Volume 17, p. 319–336.

Gil de Zúñiga, H. & Valenzuela, S., 2011. The Mediating Path to a Stronger Citizenship: Online and Offline Networks, Weak Ties, and Civic Engagement. *Communication Research,* 38(3), pp. 397-421.

Gil de Zúñiga, H. et al., 2007. *Online and Offline Activism: Communication Mediation and Political Messaging Among Blog Readers.* Washington, DC, s.n.

Google, 2012. *The New Multi-screen World: Understanding Cross-platform Consumer Behavior.* [Online]
Available at: http://www.google.com/think/research-studies/the-new-multi-screen-world-

study.html
[Accessed 4 September 2014].

Grandcolas, U., Rettie, R. & Marusenko, K., 2003. Web survey bias: sample or mode effect?. *Journal of Marketing Management, 19(5-6),* pp. 541-561.

Gurdeep, S. H. & Mukesh, S., 2001. *Data and Computer Communications: Networking and Internetworking.* 1 ed. .: CRC Press.

Hagar, C., 2013. Crisis informatics: Perspectives of trust–is social media a mixed blessing?. *SLIS Student Research Journal, 2(2), 2.*

Hair Jr, J. F., Black, W. C., Babin, B. J. & Anderson, R. E., 1998. *Multivariate Data Analysis.* 5th ed. Upper Saddle River, N.J.: Prentice Hall.

Hair Jr, J. F., Black, W. C., Babin, B. J. & Anderson, R. E., 2010. *Multivariate data analysis.* 7th ed. Upper Saddle River, NJ, USA: Prentice-Hall.

Halpern, D., 2005. *Social capital.* Cambridge, UK; Malden, MA: Polity.

Hamamatsu, Y., 2014. Higashinihon Daishinsai Ni Yoru Jinkō Idō Ga Nihon No Shōrai No Danjo Jinkō Bunpu Ni Ataeru Eikyō (In Japanese) (濱松由莉, 東日本大震災による人口移動が日本の将来の男女人口分布に与える影響). *Minzoku Eisei 80(1) (民族衛生),* pp. 12-16.

Harada, H., 2013. Rethinking the Great East Japan Earthquake and Social Capital. *The Senshu Social Capital Review No.4,* pp. 5-23.

Hasegawa, K., 2014. The Fukushima nuclear accident and Japan's civil society: Context, reactions, and policy impacts. *International Sociology 2014, Vol. 29(4),* p. 283 –301.

Hawkins, R. & Maurer, K., 2010. Bonding, Bridging and Linking: How Social Capital Operated in New Orleans following Hurricane Katrina. *British Journal of Social Work,* Volume 40, p. 1777–1793.

Hayashi, T., 2013. Saigai Yūtopia Ga Kie Ta Ato (In Japanese) (林敏彦, 災害ユートピアが消えた後). *Gakujutsu No Dōkō, (学術の動向), 18(10),* pp. 64-67.

Hayashi, T., 2014. Is it Abenomics or Post-Disaster Recovery? A Counterfactual Analysis. *International Advances in Economic Research, 20(1),* pp. 23-31.

Hill, S., Lo, J., Vavreck, L. & Zaller, J., 2007. *The opt-in Internet panel: Survey mode, sampling methodology and the implications for political research,* Los Angeles, California: Unpublished manuscript at the University of California.

Hirano, K., 2013. Difficulties in post-tsubami recrontruction plan following Japan's 3.11 mega disaster: dilemma between protection and sustainability. *Journal of JSCE, 1(1),* pp. 1-11.

Hooghe, M., 2002. Watching Television and Civic Engagement : Disentangling the Effects of Time, Programs, and Stations. *The Harvard International Journal of Press/Politics,* 7(2), pp. 84-104.

ICT Research & Consulting, 2014. *2014 Nen SNS Riyo Dōkō Ni Kansuru Chōsa (In Japanese) (2014 年 SNS 利用動向に関する調査).* [Online]
Available at: http://www.ictr.co.jp/report/20140821000067.html
[Accessed 4 September 2014].

Imai, A., 2014. Genpatsu saigai hinansya no jittai chōsa (4 ji) (In Japanese) (今井照, 発災害避難者の実態調査 (4 次)). *Jichi sōken (自治総研) 40 (2),* pp. 70-103.

IMJ Mobile, 2011. *Shinsai Ni Tomonau Twitter, Facebook Riyo Jittai Ni Kansuru Chosa." (in Japanese) (震災に伴う Twitter 、Facebook 利用実態に関する調査).* [Online]
Available at:
http://www.imjp.co.jp/FileUpload/files/documents/release/2011/imjm20110404_2.pdf
[Accessed 4 Sep 2014].

Impress Japan, 2012. *Intanetto Hakusho 2012 Mobairu To Sosharu Media Ga Tsukuru Shin Keizaiken (In Japanese) (インターネット白書 2012 モバイルとソーシャルメディアが創る新経済圏).* Tokyo: Impress Communicaitons (インプレスコミュニケーションズ).

Inoguchi, T., 2000. Social Capital in Japan. *Japanese Journal of Political Science, 1,* pp. 73-112.

Inoguchi, T., 2014. Japan in 2013: Abenomics and Abegeopolitics. *Asian Survey, 54(1),* pp. 101-112.

Ishikawa, K., 2013. Genpatsu Jiko Hinan To Kurashi Kenkō Inochi O Kangaeru (In Japanese) (石川和信, 原発事故避難と暮らし・健康・命を考える). *Nihon Rōnen Igakkai Zasshi (日本老年医学会雑誌), 50(1),* pp. 84-87.

iSPP, 2012. *Santen'ichiichi Hisaichi No Shōgen: Higashinihon Daishinsai Jōhō Kōdō Chōsa De Kenshōsuru Dejitaru Taikoku Nihon No Mōten (In Japanese) (3.11 被災地の証言 東日本大震災 情報行動調査で検証するデジタル大国・日本の盲点).* Tokyo: Inpuresujapan.

Jackob, N. G. E., 2010. No Alternatives? The Relationship between Perceived Media Dependency, Use of Alternative Information Sources, and General Trust in Mass Media. *International Journal of Communication 4 (2010),* p. 589–606.

Japan Football Association, 2013. *History of JFA, Japan Football Association.* [Online]
Available at: http://www.jfa.or.jp/eng/history/
[Accessed 4 September 2014].

Japanese Red Cross Society, 2014. *Japan: Earthquake and Tsunami.* [Online]
Available at: http://www.jrc.or.jp/vcms_lf/36_Month_Report_Narrative_Final.pdf
[Accessed 4 September 2014].

JCER, 2012. *38th Medium Term Forecast for Japanese Economy: 2011-2020.* [Online]
Available at: http://www.jcer.or.jp/eng/pdf/m38_full_new.pdf
[Accessed 2014 September 4].

JST, 2011. *The Great East Japan Earthquake Information from Official Websites. Japan Science and Technology Agency.* [Online]
Available at: http://www.jst.go.jp/pr/pdf/great_east_japan_earthquake.pdf
[Accessed 4 September 2014].

Kano, C., 2013. *Behavioral change for energy conservation: case study of post-Fukushima experience in Japan.* [Online]
Available at: http://uu.diva-portal.org/smash/get/diva2:609189/FULLTEXT01.pdf
[Accessed 4 September 2014].

Kaplan, A. M. & Haenlein, M., 2010. Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons, 53,* pp. 59-68.

Kaufhold, K., Valenzuela, S. & Gil de Zúñiga, H., 2010. Citizen Journalism and Democracy: How User-Generated News Use Relates to Political Knowledge and Participation. *Journalism & Mass Communication Quarterly 2010 87: 515.*

Kenny, D. A., 2014. *Measuring Model Fit.* [Online]
Available at: http://davidakenny.net/cm/fit.htm
[Accessed 4 September 2014].

Kimura, M., 2011. *2011 Higashinihon Daishinsai Ji No Media No Yakuwari Ni Kansuru Sogo Chosa Hokokusho (In Japanese) (*木村幹夫, 2011, 2011 東日本大震災時のメディアの役割に関する総合調査 報告書)*, Japan: Nihon Minkan Hōsō Renmei Kenkyūjo (日本民間放送連盟研究所).

Kingston, J., 2004. *Japan's quiet transformation : social change and civil society in the twenty-first century.* London ; New York: Routledge Curzon.

Kingston, J., 2012. The politics of natural disaster, nuclear crisis and recovery. in Natural disaster and nuclear crisis. In: J. Kingston, ed. *Japan : response and recovery after Japan's 3/11.* New York: Routledge, pp. 188-206.

Kiousis, S., 2011. Public Trust or Mistrust? Perceptions of Media. *Mass Communication and Society, 4:4,* pp. 381-403.

Kittilson, M. C. & Dalton, R. J., 2010. Virtual Civil Society: The New Frontier of Social Capital?. *Political Behavior,* Dec, 33(4), pp. 625-644.

Kobayashi, T., Miyata, K. & Ikeda, K., 2006. Social Capital Online Collective use of the Internet and reciprocity as lubricants of democracy. *Information, Communication & Society,* Oct, 9(5), p. 582–611.

Kobe City Fire Bureau, 2006. *Haigai no Jōkyō (In Japanese) (被害の状況).* [Online]
Available at:
http://web.archive.org/web/20080414163632/http://www.city.kobe.jp/cityoffice/48/quake/higai.html
[Accessed 4 September 2014].

Kotani, S., 2004. Why are Japanese youth today so passive? . In: G. Mathews & B. White, eds. *Japan's changing generations : are young people creating a new society?.* London ; New York: Routledge Curzon.

Krikorian, R., 2013. *New Tweets per second record and how! Twitter Engineering Blog entry. 13 Aug 2013.* [Online]
Available at: https://blog.twitter.com/2013/new-tweets-per-second-record-and-how
[Accessed 4 September 2014].

Kweit, M. G. & Kweit, R. W., 2004. Citizen Participation and Citizen Evaluation in Disaster Recovery. *The American Review of Public Administration,* Volume 34, pp. 354-372.

LaRose, R. & Eastin, M. S., 2004. A Social Cognitive Theory of Internet Uses and Gratifications: Toward a New Model of Media Attendance. *Journal of broadcasting & Electronic Media, 48:3,* pp. 358-377.

Lazarsfeld, P. F. & Merton, R. K., 1971. Mass communication, popular taste, and organiszed social action. In: W. Schramm & D. F. Roberts, eds. *The Process and Effects of Mass Communication.* Urbana: University of Illinois Press, pp. 230-241.

Lindell, M. K., 2013. Recovery and Reconstruction after Disaster. In: P. T. Bobrowsky, ed. *Encyclopedia of Natural Hazards.* : Springer, pp. 812-824.

Lin, N., 2001. *Social Capital: a Theory of Social Structure and Action.* New York: Cambridge University Press.

Little, R. J., 1993. Post-stratification: a modeler's perspective. *Journal of the American Statistical Association, 88(423),* pp. 1001-1012.

Longstaff, P., 2005. *Security, Resilience, and Communication in Unpredictable Environments Such as Terrorism, Natural Disasters, and Complex Technology,* : Center for Information Policy Research. Harvard University.

Loosveldt, G. & Sonck, N., 2008. An evaluation of the weighting procedures for an online access panel survey. *Survey Research Methods (Vol. 2, No. 2),* pp. 93-105.

Lowrey, W., 2004. Media Dependency During a Large-Scale Social Disruption: The Case of September 11. *Mass Communication and Society 7:3,* pp. 339-357.

Lyytinen, K. & Gaskin, J., 2012a. *Exploratory Factor Analysis (EFA).* [Online]
Available at: http://www.kolobkreations.com/Factor%20Analysis.pptx
[Accessed 4 Sept 2014].

Lyytinen, K. & Gaskin, J., 2012b. *Mediation and Multi-group Analyses.* [Online]
Available at: http://www.kolobkreations.com/Mediation%20and%20Multi-group%20Moderation.pptx
[Accessed 1 September 2014].

Lyytinen, K. & Gaskin, J., 2012c. *Interation.* [Online]
Available at: http://www.kolobkreations.com/Interaction.pptx
[Accessed 4 September 2014].

Macromill, 2014. *Policy for quality management.* [Online]
Available at: http://www.macromill.com/qManage/index.html
[Accessed 4 September 2014].

Manabe, N., 2013. *"Music in Japanese Antinuclear Demonstrations: The Evolution of a Contentious Performance. Model" The Asia-Pacific Journal, Vol. 11, Issue 42, No. 3, October 21, 2013..* [Online]
Available at: http://japanfocus.org/-Noriko-MANABE/4015
[Accessed 4 September 2014].

Mathbor, G. M., 2007. Enhancement of Community Preparedness for Natural Disasters The Role of Social Work in Building Social Capital for Sustainable Disaster Relief and Management. *International Social Work,* 50(3), p. 357–369.

Mayunga, J. S., 2007. *Understanding and Applying the Concept of Community Disaster Resilience: A Capital-based Approach.* Munich, Germany, Summer academy for social vulnerability and resilience building, 1-16.

McQuail, D., Blumler, J. & Brown, R., 1972. The television audience: a revised perspective. In: D. McQuail, ed. *Sociology of Mass Communication.* London: Longman.

METI, 2012a. *White Paper on International Economy and Trade 2012,* : Ministry of Economy, Trade and Industry.

METI, 2012b. *Japan's Challenges Towards Recovery. Ministry of Economy, Trade and Industry.* [Online]

Available at: http://www.meti.go.jp/english/earthquake/nuclear/japan-challenges/pdf/japan-challenges_full.pdf
[Accessed 4 September 2014].

MIC, 2010. *2010 Population Census.* [Online]
Available at: http://www.stat.go.jp/english/data/kokusei/index.htm
[Accessed 2014 September 4].

MIC, 2011a. *2011 White Paper on Information and Communications in Japan,* Japan: Minister of Internal Affairs and Communications, Economic Research Office, ICT Strategic Policy Division, Global ICT Strategy Bureau.

MIC, 2011b. *Higashiniohon Daishinsai O Keiki To Shita Joho Kodo No Henka Ni Kansuru Chosa Kekka (in Japanese) (東日本大震災を契機とした情報行動の変化に関する調査結果). apan Minister of Internal Affairs and Communications, Institute for Information and Communications Policy.* [Online]
Available at: http://www.soumu.go.jp/main_content/000160888.pdf
[Accessed 4 September 2014].

MIC, 2012. *2012 White Paper on Information and Communications in Japan,* Japan: Minister of Internal Affairs and Communications, Economic Research Office, ICT Strategic Policy Division, Global ICT Strategy Bureau.

MIC, 2013. *2013 White Paper on Information and Communications in Japan,* : Japan Minister of Internal Affairs and Communications, Economic Research Office, ICT Strategic Policy Division, Global ICT Strategy Bureau.

Microsoft, 2013. *Cross-Screen Engagement. Microsoft Advertising..* [Online]
Available at:
http://advertising.microsoft.com/international/WWDocs/User/display/cl/researchreport/1932/global/Cross_ScreenWhitepaper.pdf
[Accessed 4 September 2014].

Mimaki, J. & Shaw, R., 2014. Community Development and Disaster Preparedness in a Depopulated Society: Case of Tosashimizu City, Kochi Prefecture. In: R. Shaw, ed. *Community Practices for Disaster Risk Reduction in Japan.* Japan: Springer, pp. 134-154.

Mirua, S., 2011. *The Perfect Storm. ITU Telecom World 2011. 26 October 2011..* [Online]
Available at: http://www.ntt.co.jp/topics_e/itw2011/index.html
[Accessed 4 September 2014].

Mitomo, H., Otsuka, T., Jeon, S. Y. & Cheng, J. W., 2013. *The role of ICT and mass media in post-disaster restoration and recovery progress: A case of the Great East Japan Earthquake..*

Florence, International Telecommunication Society (ITS) 24th European Regional Conference held on 20th-23rd October, 2013.

Mitomo, H., Otsuka, T. & Kimura, M., 2012. *The Role of Media and ICT to Motivate People to Take Post-Quake Recovery Action: An Evidence of the "Pythagorean Effect".* Bangkok, Thailand, ITS 2012 19th Biennial Conference, November 18-21, 2012.

Miyata, K., Ikeda, K. & Kobayashi, T., 2008. The Internet, Social Capital, Civic Engagement, and Gender in Japan. In: N. Lin & B. H. Erickson, eds. *Social capital: an international research program.* New York: Oxford University Press, pp. 206-233.

Miyata, K. & Kobayashi, T., 2008. Causal relationship between Internet use and social capital in Japan. *Asian Journal of Social Psychology (2008), 11,* pp. 42-52.

MOFA, 2013. *List of Relief Supplies and Donations from Overseas. Ministry of Foreign Affairs of Japan.* [Online]
Available at: http://www.mofa.go.jp/j_info/visit/incidents/pdfs/r_goods.pdf
[Accessed 1 September 2014].

Murakami, K. et al., 2014. Planning innovation and post-disaster reconstruction: The case of Tohoku, Japan/Reconstruction of tsunami-devastated fishing villages in the Tohoku region of Japan and the challenges for planning/Post-disaster reconstruction in Iwate and new planning chal. *Planning Theory & Practice, 15(2),* pp. 237-242.

Nakagawa, Y. & Shaw, R., 2004. Social Capital: A Missing Link to Disaster Recovery. *International Journal of Mass Emergencies and Disasters,* March, 22(1), pp. 5-34.

Nakayachi, K., Yokoyama, H. M. & Oki, S., 2014. Public anxiety after the 2011 Tohoku earthquake: fluctuations in hazard perception after catastrophe. *Journal of Risk Research, (ahead-of-print),1-14.*

Nanba, Y., 2011. Daikibo Saigaiji Ni Okeru jichitai Eno Shien No Hituyōsei To Kongo Eno Teian (In Japanese) (難波悠, 大規模災害時における自治体への支援の必要性と今後への提案). *Tōyō Daigaku PPP Kenkyū Senta Kiyo, 2 (東洋大学PPP研究センター紀要),* pp. 118-132.

Naoi, M., Ishino, T. & Seko, M., 2014. *Subjective Belief, Risk Information and Earthquake Insurance Purchase: Evidence from Japanese Post-Quake Data.* [Online]
Available at:
http://koara.lib.keio.ac.jp/xoonips/modules/xoonips/download.php/AA10715850-00000902-0001.pdf?file_id=41225
[Accessed 4 September 2014].

Netasia Research, 2013. *Terebi To Sōsharu Media No Kankeisei ~Terebi Shīemu Ga Todoku, Hibiku, Hirogaru, Sōsharu Terebijin~ (In Japanese) (テレビとソーシャルメディアの関係性 ～テレビCMが届く、響く、拡がる、ソーシャルテレビ人～).* [Online]
Available at: http://www.mobile-research.jp/investigation/research_date_130425.html
[Accessed 4 September 2014].

NHK Newsweb, 2014. *Shinsai Sannen Hisaichi Sennihyakunin No Koe (in Japanese) (震災3年 被災地 1200 人の声). NHK Newsweb 8 March 2014.* [Online]
Available at: http://www3.nhk.or.jp/news/web_tokushu/2014_0307.html
[Accessed 8 March 2014].

NHK, 2013. *Dejitaru Jidai No Atarashii Terebi Sicho (Terebi Rokujuen) Chosa Omona Kekka Ni Tsuite (In Japanese) (デジタル時代の新しいテレビ視聴（テレビ60年）調査の主な結果について),* Japan: NHK Broadcasting Studies.
http://www.nhk.or.jp/bunken/summary/yoron/broadcast/pdf/130207.pdf [Accessed 9 September 2014].

Nishide, Y., 2009. *Social Capital and Civil Society in Japan.* Sendai: Tohoku University Press.

Norris, P., 1996. Does Television Erode Social Capital? A Reply to Putnam. *Political Science and Politics,* Sep, 29(3), pp. 474-480.

Norris, P., 2001. *Digit Divide: Civic Engagament, Information Proverty, and the Internet Worldwide.* New York: Cambridge University Press.

Norris, P., 2003. *Social Capital and ICTs: Widening or Reinforcing Social Networks?.* Tokyo, Economic and Social Research Institute Cabinet Office, Japan.

Norusis, M. J., 2005. *SPSS 14.0 statistical procedures companion.* Upper Saddle River, N.J.: Prentice Hall.

O'Reilly, T., 2005. *What is Web 2.0 – Design Patterns and Business Models for the Next Generation Software.* [Online]
Available at: http://oreilly.com/web2/archive/what-is-web-20.html
[Accessed 4 September 2014].

Ogawa, A., 2009. *The failure of civil society? : the third sector and the state in contemporary Japan.* Albany: SUNY Press.

Ogawa, A., 2013. Young precariat at the forefront: anti-nuclear rallies in post-Fukushima Japan. *Inter-Asia Cultural Studies, 14(2),* pp. 317-326.

Otani, J., 2012. Ageing society, health issues and disaster - access 3/11. In: J. Kingston, ed. *Natural disaster and nuclear crisis in Japan : response and recovery after Japan's 3/11.* Milton Park, Abingdon, Oxon ; New York, NY: Routledge, pp. 237-254.

Otani, Y. et al., 2012. Comparison of two large earthquakes: the 2008 sichuan earthquake and the 2011 East Japan earthquake. *The Keio journal of medicine 61, no. 1,* pp. 35-39.

Paton, D., 2003. Disaster preparedness: a social-cognitive perspective. *Disaster prevention and management, 12(3),* pp. 210-216.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. & Podsakoff, N. P., 2003. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology,* 88(5), pp. 879-903.

Portes, A., 2000. The two meanings of social capital. *Sociological forum,* 15(1), pp. 1-12.

Potter, W. J., 1986. Perceived reality and the cultivation hypothesis. *Journal of Broadcasting & Electronic Media ,* 30(2).

Potter, W. J., 1988. Perceived reality in television effects research. *Journal of Broadcasting & Electronic Media,* 32(1).

Putnam, R. D., 1993. *Making Democracy Work: Civic Traditions in Modern Italy.* Princeton, N.J.: Princeton University Press.

Putnam, R. D., 2000. *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon & Schuster.

Putnam, R. D., 2007. E pluribus unum: Diversity and community in the twenty-first century the 2006 Johan Skytte Prize Lecture. *Scandinavian political studies, 30(2),* pp. 137-174.

Putnam, R. D., 2009. Diversity, social capital, and immigrant integration. *National Civic Review, 98(1),* pp. 3-5.

Quan-Haase, A. & Young, A. L., 2014. The Uses and Gratifications (U&G) Approach as a Lens for Studying Social Media Practice. In: R. S. Fortner & P. M. Fackler, eds. *The Handbook of Media and Mass Communication Theory.* : John Wiley & Sons, pp. 269-286.

Rainie, L., Purcell, . & Smith, A., 2011. *The Social Side of the Internet. Pew Research Center's Internet & American Life Project.* [Online]
Available at: http://www.pewinternet.org/2011/01/18/the-social-side-of-the-internet/
[Accessed 6 September 2014].

Rainie, L. et al., 2012. *Social Media and Political Engagement. Pew Research Center's Internet & American Life Project.* [Online]

Available at: http://pewinternet.org/Reports/2012/Political-Engagement.aspx
[Accessed 6 September 2014].

Reconstruction Agency, 2013. *Current Status and Path Toward Reconstruction, March 2013. Government of Japan.* [Online]
Available at:
http://www.reconstruction.go.jp/english/130528_CurrentStatus_PathToward_FINAL.pdf
[Accessed 4 September 2014].

Reconstruction Agency, 2014a. *Fukkō No Genjō [26 August 2014] (In Japanese) (復興の現状 [平成 26 年 8 月 26]).* [Online]
Available at: http://www.reconstruction.go.jp/topics/main-cat1/sub-cat1-1/140826_gennjyou.pdf
[Accessed 4 September 2014].

Reconstruction Agency, 2014b. *Situation Overview.* [Online]
Available at: https://www.reconstruction.go.jp/english/topics/2013/03/about-us-situation-overview.html
[Accessed 4 September 2014].

Rheingold, H., 2008. Using Participatory Media and Public Voice to Encourage Civic Engagement. In: W. L. Bennett, ed. *Civic Life Online: Learning How Digital Media Can Engage Youth.* Cambridge, MA: The MIT Press.

Riad, J. K. & Norris, F. H., 1998. *Hurricane threat and evacuation intentions: An analysis of risk perception, preparedness, social influence, and resources.,* : University of Delaware. Disaster Research Center.

Rubin, A. M., 2002. The uses and gratifications perspective of media effects. In: J. Bryant & D. Zillmann, eds. *Media effects: Advances in theory and research (2nd ed.).* Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, pp. 525-548.

Ruggiero, T. E., 2000. Uses and Gratifications Theory. *Mass Communication and Society, 3:1,* pp. 3-37.

Ryall, J., 2012. *"Japan ignores protests to resume nuclear power" The Telegraph. 28 June 2012.* [Online]
Available at: http://www.telegraph.co.uk/news/worldnews/asia/japan/9361427/Japan-ignores-protests-to-resume-nuclear-power.html
[Accessed 4 September 2014].

Sakamoto, M., 2012. The Rise of NGOs/NPOs in Emergency Relief in the Great East Japan Earthquake. *Japan Social Innovation Journal, 2(1),* pp. 26-35.

Samuels, R. J., 2013. *3.11 : disaster and change in Japan.* London: Cornell University Press.

Sato, S., 2012. *Higashinihon Daishinsai Karano Fukko Machizukuri (In Japanese) (*佐藤滋, 東
日本大震災からの復興まちづく り*).* Tokyo: Otsukishoten (大月書店).

Scalise, P. J., 2012. Hard choices: Japan's post-Fukushima energy policy in the twenty-first
century in Natural disaster and nuclear crisis. In: *Japan : response and recovery after Japan's
3/11.* New York: Routledge, pp. 140-155.

Shah, D. V., 1998. Civic Engagement, Interpersonal Trust, and Television Use: An Individual-
Level Assessment of Social Capital. *Political Psychology,* 19(3), pp. 469-496.

Shah, D. V., Cho, J., Eveland JR, W. P. & Kwak, N., 2005. Information and Expression in a
Digital Age: Modeling Internet Effects on Civic Participation. *Communication Research,* Oct,
32(5), pp. 531-565.

Shah, D. V. et al., 2007. Campaign Ads, Online Messaging, and Participation: Extending the
Communication Mediation Model. *Journal of Communication 57,* p. 676–703.

Shah, D. V., Kwak, N. & Holbert, R. L., 2001. "Connecting" and "Disconnecting" With Civic
Life: Patterns of Internet Use and the Production of Social Capital. *Political Communication,*
Volume 18, p. 141–162.

Shaw, R., 2014. Community-Based Recovery and Development in Tohoku, Japan. In: N.
Kapucu & K. T. Liou, eds. *Disaster and Development Examining Global Issues and Cases.*
Switzerland: Springer International Publishing, pp. 391-410.

Shaw, R. & Goda, K., 2004. From disaster to sustainable civil society: the Kobe experience.
Disasters, 28(1), pp. 16-40.

Shaw, R., Shiwaku, K., Kobayashi, H. & Kobayashi, M., 2014. Linking experience, education,
perception and earthquake preparedness. *Disaster Prevention and Management: An
International Journal, Vol. 13 Iss: 1,* pp. 39-49.

Shibata, Y. & Iwai, N., 2012. What Japanese People Think and Do after the Great East Japan
Earthquake, Tsunami, and the Fukushima Nuclear Accident: A Preliminary Investigation by
JGSS-2012 Second Pretest (In Japanese). *JGSS Research Series No.9 (12),* pp. 155-168.

Shrout, P. E. & Bolger, N., 2002. Mediation in experimental and on experimental studies:
New procedures and recommendations. *Psychological Methods, 7:4,* p. 422–445.

Shrum, L. J., 2002. Media consumption and perceptions of social reality. Effects and
underlying processes. In: J. Bryant & D. Zillmann, eds. *Media effects: Advances in theory and
research (2nd ed.).* Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers, pp. 69-95.

Sills, S. J. & Song, C., 2002. Innovations in survey research an application of web-based surveys. *Social science computer review, 20(1),* pp. 22-30.

Slater, D. H., 2011. *"Fukushima women against nuclear power: finding a voice from Tohoku". The Asia-Pacific Journal. 9 November 2011..* [Online]
Available at: http://japanfocus.org/events/view/117#
[Accessed 4 September 2014].

Slater, D. H., Nishimura, K. & Kinstrand, L., 2012a. Social Media in Disaster Japan. In: J. Kingston, ed. *Natural disaster and nuclear crisis in Japan : response and recovery after Japan's 3/11.* Milton Park, Abingdon, Oxon ; New York, NY: Routledge, pp. 94-108.

Slater, D. H., Nishimura, K. & Kinstrand, L., 2012b. *Social Media, Information, and Political Activism in Japan's 3.11 Crisis. The Asia-Pacific Journal, Vol 10, Issue 24, No 1, June 11, 2012.* [Online]
Available at: http://www.japanfocus.org/-nishimura-keiko/3762
[Accessed 4 September 2014].

Sobel, J., 2002. Can We Trust Social Capital?. *Journal of Economic Literature,* March, 40(1), pp. 139-154.

SocialTV Lab, 2012. *Sosharu x Terebi No Kankeisei O Miru Chōsa Kekka Repoto (In Japanese) (ソーシャル×テレビの関連性を見る調査結果レポート).* [Online]
Available at: http://socialtv-lab.org/?p=26616
[Accessed 4 September 2014].

Sternberg, S., 2011. *"Japan crisis showcases social media's muscle" USA Today, 12 Apr 2011.* [Online]
Available at: http://www.usatoday.com/tech/news/2011-04-11-japan-social-media_N.htm
[Accessed 4 September 2014].

Sunstein, C. R., 2007. *Republic.com 2.0.* Princeton: Princeton University Press.

Tabachnick, B. G. & Fidell, L. S., 2013. *Using multivariate statistics.* Boston: Pearson Education.

Takahashi, T., 2010. *Audience studies : a Japanese perspective.* New York: Routledge.

Takeuchi, Y. & Shaw, R., 2014. New Insights of Education Sector from East Japan Earthquake and Tsunami. In: R. Shaw, ed. *Disaster Recovery Used or Misused Development Opportunity.* Japan: Springer.

Tamura, T. & Hamada, T., 2013. Who has the right to speak? The role of social media in spreading dissent among anti-nuclear groups in post 3-11 Japan. *Selected Papers of Internet Research, 3.*

Tanaka, M., Shineha, R. & Maruyama, K., 2012. *Saigai Jakusha To Jōhō Jakusha: San Jūichi Go Nani Ga Misugosaretanoka? (In Japanese) (*田中幹人, 標葉隆馬, 丸山紀一朗, 2012, 災害弱者と情報弱者：3.11 後 何が見過ごされたのか*).* Tokyo (東京): Chikumashobō (筑摩書房).

Tanaka, T., 2012. *NHK's disaster coverage: A valued role of Public Service Media,* Tokyo, Japan: NHK Broadcasting Cultural Research Institute.

Tatsuki, S. & Hayashi, H., 2002. Seven critical element model of life recovery; General Linear Model analysis of the 2001 Kobe panel survey data. *Proceedings of 2nd Workshop for Comparative Study Urban Earthquake Disaster Management ,* pp. 23-28.

Tewksbury, D. & Rittenberg, J., 2012. *News on the internet: information and citizenship in the 21st century.* New York: Oxford University Press.

Todd, D. & Todd, H., 2011. *Natural Disaster Response - Lessons from Evaluations of the World Bank and Others,* Washington, DC: Independent Evaluation Group, Communications, Learning, and Strategy, The World Bank.

Tse, C. W., Wei, J. & Wang, Y., 2013. Social Capital and Disaster Recovery: Evidence from Sichuan Earthquake in 2008. *Available at SSRN 2440405.*

Tsuboi, S. et al., 2012. Selection Bias of Internet Panel Surveys: A Comparison With a Paper-Based Survey and National Governmental Statistics in Japan. *Asia-Pacific Journal of Public Health, 1010539512450610.*

Uchida, H., 2013. Japan's Energy Policy After the 3.11 Natural and Nuclear Disasters–From the Viewpoint of the R&D of Renewable Energy and Its Current State. *Transition to Renewable Energy Systems,* pp. 13-27.

UNISDR, 2007. *Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. United Nations Office for Disaster Risk Reduction (UNISDR).*
[Online]
Available at: http://www.unisdr.org/we/inform/publications/1037
[Accessed 4 September 2014].

United Nations Foundation, 2011. *Disaster Relief 2.0: The Future of Information Sharing in Humanitarian Emergencies. OCHA, Vodafone Foundation, Harvard Humanitarian Initiative.*
[Online]
Available at: http://issuu.com/unfoundation/docs/disaster_relief20_report
[Accessed 4 September 2014].

Uslaner, E. M., 2000. Social Capital and the Net. *Communications of the ACM,* Dec, 43(12), pp. 60-63.

Uslaner, E. M., 2004. Trust, Civic Engagement, and the Internet. *Political Communication,* 21(2), pp. 223-242.

Valenzuela, S., Park, N. & Kee, K. F., 2009. Is There Social Capital in a Social Network Site? Facebook Use and College Students' Life Satisfaction, Trust, and Participation. *Journal of Computer-Mediated Communication,* Volume 14, p. 875–901.

Voigt, K. & Boykoff, P., 2012. *"Hit by disaster, Japanese city sees spending soar". CNN Rebuilding Japan. 9 March 2012.* [Online]
Available at: http://www.edition.cnn.com/2012/03/09/business/japan-rebuilding-sendai-business-boom/index.html
[Accessed 4 September 2014].

Wallop, H., 2011. *"Japan earthquake: how Twitter and Facebook helped" The Telegraph, 13 Mar 2011.* [Online]
Available at: http://www.telegraph.co.uk/technology/twitter/8379101/Japan-earthquake-how-Twitter-and-Facebook-helped.html
[Accessed 4 September 2014].

Watanabe, T., 2014. Chins Up! : Discovery of Ethical Consumption after the Great Earthquake in Northeastern Japan (In Japanese). *The Keizai Law Review 26. http://hdl.handle.net/11150/6437 [Accessed 4 September 2014],* pp. 311-342.

Watson, J., 1998. *Media communication : an introduction to theory and process.* Houndmills, Basingstoke, Hampshire: Macmillan.

Watson, J. & Hill, A., 2012. *Dictionary of media and communication studies.* 8th ed. London; New York: Bloomsbury Academic.

Webster, F., 2012. Information and democracy: the weakening of social democracy. In: S. Papathanassopoulos, ed. *Media perspectives for the 21st century.* Abingdon, Oxon, New York: Routledge, p. 117.

Webster, J. G. & Ksiazek, T. B., 2012. The Dynamics of Audience Fragmentation: Public Attention in an Age of Digital Media. *Journal of Communication 62 (2012),* p. 39–56.

Williams, D., 2006. Virtual Cultivation: Online Worlds, Offline Perceptions. *Journal of Communication,* 56(1), pp. 69-87.

Yabe, H. et al., 2014. Psychological Distress After the Great East Japan Earthquake and Fukushima Daiiichi Nuclear Power Plant Accident: Results of a Mental Health and Lifestyle Survey Through the Fukushima Health Management Survey in FY2011 and FY2012. *Fukushima journal of medical science, 60(1),* pp. 57-67.

Yamamoto, K., 2013. Volunteer Activities in Time of Disaster in Japan's Highly Information-Oriented Society.. *Journal of Earth Science and Engineering 3 ,* pp. 190-202.

Yamamura, E., 2014. Natural disasters and social capital formation: The impact of the Great Hanshin-Awaji earthquake. *Papers in Regional Science.*

Yamamura, E., Tsutsui, Y., Yamane, C. & Yamane, S., 2014. *Effect of major disasters on geographical mobility intentions: the case of the Fukushima nuclear accident.* [Online]
Available at: http://www.iser.osaka-u.ac.jp/library/dp/2014/DP0903.pdf
[Accessed 4 September 2014].

Yang, S., Lee, H. & Kurnia, S., 2009. Social Capital in Information and Communications Technology Research: Past, Present, and Future. *Communications of the Association for Information Systems,* August, 25(Article 23), pp. 183-220.

Yates, D. & Paquette, S., 2011. Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal of Information Management, 31(1),* pp. 6-13.

Yokoyama, Y. et al., 2014. Mental health and related factors after the Great East Japan Earthquake and tsunami. *PloS one, 9(7), e102497.*

Yomiuri Online, 2013. *2013 Nen Nippon No 10 Dai Nyūsu (In Japanese) (2013 年日本の１０大ニュース). 21 December 2013. Yomiuri Online.* [Online]
Available at: http://www.yomiuri.co.jp/feature/top10news/20131221-OYT8T00312.html
[Accessed 4 September 2014].

Yoshimura, N. & Inoue, T., 2012. Higashinihon Daishinsai Zengo No Maikuro Burogu Sābisu Twitter Ni Okeru Kōkyō Akaunto No Riyō Bunseki (In Japanese) (東日本大震災前後のマイクロブログサービス Twitter における公共アカウントの利用分析). *Jōhō Shori Gakkai Kenkyū Hōkoku, GN, Gurūpuwea To Nettowāku Sābisu (情報処理学会研究報告. GN グループウェアとネットワークサービス) (5),* pp. 1-8.

Zook, M., Graham, M., Shelton, T. & Gorman, S., 2010. Volunteered geographic information and crowdsourcing disaster relief: a case study of the Haitian earthquake. *World Medical & Health Policy, 2(2),* pp. 7-33.

Appendix A – Survey Questions for First Part of the Analysis

	Variable	Code
	Variable	Code
1	Social media use	IIT
	あなたは普段、情報を得るために以下のようなサービスをご利用になっていますか。(1. 全く利用していない，2. ほとんど利用していない（数ヶ月に一度程度以下）, 3. 時々利用する（一ヶ月に数度）, 4. よく利用する（1 週間に数度）5. 常に利用する（ほぼ毎日）) Generally, how often do you use the following tools online to obtain information? (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily)	
1.1	ソーシャルメディア（Facebook/Twitter/mixi など） Social network sites (e.g., Facebook, Twitter, Mixi etc.)	SNS
1.2	掲示板，フォーラム，ディスカッショングループ | Forum / BBS / Discussion group	BBS
1.3	個人、非公式のホームページ、ブログ | Blog / Unofficial homepage / Personal homepage	BLG
1.4	動画サイトのアカウント視聴 (YouTube，ニコニコ動画，USTREAM など) | Video sharing sites (YouTube, Niconico etc.)	STV
2	Mass media use	ITV
	普段、あなたは以下のようなテレビ番組をどれくらいの頻度で視聴していますか。(1. 全く見なかった, 2. ほとんど見ない（数ヶ月に一度程度以下）, 3. 時々見る（一ヶ月に数度）, 4.よく見る（1 週間に数度), 5. 常に見る（ほぼ毎日）) Generally, how often do you watch the following TV programme? (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily)	
2.1	ニュース・天気予報 | News / Weather	NEW
2.2	時事討論番組 | Current affairs	CUA
2.3	教育番組、科学番組、ドキュメンタリー | Educational / Documentary /	DOC

	Scientific	
2.4	金融、ビジネス | Finance / Business	FIN
	Mediator	
3	Online Civic Participation	OnCP
	東日本大震災の災害復興や災害対策に関して、あなたはインターネットメディア（ホームページ、ブログ、電子掲示板、SNS 等）をどのように活用しましたか。 (1. 全くなかった, 2. ほとんど（数ヶ月に一度程度以下）, 3. 時々（一ヶ月に数度）, 4. よく（1 週間に数度）, 5. 常に（ほぼ毎日）) How often do you utilise the Internet (e.g., Homepage, Blog, BBS, SNS etc.) to perform the following activities to support the Great East Japan Earthquake Recovery? (1=Never, 2=Once a few month, 3=A few times per month, 4=A few times per week, 5=Daily)	
3.1	最新情報やニュースを書き込む | Share latest Information / News	OnSR
3.2	自分の考えやコメントを書き込む | Express own opinions	OnEX
3.3	友人・家族・知人と相談をする | Discuss with family and friends	OnFF
3.4	災害復興や避難対策をしている人々を励ます | Encourage others to take action	OnEN
3.5	寄付をしたり、被災地から買い物をすることで支援する | Make donations online / Purchase goods from disaster area	OnDR
3.6	ボランティアに参加したり、組織する | Participate and organise volunteering works	OnVR
	Social Capital	
4	Offline Civic Participation	OfCP
	東日本大震災の復興情報を見聞きしてから、あなたがとった行動として該当するものをお答えください。(1. 該当しない, 2. どちらかといえば該当しない, 3. どちらともいえない, 4. どちらかといえば該当する, 5. 該当する) According to the recovery-related information from them you have seen, do you agree that you have done to following activities to support the recovery	

	for the Great East Japan Earthquake? (1=Not agree, 2=Somewhat disagree, 3=Neutral, 4=Somewhat agree, 5=Agree)	
4.1	自らボラティアなど支援に行った | Joined volunteering works	OfVR
4.2	復興支援のチャリティーイベントに参加した | Joined charity activities	OfCH
4.3	周りの人々に復興支援を呼びかけた | Encouraged others to support the recovery	OfEN
4.4	行政機関や民間機関に復興支援を呼びかけた | Requested government authorities and NGOs to support the recovery	OfRE
5	Bonding Trust	BoTR
	あなたは一般的に、災害復興や災害対策に関して以下の機関、人はどの程度信用できると思いますか？ (1. 信用できない, 2. あまり信用できない, 3. どちらともいえない, 4. ほぼ信用できる, 5. 信用できる) Do you think the following organisations can be trusted related to recovery of the Great East Japan Earthquake? (1=Cannot be trusted, 2=Somewhat cannot be trusted, 3=Neutral, 4=Somewhat can be trusted, 5 = Can be trusted)	
5.1	地方自治体 (市政機関，市(町)当局 など) | Local government (city government, the municipal authorities etc.)	TrLG
5.2	地域のコミュニティ (町内会、自治会， 防災組織など) | Local communities (Neighbourhood associations, NGOs, local disaster prevention group etc.)	TrLC
6	Bridging Network	BrNW
	あなたは災害復旧や災害対策の情報を聞くことができる知り合いが、以下のような組織に居ますか。(1. はい; 2. いいえ) Do you know anyone in the following organisations that can provide you with information regarding Earthquake Recovery? (1=Yes, 2=No)	
	政府および政府機関 | Central government	BrIO
	地方自治体 (市政機関，市(町)当局 など) | Local government	
	地域のコミュニティ (町内会、自治会， 防災組織など) | Local	

	community	
	警察、消防、自衛隊 | Police / Fire department / Self Defence Force)	
	NGO，非政府組織 (赤十字，ユニセフ など) | NGOs	BrNG
	民間企業、会社 | Private Companies	
	公益企業（電力、水道、ガスなど） | Utilities Companies	
	大学、研究所 | Universities	
	Control Variable	
7	あなたがこれまで経験した被災の状況と経験のうち、あてはまるものをお答えください。（いくつでも） ※「被災」とは、地震・津波などにより受けた身体的な被害、自宅などの物理的な被害、失業・休職・大幅な収入源などの経済的な被害を指します。　ライフラインの損壊、物資の不足や移動の不便などは除きます。(1. はい; 2. いいえ) Have you suffered from the following damage from the disaster? (Include physical damage such as injury, house and asset and financial damage such as loss of job, reduced income. Indirect damages such as inconvenience caused of lost lifeline, lack of supplies are not included) (1=Yes; 2=No)	DID
	東日本大震災によって、自分が被災した | Personally suffered from the disaster	
	東日本大震災によって、家族が被災した | Family suffered from the disaster	

Appendix B – Survey Questions for Second Part of the Analysis

	Variable	Code
1.	Use of mass media	MMMU
	あなたはこの一年で、以下のような内容のテレビ番組をどれくらいの頻度で視聴しましたか。 (1. 全く見なかった, 2. ほとんど見ない（1～2 回程度だけ）, 3. 時々見る（数ヶ月に一度）, 4. よく見る（一ヶ月に数度）, 5. 常に見る（1 週間に数度）) In the past year, how often had you seen the following contents on television? (1= Never, 2= Rarely, 3= Once a few month, 4= A few times per month, 5= A few times per week)	
1.1	東日本大震災の際の地震・津波による被害状況 | Damages caused by the Great East Japan Earthquake	MDG
1.2	東日本大震災の被災地域・避難地域の復旧状況 | Recovery status in the disaster areas	MRE
1.3	東日本大震災の震災からの復旧支援活動 (ボランティア活動, 募金, 寄付金活動) | Events supporting the recovery for the Great East Japan Earthquake (volunteering, charity events)	MAA
1.4	東日本大震災の復旧に関する問題・政策についての議論・討論 | Discussions on the problems and policies associated with the recovery	MDI
1.5	今後の災害・震災への備えについて | Preparations for future disasters	MPR
2.	Use of social media	MSMU
	この一年で、以下のようなメディアを通して、どれ位の頻度で震災復興や災害対策に関する情報を以下のものから入手しましたか。(1. 全く入手しなかった, 2. 1 回か 2 回程度, 3. 時々（数ヶ月に一度）, 4. よく（一ヶ月に数度）, 5. 常に（1 週間に数度）) In the past year, how often had you used the followings to obtain information relating to the disaster and recovery? (1= Never, 2= Rarely, 3= Once a few month, 4= A few times per month, 5= A few times per	

	week)	
2.1	ソーシャルメディア（Facebook/Twitter/mixi など）| Social network sites (e.g., Facebook, Twitter, Mixi etc.)	SSN
2.2	掲示板，フォーラム，ディスカッショングループ	Forum / BBS / Discussion group	SBL
2.3	個人、非公式のホームページ、ブログ	Blog / Unofficial homepage / Personal homepage	SBB
2.4	動画サイトのアカウント視聴 (YouTube，ニコニコ動画，USTREAM など)	Video sharing sites (YouTube, Niconico etc.)	SST
	Perceptions	
	メディア（TV/インターネット/新聞/雑誌など）で東日本大震災の復興情報を見聞きした際に、あなたはどのようにお感じになりましたか? (1. 全くそう感じなかった, 2. そう感じなかった, 3. どちらともいえない, 4. そう感じた, 5. とてもそう感じた) Did you feel the followings when you saw the information about the disaster and recovery from the media (e.g., television, Internet, newspaper, magazine)? (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly)	
3.	Concerns	PCON
3.1	被災地の状況に心が痛む	Heart-broken about the disaster area	PW1
3.2	被災者(家族)の状況に心が痛む	Heart-broken about the status of the people in the disaster area	PW2
3.3	被災者(家族)の経済的自立が心配だった	Heart-broken about the financial situation of the people in the disaster area	PW3
3.4	被災者(家族)の安全な暮らしが心配だった	Heart-broken about the safety of the people in the disaster area	PW4
3.5	被災者(家族)の心理的ケアが心配だった	Heart-broken about the psychological status of the people in the disaster area	PW5
4.	Bonds	

4.1	復興支援のチャリティーイベントにみて応援したいと感じた | Touched by the volunteering activities	PB1
4.2	厚い社会の絆を感じた | Strong bonds exist in the society	PB2
4.3	厚い家族の絆を感じた | Strong bonds exist in families	PB3
5.	Anxieties	
5.1	今後の震災に不安を感じた | Anxiety about future disasters	PA1
5.2	今後の震災に備える必要があると思った | Must prepare for future disasters	PA2
	Intentions	
	今後の東日本大震災の復興に向けて、あなたは以下のような事柄についてどう思われますか。 (1. 全くそう思わない, 2. そう思わない, 3. どちらともいえない, 4. そう思う 5. とてもそう思う) For the recovery of the Great East Japan Earthquake in the future, do you think you will do the followings? (1= Not at all, 2= Not much, 3= Cannot tell, 4= Somewhat, 5= Strongly)	
6.	Civic discussions	ICID
6.1	自ら復興状況や情報を調べたい | To find out more about the recovery status and information	IC1
6.2	家族と復興状況や情報について話し合いたい | To discuss with family about the recovery status and information	IC2
6.3	親しい知人や友達と、復興状況や情報について話し合いたい | To discuss with friends about the recovery status and information	IC3
6.4	会社や学校の同僚と、復興状況や情報について話し合いたい | To discuss with work or school colleagues about the recovery status and information	IC4
7.	Altruistic actions	IALA
7.1	募金をしたい | To make donations	IA1
7.2	周りの人に募金を呼びかけたい | To encourage other people to make donations	IA2

7.3	ボラティアなど支援に行きたい | To support volunteering works	IA3
7.4	周りの人々にボラティアを呼びかけたい | To encourage other people to support volunteering works	IA4
7.5	復興支援のチャリティーイベントに参加したい | To join charity events to support the recovery	IA5
8.	Preparations	IPRE
8.1	今後の震災に備えて、避難道具を揃えたい | To prepare supplies and tools for future disasters	IP1
8.2	今後の震災に備えて、避難対策を調べたい | To find out more about evacuation procedures for future disasters	IP2
8.3	今後の震災に備えて、日頃の安全対策を熟知したい | To learn about the safety procedures for future disasters	IP3
	Control Variables	
9.	あなたがこれまで経験した被災の状況と経験のうち、あてはまるものをお答えください。（いくつでも）(1. はい; 2. いいえ) ※「被災」とは、地震・津波などにより受けた身体的な被害、自宅などの物理的な被害、失業・休職・大幅な収入源などの経済的な被害を指します。　ライフラインの損壊、物資の不足や移動の不便などは除きます。 Have you suffered from the following damage from the disaster? (1= Yes, 2= No) (Include physical damage such as injury, house and asset and financial damage such as loss of job, reduced income. Indirect damages such as inconvenience caused of lost lifeline, lack of supplies are not included.)	SDID
9.1	東日本大震災によって、自分が被災した | Personally suffered from the disaster	
9.2	東日本大震災によって、家族が被災した | Family suffered from the disaster	
10.	Use of other media	

	この一年で、以下のようなメディアを通して、どれ位の頻度で震災復興や災害対策に関する情報を以下のものから入手しましたか。(1. 全く入手しなかった, 2. 1 回か 2 回程度, 3. 時々（数ヶ月に一度）, 4. よく（一ヶ月に数度）, 5. 常に（1 週間に数度） In the past year, how often had you used the following to obtain information relating to the disaster and recovery? (1= Never, 2= Rarely, 3= Once a few month, 4= A few times per month, 5= A few times per week)	
10.1	ポータルサイト・検索エンジン (Yahoo，Google など) | Internet port sites, search engines	MIP
10.2	国内の新聞 / 雑誌 | Domestic Newspaper / Magazine	MNP

Appendix C – Survey Questions for Third Part of the Analysis

	Variables	Code
1.	Knowledge - General level of knowledge of social issues (Dependent Variable - part 1 / Evaluation Variable - part 2)	Knowledge
	あなたは以下のニュースを知っていますか？最もあてはまるものを一つずつお選びください。(1. いいえ、知らない; 2. はい、でも聞いたことがあるだけ; 3. はい、少し知っている; 4. はい、大体知っている; 5. はい、詳しく知っている) How much do you know about the following news topic? (1=do not know, 2=just heard about it, 3=just a little, 4=know about it, 5=know in details)	
1.1	2020 年夏季五輪・パラリンピックの開催地が東京に決定 | Tokyo awarded as the hosting city for the 2020 Summer Olympics	fQ10_1
1.2	特定秘密保護法成立、「知る権利」論議に | Establishment of the act on the Protection of Specially Designated Secrets and discussion on the public's 'right to know'	fQ10_2
1.3	消費税 2014 年 4 月に 8％へ引き上げ決定 | Sales tax to increase from 5% to 8% in April 2014	fQ10_3
1.4	参院選で自民、公明両党が過半数獲得、ねじれ解消 | Liberal Democratic Party and Komeito Party won the majority in the House of Councillors election and ended the divided Diet	fQ10_4
1.5	安倍首相、TPP 交渉参加を表明 | Prime minister Abe declared to participate in TPP negotiation	fQ10_5
1.6	福島第一原発のタンクで、300 トンの汚染水漏れが判明 | 300 tons of contaminated water leaked from the tanks in Fukushima first nuclear power plant	fQ10_6
1.7	猪瀬都知事に「徳洲会」側から 5000 万円 | Tokyo governor Inose received 50million yen donation from the Tokushukai Group	fQ10_7
1.8	富士山が世界文化遺産に決定 | Mt. Fuji selected as one of the world's heritages	fQ10_8

1.9	アルジェリア人質事件、日本人 10 人死亡 | Japanese hostages killed in the Amenas hostage crisis	fQ10_9
1.10	中国が尖閣諸島を含む防空識別圏を設定 | China's decision to establish the East China Sea Air Defence Identification Zone' including the Senkaku Islands	fQ10_10
2.	Use of mass media - Viewing of television news and current affairs programmes (Independent Variable - part 1 / Evaluation Variable - part 2)	TVNewsCA
	普段、あなたは以下のようなテレビ番組をどれくらいの頻度で視聴していますか？最もあてはまるものを一つずつお選びください。 (1. 全く見ない; 2. ほとんど見ない（数ヶ月に 1 度以下）; 3. 時々見る（1 ヶ月に数度）; 4.よく見る（1 週間に数回）; 5. 常に見る（ほぼ毎日）) （録画再生して視聴する場合は含みますが、インターネット上の動画視聴等は除きます。パソコン、携帯電話・スマートフォン、携帯テレビ、車載テレビ等での視聴や職場、店舗等での視聴も含みます。） How frequently do you watch the following programmes on television? (Including recording viewing but excluding view from the Internet. Include viewing from PC, mobile phone, smartphone, portable TV, car TV, also including viewing in workplace, shops and restaurants) (1=never, 2=once in a few months, 3=few times a month, 4=few times a week, 5=almost daily).	
2.1	ニュース | News programmes	TVNews
2.2	時事討論番組、ワイドショー | Current affairs programmes	CurrentA
3.	Use of social media (Independent Variable - part 1 / Evaluation Variable - part 2)	SocialMedia
	普段、あなたは以下のようなメディアをどれくらい利用していますか？最もあてはまるものを一つずつお選びください。(1. 全く利用していない; 2. ほとんど利用していない（数ヶ月に 1 度以下）; 3. 時々利用する（1 ヶ月に数回）; 4. よく利用	

	する（1週間に数度）; 5. 常に利用する（ほぼ毎日））	
	How frequently do you use the following social media applications? (1=never, 2=once in a few months, 3=few times a month, 4=few times a week, 5=almost daily).	
3.1	Facebook (フェイスブック) | Facebook	Facebook
3.2	Twitter (ツイッター) | Twitter	Twitter
3.3	LINE (ライン) | LINE	LINE
3.4	他の SNS　(ソーシャルメディア)（mixi/MySpace など） | Others	Others
4	Simultaneous Multi-screening – level of Simultaneous Multi-screen activities (Independent Variable - part 1 / Evaluation Variable - part 2)	MultiScreen
	あなたはテレビを見ながら、前問でお答えの機器で以下のようなことをしていますか？ 最もあてはまるものを一つずつお選びください。 (1. 全くしない; 2. ほとんどしない（数ヶ月に1度以下）; 3. 時々する（1ヶ月に数回）; 4. よくする（1週間に数回）; 5. 常にする（ほぼ毎日）) How frequently do you do the following activities when you are watching television? (1=never, 2=once in a few months, 3=few times a month, 4=few times a week, 5=almost daily).	
4.1	テレビを見ながら番組の関連情報をネット又は SNS で調べる | Search for more information about the contents seen on television	MSSearch
4.2	テレビで聞いたことの真偽をネット又は SNS でを確認する | Check the truthfulness of the contents seen on television	MSCheck
4.3	テレビを見ながら番組に関するホームページ、ブログに書き込む又は SNS でつぶやく | Make comments about the contents seen on television	MSComment
4.4	テレビを見ながら番組の関連情報をホームページ、ブログ又は SNS で共有する | Share the contents seen on television	MSShare

4.5	テレビで見た情報によってネットや SNS で行動を取る(例えば、Facebook で「いいね！」を押す、Twitter で「フォロー」する) | Take actions (such as 'Like' on Facebook or 'follow' on Twitter) in response to the contents seen on television	MSAct
5.	Trust towards mass media on social issues (Control Variable - part 1 / Predictor variable - part 2)	
	ニュースや社会問題に関する情報を得る際に、各メディアをどの程度信用できると思いますか？ (1. 信用できない; 2. あまり信用できない; 3. どちらともいえない; 4. ほぼ信用できる; 5. 信用できる) How much do you trust the news and social issues information from television? (1= not trust, 2=mostly do not trust, 3=neutral, 4=mostly trust, 5=fully trust).	TrustTV
	テレビ（地上波、BS) | Television	
6.	Trust towards social media on social issues (Control Variable - part 1 / Predictor variable - part 2)	TrustSMedia
	ニュースや社会問題に関する情報を得る際に、各メディアをどの程度信用できると思いますか？ (1. 信用できない; 2. あまり信用できない; 3. どちらともいえない; 4. ほぼ信用できる; 5. 信用できる) How much do you trust the news and social issues information from social media? (1= not trust, 2=mostly do not trust, 3=neutral, 4=mostly trust, 5=fully trust).	
6.1	Facebook (フェイスブック) | Facebook	TFacebook
6.2	Twitter (ツイッター) | Twitter	TTwitter
6.3	LINE (ライン) | LINE	TLINE
6.4	他の SNS　（ソーシャルメディア)（mixi/MySpace など） | Others	TOthers
7.	Usage of Other media (Control Variable - part 1)	

	普段、あなたは以下のようなメディアをどれくらい利用していますか？ 最もあてはまるものを一つずつお選びください。 (1. 全く利用していない; 2. ほとんど利用していない（数ヶ月に 1 度以下）; 3. 時々利用する（1 ヶ月に数回）; 4. よく利用する（1 週間に数度）; 5. 常に利用する（ほぼ毎日）) How frequently do you use the following media? (1=never, 2=once in a few months, 3=few times a month, 4=few times a week, 5=almost daily).	
7.1	インターネット (ホームページ、ポータルサイト・検索エンジン など) Internet (Homepage, portal sites etc.)	ITNews
7.2	新聞	Newspaper	NEWP
7.3	ラジオ	Radio	RADIO