

**Risk Communication in Chile: A study of 2014
Valparaiso wildfire**

by

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Abstract

Global warming and the consequent increase in natural disasters have influenced global risk prevention worldwide. Although scientific progress has improved the prediction of risks scenarios, there are examples indicating there is a gap between scientific knowledge and the ways communities perceive risks. In this context, this empirical research aims to understand the communication gaps and social aspects that could explain the disconnection between the scientific world and communities at risk. This research analyses an interface fire that occurred in Valparaiso, Chile, in 2014, which has been the worst wildfire in the city's history. From a critical rhetoric of risk communication approach, this exploration concludes that in Valparaiso, top-down communication practices took place and communities at risk played an isolated and marginalized role, illustrating the predominance of a crisis management approach and a top-down information flow. This case highlights the critical role played by intermediaries, as key supports in the process and as central players able to fill communication gaps.

Keywords: risk communication, knowledge distribution, public awareness, citizen participation, and technical communicator.

To my mother Leonor, my husband René and my daughter Gabriela

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List of Acronyms

CONAF	National Forestry Cooperation
ONEMI	National Emergency Office
SFU	Simon Fraser University
UN	The United Nations

Chapter 1

Introduction, situating the inquiry

In 2015, Margareta Wahlström, who was at that time the head of the United Nations Office for Disaster Risk Reduction, said that “Chile is an example of how to do things well to face disasters”. While visiting the country on September 15th, 2015, the day after an 8.3 magnitude earthquake took place in northern Chile, the U.N. leader pointed out the successful efforts made to reduce disaster risks by the Chilean government. After the earthquake, the early warnings systems worked in an effective manner, allowing the evacuation of more than a million Chileans. National and international press described the Chilean performance as speedy, orderly and efficient and Wahlström expressed a similar opinion. To foreign eyes, Chile appeared as a country that invests in resilient infrastructure and early warning systems.

Unfortunately, this emergency performance was not a representative example of what happens in Chile. This experience contrasts other recent disasters faced in Chile like the 2015 floods and mudflows, which occurred in Northern Chile, leaving 300 Chileans isolated, 11.000 people affected and more than 20 people dead (Bio Bio website, 2015). This event illustrated the low capacity to respond, lack of public awareness and a lack of urban planning (Giesen, 2015). At the same time, this case showed a disconnection between scientists/experts, who had alerted about Chilean risks, and local authorities, policy makers and vulnerable communities.

This disconnection between scientists (expert sphere) and vulnerable communities (non-expert public) has been a pattern observed in different emergencies faced in the country. The earthquake that shook the country on February 27, 2010, and 2014 Valparaiso wildfire were other examples that illustrate that populations at risk did not have access to technical and critical information in a timely manner.

In this gap, risk communication plays a critical role. A concept that has been in use since 1984 (Paveglio et al. 2009), risk communication is understood as “the process of communicating responsibly and effectively about the risk factors associated with industrial, natural hazards, and human activities” (Leiss, 2004, p.401). This concept allows us to “improve the public’s ability to make appropriate decisions in view of technological hazards and benefits” (Cvetkovich, 1989, p. 255).

In a risk communication context the role of technical communicator is especially relevant. As a position that connects experts to policy makers and non-expert public, technical communicator provides an opportunity to work in a coordinated way and enhance the relationship among stakeholders in a risk management scenario (Grabill and Simmons, 1998). More than translating knowledge, a technical position can communicate risks but locating vulnerable communities into the decision making process and counteracting top down approaches (ibid)

It is in the context of these problems that my inquiry is situated. Specifically, I carried out an empirical research that looked at an interface fire that took place in Valparaiso, Chile in 2014. This research is an effort to understand communication gaps and some of the dimensions that could explain the disconnection between the scientific world and vulnerable communities. Although this is only one side of the story and risk communication as a field goes well beyond the relationship between scientists and citizens, my main concern is to understand beyond the surface how risk communication processes take place in Chile, and how a risk situation could be an opportunity for community development and empowerment.

1.1. The Valparaiso emergency, an opportunity to look at Chilean communication gaps

"Gabriela Mistral¹ called Valparaíso 'The standing city'. Standing up because people live vertically, from top to bottom. The hills are its shoulders and the sea, its feet. This differs greatly from cities, which are horizontal and laid down. Valparaíso is dry, hot and burning, the three meanings of 'Alimapu', the name given to it by the Changos, the pre-Hispanic fishing people who inhabited the bay. At night Valparaíso is 'Valparalights' and during day is 'Valparawind'. But 'Valparapoor is winning the game'."

Agustin Squella, 2014

The description given by the winner of the Chilean National Prize for Humanities and Social Sciences, Prof. Agustin Squella, captures well some of the tension observed in Valparaiso. Its adverse geography, its strong winds, its cultural values, and its poverty are some of the characteristics that help to understand the setting where this research takes place. Specifically, I analyzed a wildfire that occurred in Valparaiso in 2014. Called "the Great Fire of Valparaiso" for its level of destruction, it is the worst wildfire in the city's history. In total 16 people died, 2,500 houses burned down and more than 11,000 people lost their homes (La Tercera website, 2014).

This case draws attention because it could be classified as a "chronicle of a disaster foretold". Since 2012, several research groups, international organizations, local authorities and firefighters had warned about the high probability of a fire like this occurring but the level of public awareness was low and vulnerable population declared do not have information about Valparaiso risks before the emergency. The lack of economic resources, the high fuel load located in the top of the hills, the great number of landfills, and the lack of regional planning and community interest in getting involved in

¹ Gabriela Mistral (1889-1957) was a Chilean poet, teacher and feminist who won a Literature Nobel Prize in 1945.

city issues were some of the factors responsible for the magnitude of the event (Venegas, 2014; Correa & Castillo, 2015).

This case also illustrated the current challenges faced by the Chilean communication emergency system. Since 2010, when an 8.8 magnitude earthquake struck off the coast of southern Chile, several researchers have concentrated their efforts on the analysis of public policies and ways to improve the Chilean emergency communication system (Bordas, 2011; Montenegro and Peña 2010; Ramirez, 2011). However, there is still not enough empirical evidence about how information related to risk flows in Chile, how information is provided to the community, through which channels communities receive this information and how the affected communities interpret such information.

On a broad level, this thesis, from a communication perspective, aims to answer the question as to why 16 people died in the 2014 emergency when scientific knowledge had been produced and published about the Valparaiso risks, as well as awareness on the part of local authorities about the possibility of a major wildfire. It also intends to answer the question about why the communities at risk did not manage the information about the hazards in an effective manner. To answer these questions, I analyze the flow of preventive information and how the process of disseminating risks took place.

In this context, I argue that risk management institutions in Valparaiso exceed the economic and human resources needed to fulfil their tasks. Building on that, I conclude that this case illustrates that there are poor risk communication plans and a lack of community participation in Valparaiso. These practices cause a marginalization of vulnerable populations and perpetuate a top down and linear communication flow. At the same time, this case highlights the role of risk communication and specifically of technical communicators, which have critical functions in connecting the scientific sphere with risk practitioners and vulnerable communities.

1.2. Goal, objectives and scope

Building on and contributing to the literature that examines the current challenges in risk communication, the overarching goal of this research is to explore the process of the dissemination of preventive information and knowledge within risk management

institutions, research centers, and communities at risk in the context of the 2014 Valparaiso wildfire. The objective is to understand how this process influences the information flow, how much communities participate in the process and how other factors such as social characteristics or the relationships among the participants could affect this flow. To pursue this goal, this research is articulated around three interrelated objectives.

The first objective is to understand how information is distributed before an emergency in the Chilean risk management and prevention context. To illustrate this, the thesis will document a data flow in the form of a diagram that includes interested parties (stakeholders), distribution channels and any processes that bridge the stakeholders' interests.

The second objective is to explore and document whether or not the preventive information flow is blocked, including whether or not there are knowledge and information gaps. These findings will help to highlight possible factors that affect the effectiveness of the risk communication process.

The last objective is to develop a list of considerations to suggest ways to improve communication among risk management institutions, research centers and communities at risk in Valparaiso.

In keeping with the main goal of this research, the scope of this study does not consider the process of production and reception of preventive information, but rather focuses on understanding the complexity of the dissemination process and the conditions that affect it.

1.4 Theoretical grounding

The underlying thesis research addresses the tension between who produces knowledge and how it is received through a critical risk communication framework. This approach, promoted by Grabill and Simmons' (1998) work, is an effort to counteract the asymmetrical power relationship and linear communication approach established by the institutions that produce risk knowledge.

Grabill and Simmons' approach is "based on an ideal of participatory democracy in which risk is contextualized and recognized as something that emerges in the process of deliberation among truly diverse parties" (Jersen, 2014, p.90). This framework focuses on the role of context and local factors, emphasizing that citizens can contribute valuable knowledge to the decision making process, and the lack of such a process explains why many risk communication projects fail.

In order to address the separation between the scientific and public sphere Grabill and Simmons promote a "technical communicator position" as a function that is able to move between the research sphere, policy sphere and vulnerable populations. Through this function, this approach counteracts the separation of risk assessment and risk communication to locate the production of knowledge within communicative processes.

The social construction of risk is another key point in Grabill and Simmons' approach. This approach establishes that the meaning of risk includes different factors and interests and is characterized by "interactions between interests more or less powerful" (p.424).

To analyze risk communication practices, this frame includes the notions of power and oppression given by Michel Foucault and Iris Marion Young, respectively.

1.3. Relevance of the research

The importance of this research is based on three interconnected arguments. First of all, this study takes places at a critical moment in Chile. As a result of climate change and environmental degradation, a severe drought has affected Chilean territory for the last seven years (CR2 report, 2015). In 2015 the precipitation deficit was between 30 and 60% and is currently affecting the central region of the country. This hydrometeorological hazard has increased the number of fires in Chile, registering a growth of 27% in comparison to the historic average, and researchers argue that this adverse environmental scenario will continue in the coming decades (ibid). The impact of climate change observed in Chile is not a singularity; rather, climate change has increased the level of exposure to natural disasters around the world. In this context, studying risk communication, as an opportunity to exchange knowledge between the scientific world

and the vulnerable communities, could support a process of enhancing the level of the Chilean resilience, and therefore its sustainable development.

Secondly, this research takes place at a moment of change in the institutional emergency system in Chile. Since the 8.8 magnitude earthquake that took place in the country in 2010, there has been an ongoing process of improving the emergency system². Government, agencies, and research centers have made efforts to shift paradigms from crisis management to risk reduction in order to face better future risk scenarios. In this context, this research could contribute to the national discussion about risk prevention plans, providing empirical evidence on a process that has not been systematically analyzed.

Finally, there is not enough empirical evidence about how risk information flows and how information is provided to the communities at risk (Steelman and McCaffrey, 2013). In this context, this research is going to contribute to fulfilling this gap.

1.4. Overview

Each chapter in this thesis aims to address how knowledge related to risks is disseminated in Chilean society.

Chapter two begins by defining key concepts and includes a selected review of relevant literature about a) the evolution of the concept of risk communication and the challenges it creates, b) the description of two different risk management approaches, and, c) a revision of the role of mass media in an emergency context. The second section of this chapter describes the critical rhetoric of the risk communication framework, the approach promoted by Grabill and Simmons (1998) and the theoretical grounding for this research. This approach promotes the technical communicator role as

² The initiative establishes a National System of Civil Protection. This project includes the creation of a National Civil Protection Agency, a Civil Protection Committees and Emergency Operations Committees. More information can be found at http://www.senado.cl/sistema-nacional-de-emergencia-y-proteccion-civil-concuerdan-en-la-necesidad-de-priorizar-su-tramitacion/prontus_senado/2014-04-03/161935.html

the position that is able to connect the scientific sphere to vulnerable populations and argues to include a broader definition of risk as a social construction.

Chapter three describes the research design. This first section includes the method of inquiry, data collection and analysis as well as the limitations and obstacles of this research. The second section of this chapter includes a detailed description of the Valparaiso wildfire as a case study and includes the hazards and vulnerabilities of the city where this emergency occurred as well as the wider economic and political context of Chile.

Chapter four presents the core findings of this research. The results are presented in two sections. The first section includes information channels and communicative efforts among risk management institutions, research centers, and communities at risk, illustrating the linear communication flow observed in Valparaiso. The second section incorporates the factors and conditions that explain the communication gaps explained in the previous section. Particular attention is paid to factors such as the lack of social cohesion and citizen participation observed in the city as social conditions that explain communication gaps among parties. At the same time, this chapter includes the description of institutional practices such as multitasking researchers and close institutions that also explain the lack of connection between stakeholders.

Chapter five presents a discussion and conclusion building on the findings described in the previous chapter. This section highlights the importance of a technical communicator in risk communication scenarios as well as access to information as an essential element of public awareness and democratic and inclusive risk communication practices. The second part of this chapter presents some considerations for future work, where the role of technical communicator, alternatives media as well as the importance of enhancing local capacities is emphasized.

2. Chapter 2

Theoretical framework

2.1. Defining key concepts

Before setting out on our exploration of risk preventive communication in the Valparaiso wildfire, it is necessary to define the key concepts of this research.

2.1.1. Understanding hazards and natural disasters

“There is nothing ‘natural’ about a disaster. Nature provides the hazards – earthquakes, volcanic eruptions, floods and so on – but humans help create the disaster” (UN-ISDR, 2011). As the United Nations argues, there is a vast difference between the notions of natural hazards and disasters. A hazard is considered a “dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage” (UN website, 2015). These events could have a natural origin (hydrometeorological, geological and biological), technological origin (danger associated with industrial accidents) or environmental origin (impact on natural resources produced by human activities) (UN-USDR, 2004).

On the other hand, a disaster is a “result of the combination of the exposure to a hazard, conditions of vulnerability and the insufficient capacities to reduce the consequences” (UN-ISDR, 2004).

How do natural hazards become disasters? This is the question that arises here. One of the answers is that “an extreme natural event is not a disaster until a vulnerable group is exposed” (Wisner et al p.30).). According to Wisner et al. 2003, macro forces,

such as rapid population change or urbanization, as well as root causes like political and economic systems affect the level of vulnerability (2003). In light of these concepts, it is not surprising that the impact of a disaster is not homogeneous and disadvantaged populations are more vulnerable to the consequences of these events, confirming the strong relationship between poverty and natural hazards (Pelling, 2003, Roy, 2007, Romero-Lankao et al. 2014, de Ville de Goyet and Griekspoor, 2007).

The distinction between hazard and disaster inevitably prompts us to talk about risk. This concept is defined by the United Nations as the “probability of harmful consequences resulting from the interactions between natural or human-induced hazards and vulnerable conditions” (UNDP, 2009). Beyond simple scientific notions, this concept expresses multi dimensions that are shaped by individual and social values (McCaffrey, 2008). Indeed, the complexity of the concept lies in the notion that while risk is a "universal abstract idea" (Hampel, 2006, p. 5) it could be defined in different ways for everyone. "Although it is almost omnipresent, risk is still not a uniform object" (ibid). As Slovic (1999) points out, risk could be a "synonym for hazardous activity, consequences, or sometimes means threat" (p.282).

2.2 Literature review

Adding to the concepts I have introduced so far, in what follows I expand on three overarching themes for this research. I describe how the definition of risk communication has changed in the last decades, I incorporate the description of two risk management approaches, and finally I include a review of the role of mass media in the process of disseminating risk knowledge.

2.2.1 Understanding the concept of risk communication, from one-way flow to two-way exchange

Risk communication, understood as "the process of communicating responsibly and effectively about the risk factors associated with industrial, natural hazards and human activities" (Leiss, 2004, p. 401), is a relatively new and eclectic field of study. It emerged in 1984 when a Bhopal toxic gas leak took place in India, causing the deaths of 15,000 people (Paveglio et al., 2009, p.79).

Although risk communication nowadays has a more inclusive approach, being understood as a "network, an interactive process of exchanging information, opinions, and values among all involved parties" (Grabill & Simmons, p.425), the most predominant approach has been the Shannon and Weaver Model (McComas, 2006). It has been called the one-way flow, the technical view (Gutteling & Wiegman, 1996), and a positivist or technocratic model (Grabill and Simmons, 1998) due to its linear conception of communication. In a risk communication context this implies that experts convey specialized knowledge to the public (Paveglio et al., 2009) and educate people "to think about risk the way experts do" (Grabill and Simmons, 1998, p.421). Several authors have described this practice as a deficit model because it considers the public to be ignorant of risks, their probability and scientific knowledge³ (Frewer, 2004; Hilgartner, 1990).

This linear static definition of risk communication changed around 1990. By this time, the U.S. National Research Council had promoted including interactive involvement in the process (McComas, 2006). This new approach is part of the negotiated theory, which is based on a "democratic model" of communication (Ibid). At this point, I would like to embrace the criticism made by Grabill and Simmons (1998), who argue that even though the literature promotes inclusion of the public in decision-making processes, the solution is mostly associated with educating the public on the scientific perspective of risks. Even though people participate in risk communication processes, they do not intervene in knowledge production about risks. These authors

³ In this sense, scientific knowledge is called "Scientific truth", a conceptualization that implies the supremacy of the vision of the nature made by observations or experiments.

argue that this new approach is more inclusive but it tends “to assume equal power relations among public and scientists and local authorities” (p.427).

In recent decades, new approaches have included some of the aspects the previous theories left out, such as social conditions, perceptions and the context of communication (Paveglio et al., 2009). New perspectives have moved away from top-down communication practices to a more consultative and inclusive one. The “communication perspective” incorporates active public involvement in the design of risk management practices (Rowe and Frewer, 2000, Cvetovich and Lofstetd, 1999), suggest that research on risks understands that “risks are not limited to physical assessment but are also a reflection of the understanding of the social system and the actors playing roles within them” (p.3). In this direction, several studies indicate the importance of considering local environmental knowledge (LEK) in risk communication practices. According to this approach the lack of consideration of diversity in peoples and local knowledge systems is the main reason why major government efforts do not have direct impacts on the level of preparedness (Eriksen & Prior, 2011). Eriksen and Prior (2011) suggest that contextualized beliefs, attitudes and values affect the interpretation of risk communication messages. These Australian scholars argue that interactions with land and nature as well as the relationships between people and previous emergencies are associated with how people incorporate the risk information supplied by authorities`. Along the same lines, other researchers have argued that a “mental model” approach could improve the design of risk communication. This perspective is based on the assumption that communication is part of the constructivist paradigm, which rests on the idea that social beings share mental models of this social reality (Paveglio et al., 2009).

In this research, the concept of risk communication is addressed as a “network, an interactive process of exchanging information, opinions, and values among all involved parties” (Grabill & Simmons, p.425). At the same time, I adopt the conceptualization of Williams Leiss, who points out that in the risk communication flow there is an interaction between expert and public spheres. While one is characterized by a scientific view of risk, another one is understood as the place where the general public interacts. According to Leiss (1994) both spheres speak in “different languages” and address the process of assessing risks differently. This model establishes that

government institutions are located in the center of both worlds because “they have the responsibility to speak in both languages in diverse settings” (p.37). Thus, risk communication flow is developed in the interaction between these two spheres and is considered to be a “circular process, an opportunity to create new knowledge and transform and modify attitudes and behavior” (p.35).

2.2.2 Disaster management approaches

Gradual changes in the definition of risk communication have influenced how international agencies approach disaster management. The UNISRR has advocated a “shift in policy emphasis from post-disaster relief and rehabilitation to a more proactive approach of disaster preparedness and mitigation” (UNDRR, 2004, p.80) since 1990. If we consider the four phases of emergency management- mitigation, preparedness, response and recovery- there has been a shift focusing on preparedness more than recovery or changing from a crisis management approach to a disaster risk reduction one. In terms of information, while a crisis management approach prioritizes vertical flows of information and hierarchical relationships among parties or stakeholders, disaster risk reduction is grounded in open information management in which communication flows in matrix or nodal patterns (ibid).

Since the International Decade for Natural Disaster Reduction in 1990, countries have adjusted their policies and institutionality, presenting their local plans and progress in the World Conferences on Natural Disaster Reduction, like in Yokohama in 1994, and they have implemented international agreements such as the Hyogo Framework 2005-2015 and the recent Sendai Framework for Disaster Risk Reduction 2015-2030⁴.

⁴ Chile has been one of the countries from Latin America that has followed the UN international strategy framework since the 90s. At the same time, Chile is part of the Inter-American Network for Disaster Mitigation (INDM) established by the Organization of American States in 2007 and supported by the Canadian Agency for Cooperation International (ACDI) (Dipecho report, 2012).

2.2.3 The role of mass media in the process of dissemination of risk information

The analysis of information flow and how particular knowledge is received and understood by people inevitably prompts us to discuss mass media. Risk information is mediatized by mass media, impacting its scope, context and discourse. "Media has a huge impact on the ways in which risks are defined and are perceived by the public and authorities" (Vasterman et al., P. 107-114).

The impact of media is observed before, during and after an emergency event. In the first stage, media plays an important role, especially because "the relationship between motivation and acquisition of knowledge is proportional to the possibility of being exposed to certain messages" (Wolf, 1994, p.14). During and after the event, its role is to disseminate in real time accurate information related to the emergency in order to keep the population informed (Taylor et al., 2005).

In the dynamics of knowledge production, mass media plays a key role, especially its function in forming public opinion. In this context it is necessary to consider the concept of agenda-setting. The theory proposed by McCombs and Shaw (1972) argues that mass media plays a critical role in the delivery of a hierarchical list of important issues to society. This concept is connected to the framing theory, which is understood as "the impact of the salience of characteristics of media coverage on audiences' interpretation of these news stories" (Scheufele, 1999, p. 103). Both theories are part of the list of key concepts proposed by the literature on media and natural disasters (Vasterman et al., p. 107-114).

At the same time, the literature on risk management suggests that while news media does have a responsibility to mitigate the impact of disasters, it often does not play this public role (Stockdale & Sood, 1989). Taylor et al. (2005) point out that news media often do not provide accurate, up-to-date information during emergencies. On the contrary, they focus on "entertaining" their audience. Acknowledging the reality that "many journalists clearly abandoned the concept of fair and balanced coverage and became advocacy reporters" (Perkin and Izard, 2010 p. 5), this criticism goes beyond

the traditional journalistic practice of objectivity; rather, they focus on how some news media do not provide precise information to support recovery and mitigation stages.

Corvello et al. (1991) argue that channels among authorities and the public are affected by "selective and biased media reporting that emphasizes drama, wrongdoing, disagreement, and conflict; premature disclosures of scientific information; and oversimplification and distortions of, as well as inaccuracies in, the interpretation of technical risk information" (p. 111).

Chilean scholars made similar criticisms of the Chilean news media after the 2010 earthquake. According to Saez and Peña (2012), Chilean TV was sensationalistic in its coverage of this catastrophe. According to Souza and Martinez (2011), in the social absence of first person stories on Chilean TV, social networks became the main protagonist of disaster response in the 2010 emergency. The Chilean literature highlights the lack of systematization and academic study on the impact of media in emergency situations and disasters (Saez and Peña, 2012), arguing that it is necessary to consolidate an integrated information and communication system addresses emergencies using all the advantages of information technologies.

In this context, how news media portrayed the emergency in Valparaíso in 2014 was no exception. In their descriptions of the fire in Valparaíso with a high quota of drama, newspapers, mainly the regional newspaper, *La Estrella de Valparaíso*, used references to "destiny" or "luck" as a narrative tool to describe the origin of the fire and the drama experienced by the families of Valparaíso (Vargas, 2015). Biblical language was used in their descriptions, referring to "divine punishment", and "miracles" or epithets such as "apocalyptic" or "inferno" to represent the tragedy. Amongst these descriptions, the following stand out: "It is as if the city had to pay a divine punishment simply for being as it is. The pain continued till Sunday" (*La Estrella de Valparaíso*, 14th April 2014). "However destiny and bad luck contrived that Eliana, 76 years old, would again live to see her house consumed by flames" (*La Estrella de Valparaíso*, 14th April 2014).

On a lower level, using frames or final subtitles, information of public utility was given such as appeals from local authorities, and information on evacuation routes,

shelters and aid. Specific local information, which could be useful for residents or for those who wished to help with reconstruction, was not a priority for local newspapers (Vargas, 2015).

2.3. Theoretical framework: Critical rhetoric of risk communication

This research adheres to the “critical rhetoric of risk communication” frame. This framework, promoted by Grabill and Simmons (1998), understands risk communication as a practice of power where supremacy has been traditionally imposed by a scientific perspective, implying a linear communication approach and leaving out the public in the decision making process. The critical rhetoric of risk communication is part of the rhetoric of risk approach, which “is defined as the study of discourses about risk and how they function shape perceptions of human history” (Jersen, 2014, p.87).

This theoretical framework was chosen because it focuses on the role played by social and contextual factors and “it works from an idea of risk that emerges from the tenets of participatory democracy” (ibid. p, 90). As Grabill and Simmons (1998) highlight “we must be cautious in our use of the term democratic” (p. 429). They base their argument in that foster participatory democracy implies one that involves “the public in fundamental ways at the earliest stages of the decision making process... and actively participate in producing the policy itself” (ibid). In this context, these authors are open to include intermediary positions, as technical communicators, who “think systematically in ways that construct relationships between disciplines and publics... and it has an advocacy role ” (p.431).

While Valparaiso case offers detailed empirical evidences about social factors that interact in a risk scenario, illustrating how a community at risk has been marginalized of the decision making process, this critical rhetoric approach expands the definition of risk and it highlights the role played by risk communication practices in the process of knowledge production, taking distance from the traditional and technocratic way to describe risk communication.

This approach is articulated by three interrelated principles. First of all, it understands risk as a social construction, as I explained above; this means the concept of risk is defined by multiple discourses. The relevance of this conceptualization is based on locating knowledge production among communication processes and establishing that the parties exercise power differently. In other words, if we understand the production of knowledge as a part of the communication process, the interaction among communication participants (scientists and the public) is seen as a space of exchange and collaboration, avoiding the positivist way of understanding risk communication. This argument is based on the notion that “knowledge is not an accumulation of facts... rather a collection of perceptions that are agreed upon by a discourse community” (Grabill and Simmons, p. 424).

Secondly, the critical rhetoric of risk conceives the process of decision-making as “the key institutional location for knowledge making” (p.428), where different relations of power play a role. Thirdly, this approach promotes the idea of the contextualization of risk. Because of the way risk has traditionally been seen “algorithmically and audiences as universal, rational and therefore silent” (p. 429), this approach counters this supremacy by establishing that it is necessary to localize risk situations in a particular context, avoiding a generalization of the “public”⁵. This argument lies in the notion that seeing the public, as a unified group, “fails to consider groups that are not culturally identify with what the institutions consider the norm” (Simmons, 2007, p. 87).

2.3.1 Power and oppression

There is nothing new in suggesting that the production of knowledge is in the hands of experts. This reality establishes a hierarchy and arbitrary line between “the truth about risks and non-experts” (Grabill and Simmons, 1998). In order to counter this hierarchy, this framework promotes addressing risk communication practices through the notions of power and oppression given by Michel Foucault and Iris Marion Young.

⁵ For Grabill and Simmons (1998) the concept of public is problematic. They argue that the “public” is fictional and by understanding them as a unified group we decontextualize people affected by risks (p.429).

Michel Foucault (1977), who analyzes the relationship between knowledge and power, argues that the ones who have the power are the ones who decide which knowledge is valid and which is not. In the context of this research, the hierarchy of power in risk communication plays a pivotal role in knowledge distribution, and, consequently, in the level of public awareness because the risk assessment remains in hands of experts. Foucault states that institutions exercise power by regulating and constructing knowledge making through a system of rules and practices. Foucault argues that by understanding the manners in which power is used and looking for gaps in this system, “we can work toward resisting, even altering these unequal power relations” (Grabill & Simmons, 1998, p.417).

The concept of citizen participation and oppression takes place in the discussion of knowledge production as a practice of power. Iris Marion Young defines citizen participation as a process that provides an opportunity to influence public decisions and is a component of the democratic decision-making process. Young (2004) suggests that keeping groups out of this process is an example of exclusion, where a particular group dominates and has control. In the context of risk communication, this process is seen in the linear approach, where authorities and scientists formulate the knowledge, keeping the public as outsiders. As Grabill and Simmons (1998) point out, the concept of powerlessness that is part of the Young schema is relevant in the risk communication discussion. According to Young (2000), powerlessness is defined as a “lack of decision making power, and exposure to disrespectful treatment because of the lowered status” (p 2). As Young argues, “the only way to fight against powerlessness is to gain a greater consciousness” (p 3). This process is made possible by different methods such as access to education and literacy. In the context of risk communication, this can be possible if the public and affected communities have access to the information in adequate time and participate in the process of production of knowledge and preventive plans before an emergency; in other words, if citizens are part of the public process.

2.3.2. Risk assessments and technical communicator

In order to understand the tension between knowledge production disciplines and vulnerable populations, risk assessment is the central concern of Grabill and Simmons' work.

Risk assessments are understood as analyses that determine the level of risks in a particular area, and consider factors such as probability and magnitude of loss (Slovic, 1987). Because, only experts traditionally develop this process, it marks the beginning of a failing practice being considering as a positivist way to see risk communication (Grabill and Simmons, 1998). In order to address this issue, this frame dissolves the separation of risk assessment from risk communication to locate the production of knowledge as part of the communication process. Under this perspective, risk assessment "has to incorporate technical information about risk within a broader framework, including social, political and economical factors" (p.425). This conceptual change allows a more participatory process where communities at risk are integrated in the early stages of the decision-making process where the production of knowledge takes place.

One question that arises here is how risk assessment can incorporate social factors and communities at risk. Grabill and Simmons promote the concept of the technical communicator as a person who is able to "provide space for those least powerful within assessment and communicative decision making practice" (p.437).

The technical communicator, as one possessing the "research and writing skills necessary for the complex processes of constructing and communicating risk" (p.417.), is able to move from the expert to the public sphere and insert the public into the risk assessment. They move without any boundaries from the traditional assessments to the public. The incorporation of a technical communicator into the risk communication practice promotes a wider range of research practices where scientists could include the public in the construction of knowledge. The following figure illustrates role of the technical communicator in risk communication practice.

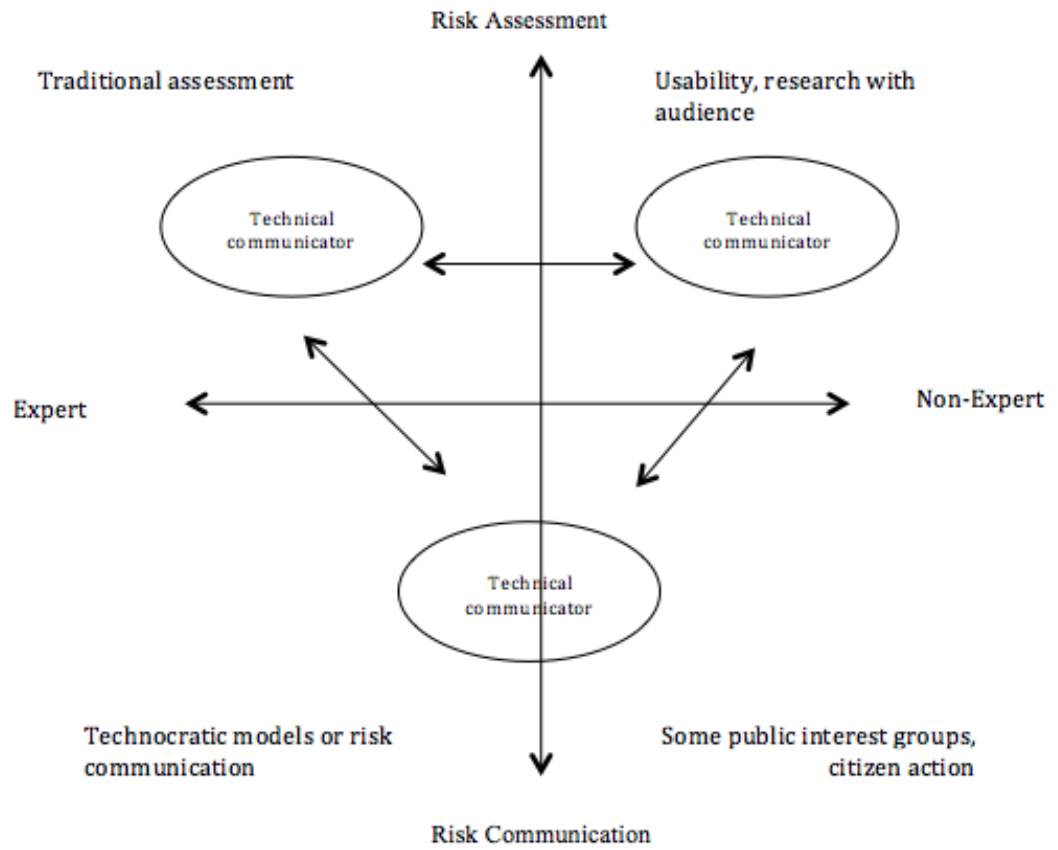


Figure 1 Multiple positions of the technical communicator. Grabill & Simmons (1998), p.434.

In this figure, four spheres are represented. On the top and bottom left sides the linear approach of risk communication is illustrated, where only experts make risk assessments. In this context, the technical communicator position is conventional, and the role is basically the translation of scientific knowledge. In contrast, on the right side, the public and non-expert sphere is represented. In this position, the technical communicator is able to “give voice of these audiences” (Grabill and Simmons, 1998, p.434), creating a place for a collaborative approach.

In this map the scientific and public sphere are divided binarily into the two spheres, scientific and public, by a continuous line. For Grabill and Simmons this representation is an “attempt to express a range of practices between ‘straight’ assessment and communication” (p.434). On the bottom, the position played by a technical communicator is in the middle of both spheres, where they are able to move from the technocratic model to citizen participation. In this way, this model prevents “exercises of power” (p.436), locating “communication into the realm of civic discourse” (p.435).

Grabill and Simmons introduce the concept of “usability” as the way citizens can participate in the production of knowledge. The usability practice lies in the notion that citizens have important knowledge to share with policymakers and traditional risk assessors. More specifically, through this practice, vulnerable communities participate in public space using technology and environmental resources. Here, they emphasize that usability does not mean testing methods; rather, they promote qualitative research and participatory and inclusive practices. The “usability testing” of risk communication incorporates citizens as “users” into the early stages of decision making, specifically in the production of knowledge, where local knowledge is commonly excluded.

2.4 Conclusion

Grounded in the premise that behind any disaster there is socioeconomic inequality, and an uneven distribution of environmental hazards (Taylor, p.36), in the first part of this chapter I address the differences in conceptualization between natural

hazards and disaster, making the point that hazards are natural and disaster are social events caused by vulnerable conditions.

Secondly, through a literature review I illustrated how the concept of risk communication has been changing over time. Although a technocratic approach has been the predominant approach, in the last decades a more inclusive perspective has been incorporated, including aspects of local environmental knowledge and the mental model approach. I linked the shift in risk communication conceptualization with the changes in disaster management. On this matter I emphasized how international agencies' focus has moved from the recovery process to mitigation.

Because news media mediate all this changes I reviewed the relevant literature about the role of mass media in the process of the dissemination of risk information, emphasizing that news media has focused on sensationalism in its coverage of catastrophes.

This chapter also includes a section on the critical rhetoric of the risk communication approach as the theoretical framework of this research. This approach promoted by Grabill and Simmons (1998) is grounded in the social definition of risk and it is an effort to counteract linear communication practices, introducing the important role played by a technical communicator linking science and practice. More than creating bridges between the technical and public sphere, it inserts the public into the production of knowledge.

3. CHAPER 3:

Research Design and Case Study

3.1 Research design

As I mentioned in chapter one, this research explores the 2014 Valparaiso emergency in order to understand and map how preventive information and knowledge related to fire risks were disseminated in Valparaiso before the 2014 emergency and, more specifically, to answer the following sub-questions:

1. How and through what channels do participants in the risk communication process distribute and receive knowledge related to fire risks?
2. How much do communities at risk participate in the decision-making process?
3. What kinds of factors affect the success of the process of dissemination of risk knowledge?

My interest in this type of examination is due, in part, not only to the relative lack of empirical material about the subject, but also to an interest in highlighting the perspective of each participant in the communication process (communities at risk, risk management institutions and research centers) as opposed to understanding risk communication as a linear practice of transmitting risk information, where the scientific sphere transmits knowledge to the public.

Methodologically, I employed a qualitative approach using a single case study design. Case studies are suitable for analyzing complex social phenomena, as they allow for the consideration of the holistic and contextual characteristics of real life events

(Yin, 2003) and the establishing of linkages between practical events and theoretical abstractions (Stake, 2000). Case studies have a powerful advantage in the identification of new variables (George & Bennett, 2005) and they are particularly appropriate for answering questions that focus on process and explanation (Yin, 2003).

In terms of the interest and relevance of the case, this emergency has a set of particular features that justifies its exploration with explanatory purposes. For example, the 2014 wildfire has been the biggest emergency faced by Valparaíso and the biggest interface fire in the country. At the same time, from a risk communication perspective, this case reflects a pattern observed in previous Chilean disasters: a communication gap among stakeholders. In the Valparaíso case, as well as in previous emergencies like the 2010 earthquake, experts were informed at a technical level and in some mass media about the high probability of having a risk situation. There were at least four institutions that alerted authorities about the risks in Valparaíso before the emergency included Universidad de Chile, Universidad de Valparaíso, Pontificia Universidad Católica de Chile and the National Forest Corporation (CONAF). A similar situation occurred in 2010 with the 8.8 magnitude earthquake that took place in the country. By this time, seismologists from Universidad de Chile had led researches on the high risks faced by the south of the country before the emergency. However, more than 700 people died because of the lack of wider public awareness (Chilean Congress Report, 2010).

In terms of data collection, the first step of this research was a revision of the frameworks written by risk management institutions in Chile and a national press review. The goal of this step was to identify the participants and the stakeholders in the communication process and institutionalized procedures in Valparaíso's context, as well as to collect information to write the case. At the same time, the press review had two objectives. On one hand, the goal was to do a chronological reconstruction of the case, and on the other hand to understand how media covered this emergency. This exercise was a valuable process for the fieldwork, producing a better understanding of the case and building a wider picture of the emergency.

Drawing upon the press review, the parties identified as key participants in the risk communication process in the 2014 Valparaíso case are the following:

1. **Risk Management Institutions**
 - i. Valparaiso Municipality
 - ii. National Emergency Office
2. **Preventing and Managing Fire Institutions**
 - i. National Forest Corporation (CONAF)
 - ii. Local Firefighter Companies
3. **Knowledge Production Institutions**
 - i. University of Chile
 - ii. Valparaiso University
4. **Vulnerable Communities**
 - i. Mariposas, el Vergel, La Cruz, El Litre, Las Cañas, Ramaditas, La Virgen, Merced, Jimenez, Yungay and Rocuant Hills.

The methodological tool chosen to gather information from the first three parties identified above were deep semi-structured interviews. In particular, a deep semi-structured method was used to gather information from professionals from risk management institutions, institutions that prevent and manage fire emergencies and institutions that produce knowledge. Guest et al. (2013) point out that semi-structured interviews are appropriate tools for gathering information from an individual perspective, or focusing on individual experiences, beliefs, and perceptions.

The most important goals of these interviews were to gain information about how risk knowledge was distributed, what channels they used, how they measured the effectiveness of the distribution and formulation of this knowledge, and to build a list of the main issues and challenges they face when they disseminate risk information.

As a part of the criteria list I included 1) direct involvement in the production of knowledge, prevention and emergency management related to the 2014 Valparaíso wildfire and 2) being willing and able to participate in a mutually agreed upon number of audiotape-recorded interviews.

At the same time, I used focus group interviews to gather information from vulnerable communities. This method, as a form of qualitative research, is an open conversation and a planned discussion led by a moderator (in this case I guided the conversation) who is responsible for introducing the questions and themes in the conversation in order to obtain the perceptions of the group about a particular area (Langford & McDonagh, 2003). This tool, used since 1936 (Stewart et al., 2007), allows us to understand the explanations beyond a surface level (Langford & McDonagh, 2003). As Langford and McDonagh (2003) point out, this method seizes on group synergy. In other words, focus groups leverage the conversational environment to their advantage. This argument rests on the idea that people behave differently when they feel empathy for others' opinions, as they feel more comfortable with opening up in the discussion (Stewart et al. 2007).

The most important goals of this part of the research were to understand how vulnerable communities from Valparaíso received information about their risks, identify their level of empowerment, determine how much they participate in prevention plans and knowledge production and their level of involvement in the decision-making process.

As a part of the criteria list I included 1) direct involvement in the 2014 Valparaíso wildfire and/or Valparaiso emergencies, 2) being at least 18 years old and 3) being willing and able to participate in a mutually agreed audiotape-recorded interview under a regime of confidentiality and anonymity (unless they wish otherwise).

In terms of ethical considerations and because Chilean institutions do not have research ethics boards, this research was based on the guidelines offered by Simon Fraser University and this project posed minimal risk to the research participants.

After I received Ethical Approval from Simon Fraser University I started the process of contacting participants via emails and phone calls. Because I identified key

participants in the news media revision, this process was fast and received a positive answer from the majority of the potential participants. However, one of the obstacles faced during this process was reaching professionals from the National Emergency Office, ONEMI. After several unsuccessful efforts trying to contact them, I did not include this institution in this research as they never replied to my emails or phone calls. This situation was contrary to the answers received from the rest of participants. After arranging a day, I carried out all the interviews in person at Valparaiso from April 12 to May 23, 2015. Ensuring free, informed, and ongoing consent of the research participants was my pillar in this research. In regard to this, all participants signed a consent form to participate and confidentiality was ensured before being interviewed. The following list includes the participants who contributed to this research:

1. **Risk management institutions:**

a. Emergency Department- Valparaiso Municipality: Institution in charge of the community emergency committee, COE, and Plan for Civil Protection at the local level.

2. **Preventing and managing fire institutions**

a. National Forest Corporation (CONAF), regional office: This institution is a private entity, but is dependent on the Ministry of Agriculture. Its main goals are to manage the forest policy of Chile and encourage the development of this sector. It has local offices in each of the 15 regions of the country. The regional office is in charge of the development of local programs and participates in the community emergency committee.

b. Valparaiso Firefighter Company: This is the country's oldest company. It was founded in 1851. Currently, it is composed of 16 companies. This institution works in three areas: rescue, forestry, and hazardous materials.

3. Knowledge Production Institutions

a. Universidad de Chile: This university is a national and public institution that was founded in 1842. This institution conducts 30% of the national research (UCH website), and it hosts the Forest Fire Laboratory.

b. Universidad de Valparaiso: a national and public institution and one of the most important higher educational institutions in Valparaiso region.

4. Communities at risk

a. Residents from La Cruz, Mariposas, Merced Hills. The majority of the population from this area is considered as a vulnerable population. Their incomes range from between 200,000 and 300,000 Chilean Pesos (between 400-600 Canadian Dollars a month) (Adimark 2010, Censo 2002),

3.1.1. Summary of data gathering

1. I reviewed national press, legal documents and frameworks in order to identify stakeholders and institutionalized processes related to Valparaiso's emergency procedures. The review included: 1) policy frameworks, regulations and government plans that intersect with natural hazards and risk communities and 2) websites, public declarations and manuals from the National Emergency Office and Forestry National Corporation, and local authorities. At the same time, I reviewed Chilean newspapers from April 12, 2014 to May 12, 2014. The goal was to write the case (the following section) and understand how newspapers depicted the emergency as a background to the fieldwork.

2. I conducted fieldwork, which took place in Valparaiso and Santiago, Chile. The following data collection activities were carried out:

a. Seven interviews with professionals from risk management institutions, local authorities and researchers. Participants were from The National Forestry

Corporation, the management emergency department from Valparaiso Municipality, local firefighter company, Universidad de Chile and Universidad de Valparaiso.

- b. Three focus groups comprised of Valparaiso residents (15 people in total).
- c. Three interviews with Valparaiso Residents⁶.

3.1.2 Data analysis

All the gathered information provided by the interviewees and focus groups was analyzed using thematic analysis. As Boyatzis (1998) argues, this method is a process of "encoding qualitative information" (p. vii). Thus, it allows the development of classifications that serve as labels for the data section. I used Atlas-TI software to thematically organize the information and I used a manual system as well. This process was developed from June to August, 2015.

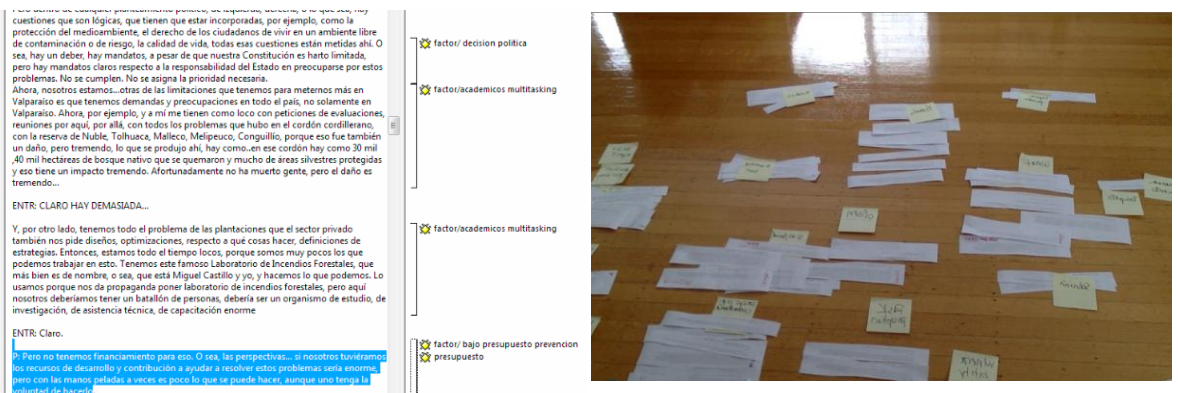


Figure 2 Process Analysis

⁶ These participants could not be part of the focus groups. Because of this I carried out three individual interviews.

All of the gathered information provides input to build an information flow diagram, which illustrates how risk information flowed in Valparaiso before the 2014 emergency and where the communication gaps are located. A flow diagram tool provides a guide for the analysis and mapping of processes. In exposing those interactions, it is possible to understand the complex mechanics of social processes and illuminate the potential for change. It allows the identification of significant activities and processes, and more importantly, the process to be observed from a general perspective but with enough detail to identify their issues (Lorino, 1993). This method helps to determine the interrelationships among the participants in the communication process, and the different stages of a process as well as by the identification of its problems to introduce changes (Madroñero et al., 2003).

3.2 Case Study

3.2.1 Emergency description

The emergency studied began on April 12, 2014 and lasted for 2 days. Due to its level of destruction it was called “the worst wildfire in Valpairo’s history”. The fire affected eleven hills of the city (Mariposas, El Vergel, La Cruz, El Litre, Las Cañas, Ramaditas, La Virgen, Merced, Jimenez, Yungay y Rocuant). As a result of this emergency, more than 2,500 houses burned down, leaving 8,000 people homeless, 17,000 people were evacuated, more than 1,100 forest hectares burned down and 16 people died (all from the Las Cañas hill). The temperature reached between 900 and 1000 degrees Celsius. Thus, access to and within the city was limited to disaster response workers. When the emergency became out of control, the Chilean president, Michel Bachelet, declared Valparaiso a catastrophe zone and decreed a state of exception. The Armed Forces took control of the public order and 1,700 military personnel moved into the city.

Many faucets were without water and the difficulties faced by the emergency personnel to reach the most affected sectors were some of the first criticisms among the

victims that arose after the catastrophe (El Mercurio, 2014). The first appraisals made by the residents were not far from the expert point of view. The Chilean urban planner Iván Poduje pointed out in a national newspaper “the rapid spread of fire and the difficulties to reach people at risk respond to the insufficient city planning” (ibid).

The emergency corresponds to a wild land-urban interface fire. This classification was created by United States organizations in the 1990s in order to describe a place located in an interaction zone between forest and urban areas (Stewart et al., 2007). In particular, a wildland-urban interface was defined as a zone with a high fire risk “where houses meet or intermingle with undeveloped wild land vegetation” (Castillo and Correa, 2015). In Valparaiso, this zone is particularly complex. On one hand, in this area the highest point is set above an altitude of 300 meters above sea level and quickly drops down within a few meters, resulting in abrupt slopes (Ibid); on the other hand, the vegetation in this area corresponds to artificial formations like eucalyptus (Ibid), which causes a great amount of natural residues like leaves, which are highly inflammable.

Enzo Gagliardo, the commander of the Valparaiso firefighter company, declared in a national newspaper: "I have worked as a firefighter for 41 years and I had never seen a fire of this nature. When we looked up, we could see all the hills with their houses burning. It was impossible to control the fire" (El Mercurio, 2014). Indeed, as Gagliardo argues, the high winds were one of the factors that precipitated the high magnitude of the fire, which spread at a rate of 70 km/hr (Emol, 2014).

Far from being an emergency that can be explained by one factor, several conditions interacted to produce the Valparaiso emergency. Local press and several authors highlighted certain aspects that allowed the rapid growth of the fire, as well as its magnitude.

In terms of regional planning, some factors mentioned were the lack of city planning and weak planning instruments. The communal regulatory plan is the policy that guides the organic growth of the city with the municipality goals. In Valparaiso this document has not changed in the last 30 years (Padilla, 2014). Although it received some modifications in the 1980s, no information related to wildfire risk was included. They only considered floods, earthquakes and tsunamis as hazards. It is important to

note here that this planning regulation did not change even though there was evidence illustrating the importance of including, for instance, fires, as one of the hazards to the development plan of the city (La Tercera, 2014; Gonzalez, 2009). In the end, “the 2014 wildfire paradoxically helped to accelerate the process of incorporating this risk variable into these instruments” (Garcia & Castillo, 2015, p.701). From June 2015, the Ministry of Housing and Urban Development decreed the incorporation of the risk threat of forest fires in the Communal Regulating Plans, this being a rules-mandatory provision.

Another factor that could explain the magnitude of the emergency was the illegal occupation of the territory. In Valparaiso, human settlements, most of which are illegal, have grown to the periphery of the city. As a result, the population was living in high risk areas. “This expansion of cities produces an unwise approach of the buildings to forest areas, having as a consequences a high level of vulnerability” (Castillo and Garcia, 2015, p. 700). At the same time, Valparaiso experienced population growth in interface zones. As Castillo and Garcia (2015) explain, the problem was that some people built houses on a small amount of land, which were mainly legal. However, their close relatives built more houses as extensions of the first ones, not following any safety guidelines and building in the ravines. This city expansion increased people’s vulnerability because in these areas there is a lack of routes for emergency vehicles, as well as a lack of sewage systems. The following figure illustrates the inorganic growth of Valparaiso. People live in ravines. Those areas are difficult to reach by emergency vehicles.

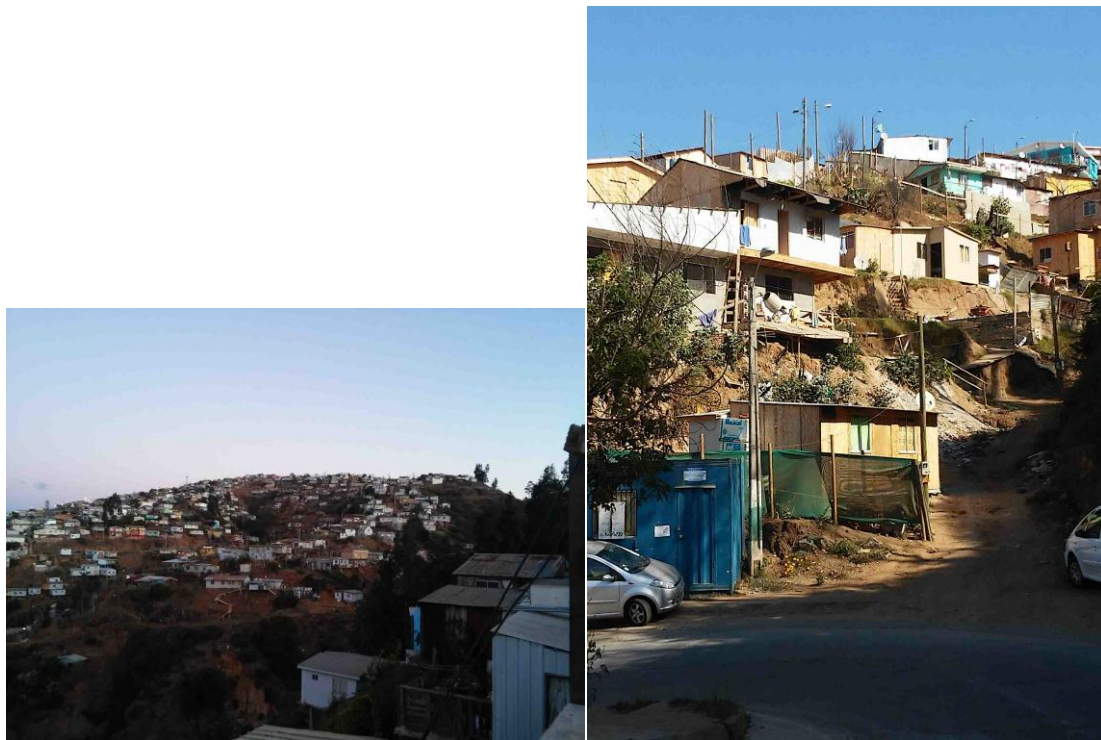


Figure 3 Valparaíso, La Cruz hill. Source: Sofía Vargas

The lack of appropriate collected and disposed of waste is another issue associated with the illegal occupation in Valparaíso that increased people's exposure to fires. In 2014, Valparaíso had 200 micro landfills in the city (La Segunda, 2014). According to a report written by the Recovery Program and Urban Development of Valparaíso (PRDUV), three conditions created this problem in the city: the geography, the social context and the shortcomings of the municipal waste collection system (La Segunda, 2014).

Valparaíso's meteorological characteristics are another factor to incorporate in the discussion in order to understand the complex scenario in which this emergency took place. This region, as well as the rest of the country, has been affected by a severe drought. The decade between 2003 and 2013 was the driest since 1866 for the central zone located from the Coquimbo to Biobío regions. At the same time, 2013 marked the fifth year of a rainfall deficit (La Tercera, 2014). This condition caused a low level of humidity, increasing the probability of a wildfire.

After the emergency, the eyes of the entire country were focused on finding the cause and those responsible for this disaster. After an investigation lasting 10 months, the National Police Office determined that the cause of the 2014 Valparaiso wildfire was two electrocuted birds who died after perching on power lines located in the El Peral farm. According to the report, the birds created an electronic arc, and the animals and their burning feathers fell to a site covered with grass and dried leaves (La Tercera, 2015). This situation, in conjunction with the factors mentioned above, led to the rapid spread of the fire.

3.2.2 A chronicle of a disaster foretold

“As if the city would have had to pay a divine punishment for being just as it is, the pain and the fire continued until Sunday, mobilizing the entire country through its solidarity and emergency network, help that never fails in these moments...” (La Estrella de Valparaiso Newspaper, April 14, 2014)

This is how the local newspaper “La Estrella de Valparaiso” described the wildfire that took place on April 12, 2014. Destiny, bad luck or simply God’s punishments were some of the explanations given to describe the emergency faced by the city and its citizens. However, far from being an unlucky city, the high level of Valparaiso’s vulnerability, due to its social, economic, geographic and meteorological characteristics, explains the magnitude of this tragedy. These factors were well known by technical authorities at the national and international levels.

The Wildfire Laboratory of the Faculty of Forestry at the University of Chile was one of the institutions that studied wildfire risk in the country. Professors Miguel Castillo and Guillermo Julio led research on Valparaiso. In 2013, Castillo was working on the project, where he identified 23 risk areas located in the city, all with similar characteristics such as houses built with high combustion materials, a lack of routes for emergency vehicles and a large number of landfills. In March 2013, Castillo reported to the “El Mercurio de Valparaiso” that local authorities were responsible for the high

wildfire risk faced by this city, particularly as a result of the lack of supervision and inspection (El Mercurio Valparaiso, 2013).

Professor Uriel Padilla led another study on Valparaiso's risks that was published two years before the emergency. The publication was written in the context of Padilla's Master's thesis and the results were disseminated among technical experts. Padilla ranked the riskiest hills in Valparaiso according to vulnerability factors. The risk was categorized according to technological, social, territorial and cultural aspects, incorporating multiple variables such as population density, the number of wildfires, the age of the population and their social and economic characteristics, land area, community organizations and the number of landfills located in the city. The results of this research were discussed in a local meeting with local authorities. In Padilla's words, "although the findings were disseminated, there was not any opportunity for collaborative work" (El Mostrador, 2014).

At an international level, the report, "Indicators of Disaster Risk and Risk Management", published by the Inter-American Development Bank in 2010, points out the low level of risk identification in Chile. Although the report highlights a high level of resilience considering the high economic losses as a result of the disaster faced by Chile, it also emphasizes that the level of risk identification in the country decreased between 2005 and 2008 and it represents the lowest in Latin America. This publication measured indicators such as inventory of disaster and losses, hazards monitoring and forecasting, hazards evaluation, mapping, risk assessment, community participation and risk management training and education.

At the same time, the International Council on Monuments and Sites was also alerted about Valparaiso's risks. In a report published in January of 2014, the international organization points out that the city is vulnerable to fires due to building materials and topography, making the point that this is a complicated reality for a city that was declared a UNESCO World Heritage Site.

Rodrigo Reveco made another warning call. A professional from the International Maritime Organization of the United Nations pointed out in the press that he sent a warning letter to the Valparaiso authorities indicating the high risk Valparaiso had by this

time. The professional argued that the at-risk areas in the city should be protected by firewalls. However, they were not built (America Economia, 2014).

The majority of the previous information about the risks faced by Valparaiso was distributed at a technical level. They were mainly disseminated in mass media after the emergency, but some of the researchers mentioned above warned about Valparaiso's risk in 2013 when another big fire took place in the city in the Rodelillo area. This emergency highlighted some issues related to houses that were built in areas not prepared for residents as well as a lack of appropriate and expeditious evacuation routes. Miguel Castillo stated in a national newspaper that "this city is facing a serious problem of land use. There are clearly deep conflicts in defining areas suitable for construction and expansion of land" (El Mercurio, 2013).

3.2.3 Environmental, social and economic context

As several authors (Paveglio et al., 2009, Cvetovich, G. & Lofstetd, 1999) have pointed out, risk communication processes correspond to local conditions. Building on this premise and, in order to understand where exactly this case took place, the following section describes the environmental and social background of Valparaiso as well as the political and economic context of Chile.

3.2.3.1 Valparaiso: a description of the city

From a physical-geographical point of view, Valparaiso is set in the middle of a coastal plain in a north-south direction in Chile. It is located between latitude 33°01' south and longitude 71°38' west. As a reference point, Valparaiso is situated 118 km northwest of the capital city of Santiago (Sanchez, 2009).

The geography of Valparaiso is one of its most well known characteristics. It is composed of 42 hills, which surround its port. "Valparaiso has a very small flat area, part of which was taken from the sea, so the significant majority of the population lives in the hills. In these hills, besides poverty, it has spread spontaneous architecture of buildings that look like fragile vessel about to set sail or burned" (Squella, 2014). As Agustin

Squella describes, Valparaiso has two areas, a flat area and the hills. The first part includes services and a commercial zone. The harbor and the Chilean congress are located there, and it is responsible for more than 80% of goods production and services and contains less than 5% of the population (Sanchez et. al, 2009). This part is situated from the sea level to 100 meters, and according to Padilla (2014), is the better constructed and more connected part of the city. The second area is composed of its hills. This zone has different levels of terraces ranging from 20 to 60 meters above sea level, reaching over 450 meters high (Ibid). 90 percent of Valparaiso's residents live in this sector and it represents 10% of goods and services activity (Sanchez et. al, 2009). The top area of the hills is poorly constructed due to the large number of illegal settlements. This region has 62 illegal settlements (Minvu website, 2011).

From the mid-nineteenth century to the mid-twentieth century, Valparaiso was the economic capital of Chile. It was the focal point for financial transactions and managed the development of mining and industrial companies (Valparaiso Municipality, 2014). In the nineteenth century Valparaiso received successive waves of immigrants, mainly European, which made the city a cosmopolitan and pluralistic place (ibid). But the city, which once had great cultural and economic wealth, has become impoverished over time. Natural disasters, like the 1906 earthquake that largely destroyed the city, external factors, like the opening of the Panama Canal in 1914 (Sanchez et al, 2009), and national processes, like the modernization and privatization of the harbor by the dictatorship of Augusto Pinochet, have increased the population's vulnerability (Grez, 2014).

Nowadays, Valparaiso is a city with a high level of vulnerability, with 12.69% of its people living under the poverty line (National System of Municipal Indicators-SINIM-2007) and the regional unemployment rate in the first trimester of 2014 was 7.4% (the national average was 6.1%) (National Institute of Statistics website, INE, 2014). The majority of Valparaiso's population has a low level of education. The predominant groups are identified as having an incomplete school level (Padilla, 2012).

3.2.3.2 Valparaiso's hazards

As recounted by Indirli et al. 2010, Valparaiso has been shaped by its disasters and how the city has had to be rebuilt after them. "Valparaiso tells the never-ending story of a tight interaction between society and environment, stratifying different urban and architectonic layers, sometimes struck by disasters and always in hazardous conditions" (p.543).

The city's hydro meteorological conditions mainly determine the natural hazards in Valparaiso (Urrutia & Lanza, 1993). According to the level of occurrence of the events, the most frequent natural hazards are floods. Erosion of the land, high slopes and high winds are the most important factors shaping the level of people's exposure (Padilla, 2012). Valparaiso has been affected by at least 60 disasters caused by floods (Urrutia & Lanza, 1993).

According to the magnitude of the event, earthquakes represent the most dangerous hazard to Valparaiso (Padilla, 2014). Several events, in 1730, 1906, 1985 and 2010 have affected the city, the most devastating being the 1906 earthquake (Memoria Chilena, 2014).

On the other hand, wildfires represent another major hazard for the city. From 2005 to 2009, the number of big fires in this area was 227. This means there were 70 fires per year, more than the national average of 40 (Infobae website, 2014). The fire season runs from January to April. According to Castillo and Correa (2015), the high frequency of urban fires in Valparaiso is a recent phenomenon, although they have been constant for the last 10 years. "Houses affected by fire were unusual before 2001 and the only reference was the 1968 fire that affected Gomez Carreño (200 houses) and 1994 at Rodelillo (56 houses). However, from 2001 the frequency of fires has increased every year" (p.698).

Valparaíso, in terms of its natural hazards, is complicated during the entire year. In this context, planning scholars argue that government agencies have failed to realize city planning from the point of view of potential disasters (Gonzalez, 2009).

Valparaíso's hazards are not an exception in the country. As a result of its geographical characteristics, combined with its demographics and social, political and economic variables, Chile has a high level of exposure to disasters (Dipecho report, 2010).

3.2.3.3 Chile, its political and economic context

The analyzed emergency took place in Chile. In order to understand this setting is necessary to consider that the social and economic Chilean context is marked by the dictatorship seen in the country from 1973 to 1989. "In these 17 years all the pillars upon which Chilean society was built since 1930 changed, building a social structure where capitalist accumulation colonized all spheres of social reproduction" (Mayol and Ahumada, 2015, p. 52). At this time, a restructuring was led by a group of Chilean economists known as the "Chicago Boys" because they followed Milton Friedman's theories and studied at University of Chicago. This is how Chile became a free market-oriented country and why it is also known as "the guinea pig of neoliberalism". Neoliberalism, as David Harvey argues, proposes that "human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free market and free trades" (Harvey, 2005, p.103). In the Chilean context, the market was associated with centralization and the state associated with control and hierarchy (Mayol and Ahumada, 2015). Since 1973 the political and upper class has settled a modernizing discourse where "social issues are seen as painful results, natural perhaps, of all this progress" (Ibid, p. 83).

According to Gonzalez, 2004, the macroeconomic success of the Chilean economic model, which is responsible for the stability of the economic and political system, has to be understood "from the disciplining of an atomized society, from a working masses afraid of being outside" (González, 2004, p. 3). The economic system transcends the financial transaction and affects the configuration of citizenship. As Gonzalez argues "common and public space lost their reference, which is occupied by the market. This framework redefines concepts such as citizenship, democracy and participation under its own logic" (Gonzalez, 2006, p. 7).

In spite of the significant macroeconomic growth and stability that Chile has shown in the last decade, it is a country with a high level of socioeconomic inequalities. According to the Organization for Economic Cooperation and Development (OECD), Chile has the highest income inequality among its member countries (OCDE website, 2015), with the richest groups having an income that is 27 times that of the poorest.

The information about Chile exposed above is relevant if we consider that there is a close relationship between political and economic system and risk reduction plans. Particularly pertinent in this case and as Krüger et al. (2015) argue “under neoliberal cultural frames, a process of authentic disaster risk reduction becomes extremely difficult” (p.103). This argument lies in the idea that “neoliberal frames of social and environmental relations have come close to being completely naturalised in current discourses, making alternative understandings extremely difficult to empower” (Gramsci, 1971, paraphrased by Krüger et al. 2015 p. 105).

3.2.3.4. Chilean emergency system -institutional framework

The last point of this section aims to describe the Chilean emergency institutional framework. Chile has a long history related to disasters and natural hazards, which has shaped the emergency normative system. For example, the 1928 earthquake that took place in southern Chile allowed the creation of the Law on Urban Planning and Construction; the 1939 earthquake boosted the earthquake-resistant building code; then, after the 1960 earthquake, the most powerful one ever recorded in human history, the National Emergency Office (ONEMI) was created; and after the 1985 earthquake the existing standard of earthquake-resistant buildings was strengthened (Dipecho report, 2012. p 29).

At a national level the National Emergency office (ONEMI) is responsible for the country’s emergency communication system. This institution is in charge of the coordination, evaluation, and control of any emergency situation in the national territory as well as the coordination of planning and administration of government funding. ONEMI has an Early Warning Center, which is responsible of monitoring possible risk scenarios (More information www.onemi.cl) and it has 15 regional offices in the country.

At the same time, in Chile there are other institutions, which advise and work coordinated with ONEMI, such as Hydrographic and Oceanographic Armed Service (SHOA), which is part of the navy, and the National Seismologic Center, which is part of the University of Chile.

Since the 8.8 magnitude earthquake that took place in the country in 2010, two processes have been taken place in Chile. On one hand, ONEMI has been widely criticized. Such criticism has focused on the slow reaction to warnings the public after the 2010 earthquake and the lack of information dissemination in a timely manner. It is important to mention that in 2010 the tsunami warning failed after the earthquake. This tsunami left 156 deaths and 25 lost people in total (Spanish news, 2011). As a result of this criticism, from 2013 to 2014 ONEMI focused on three strategic objectives: increasing confidence from the public in ONEMI, strengthening the work made by regional offices and improving response capability (El Mercurio, 2014).

On the other hand after 2010 earthquake there has been an ongoing process of improving the emergency system. Government, agencies, and research centers have made efforts to shift the paradigm from crisis management to risk reduction in order to face better future risk scenarios. There is a bill that modifies the current Chilean emergency structure. The law focuses on the creation of a National Civil Protection Agency, which would replace ONEMI. This turns into a decentralized system. The bill after several changes is still in the congress.

3.3. Conclusion

This chapter describes the methodological approach of this research and a description of the case study. Chapter 3 was divided into two sections. The first one included a description of a case study, as the research design, research questions, and incorporated details of the participants and summary of the data gathering. The second

one provides details of the 2014 Valparaiso emergency. This part illustrates a broader description of Valparaiso, as a port city characterized by its cultural value, poverty and challenging geography, and Chile, as a centralized and neoliberal country, as the setting where this inquiry took place. The last part of this section includes a summary of the Chilean emergency system. In this chapter, the fact that the fire risks were well known at the technical level and unknown for vulnerable population was highlighted.

Chapter 4

Results

The following section illustrates the most important findings collected by this research. This chapter is organized into two parts. The first section includes a description of how risk knowledge was disseminated before the emergency. The second part incorporates the factors and observations provided by participants that explain the previous map.

4.1 Part 1: Information flow – 2014 Valparaiso Emergency

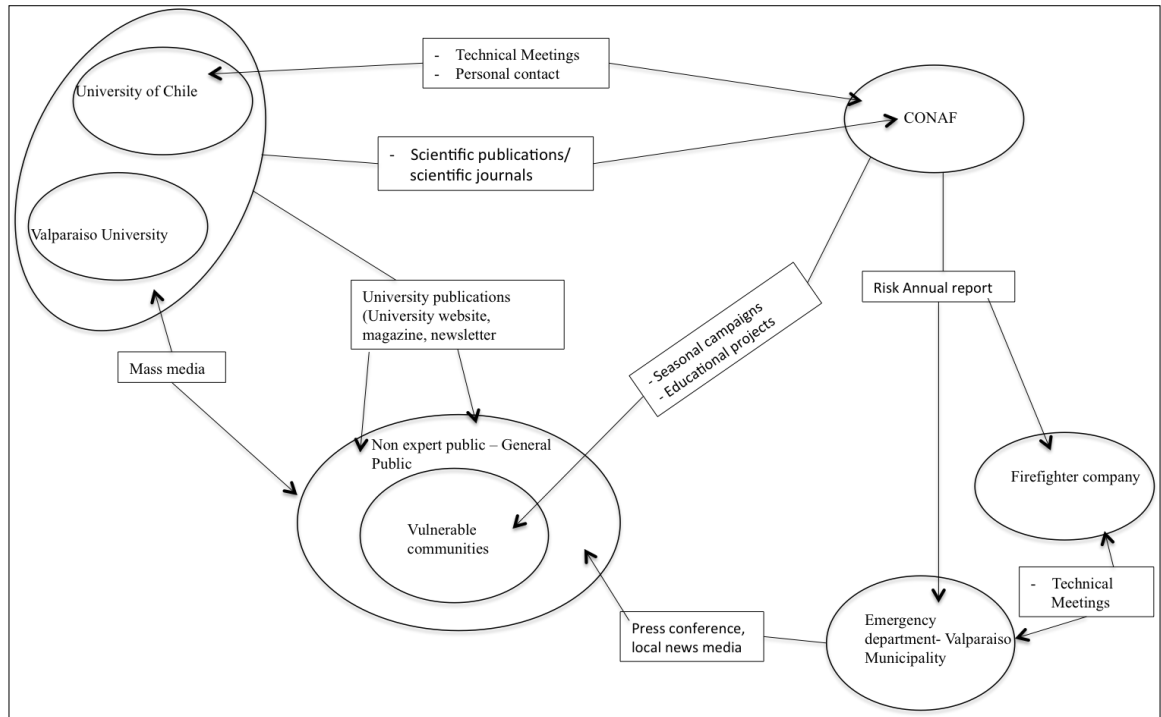


Figure 4 Own source: Information Flow

4.1.1. Flow description

This figure illustrates how risk information flowed from knowledge institutions to the vulnerable communities. This map includes the four parties that participated in this research (universities, Universidad de Chile and Universidad de Valparaiso; fire preventing and managing institutions, CONAF and local firefighters; local risk managers, Valparaiso Municipality; and communities at risk). The non-expert public is represented by one circle and the vulnerable population belongs to it. This distinction was made in order to illustrate that even though there are some activities that reach a general public, vulnerable community did not receive or participate in these initiatives. The direction of the arrows indicates who starts the communication and who receives it and the boxes represent the channels used to disseminate information.

One initial consideration that emerges from this diagram is that among the four parties there is a clear boundary between who produces knowledge and who receives it, establishing a linear information flow, and vulnerable communities are characterized for being only recipients of the information.

The main channel used by knowledge production institutions to reach the non-expert public was university websites. Researchers from these organizations argued that the public of those media are mainly internal and specialist, although the information is public. Moreover, there were no registered specific dissemination activities that reached Valparaiso residents as a vulnerable community. Moreover, they did not actively use mass media to disseminate their findings; on the contrary they are recipients of mass media requirements.

Scientists from both University of Chile and Valparaiso argue that the communication departments in their institutions have helped to connect their research to non-expert public. One participant from a Valparaiso university highlighted the role played by these units. "For example, the journalist who works in this faculty encouraged me to write opinion columns about Valparaiso risks. I have written a couple of columns published in La Estrella de Valparaiso newspaper. Because of this, nowadays there are more debate about risks", he said. Another researcher emphasized the role played by the outreach department of his university, which works connecting the faculty work with the society. "The person in charge of this department is generally a professor from the same faculty. It has the advantage that the person is well prepared in technical terms, but at the same time, he has multiple responsibilities, so he does not have time to work on that", mentioned a researcher.

One point that it is important to note here is that there was no fluid information flow between the participants from University of Chile and University of Valparaiso, even though researchers from both institutions studied the same research area.

As the map illustrates, University of Chile has a fluid communication to CONAF as a risk management institution. The connection between those two institutions is characterized by two-way exchanges of information and using personal contacts to reach among them. Participants from both institutions agreed that because they are mainly from the same discipline and studied at the same institutions, they share a similar background and many personal connections. At the same time, they agreed that although these kinds of channels are not institution-based, they are fast and efficient because they "speak the same language".

CONAF uses traditional linear dissemination activities to reach non-expert public and local risk managers, such as the Valparaiso Municipality. Among the activities registered were seasonal campaign, instructive brochures, and educational projects for forest fire prevention. In 2013 there were 5,228 activities developed reaching 52,370 people. Moreover, this institution sends an annual report to the Municipality, describing the riskiest areas as well as a recommendations list.

In 2013, the year before the emergency, the Local Emergency Department of the Valparaiso Municipality did not develop any preventive activities in the city, so there were no registered actions to disseminate risk information besides a press conference where the mayor of the city alerted the local population about the fire season. This activity takes place annually. Moreover, participants from the Firefighters Company and Local Emergency Department declared that the communication among them is fluid. They meet regularly and coordinate during an emergency; however, there were no preventive activities developed together in 2013.

As the previous description illustrates, the communication process in Valparaiso has a top-down approach, developing linear activities. There were no incidents of public involvement or opportunities for two-way exchanges of information and knowledge that included local and vulnerable communities. The communities at risk were passive, isolated and received limited information. At the same time, there were not coordinated activities developed in 2013.

The general lack of communication was a point acknowledged by participants from the four parties. For example, participants from knowledge production institutions were aware of the limited coordination with local risk managers and vulnerable communities and they criticized the fact that in the risk management system each institution's work served its own interests without considering the point of view of others. One researcher pointed out that "there is a total lack of communication. We are islands, where everyone moves by their own interests. In general, there is not an integrated and collaborative work". Another participant from a research institution said, "the few initiatives developed arise from conversation between friends who work in the different institutions and have the same focus. There are not an alignment between academic world and authorities".

From the perspective of vulnerable communities, the lack of communication is also a situation acknowledging by them and they claim to receive risk information in a timely manner. One resident mentioned, “I have never had any kind of information about Valparaiso hazards before the emergency. Unfortunately the connection with the municipality is only when we need them to cut down a tree or something like that”.

In terms of preventive projects, the majority of participants from the four parties said that they have the will to work in a coordinated way, but the problem is a lack of concrete planning. “What happens is that if I collect my studies and take them to the municipality, it's likely that they listen to me, we would probably have a cup of coffee together, then we will take a picture together, and finally I come back to my office and people from the municipality will continue working. In conclusion nothing happens. There are no actions”, said a participant from a research center. Another participant mentioned that the main issue is the perseverance. “We have been always good in the early stages. For example in a project formulation, in the first meetings or even in the first action, but then we fail. We fail in working on long term initiatives”, he said.

The disconnection described was observed before the emergency. After an emergency, they declare that they work in a way that is coordinated and aligned. In regard to this, a local risk manager said, “During and after an emergency we work in close alignment, we communicate well but the situation is different in the prevention phase. We have had only a couple of initiatives together”.

On sum, in Valparaiso's emergency there were multiple communication breakdowns (between scientific community and vulnerable community, risk managers and scientific community, local authorities and scientists, vulnerable community and local authorities). Although there were some institutions that had a close relationship, such as University of Chile and CONAF or Valparaiso Emergency Department and the Firefighter Company, from a systemic point of view the information flow was linear, limited and characterized by multiple communications gaps.

4.1.2 Part 2: Dimensions that affect information flow

This section illustrates the factors mentioned by participants that affect the risk communication process in Valparaiso. They are organized in social, economic and institutional dimensions.

4.1.2.1 Social dimension

a. Lack of Social Cohesion:

The general tenor of the discussions about the Valparaiso emergency with the majority of the participants suggested there is distrust among them, illustrating a severe lack of social cohesion. First of all, local risk managers do not trust the local community because they argue that residents are responsible for the high level of risk registered in the city; specifically, for the great amount of refuse in Valparaiso, which is described by them as the most important risk factor. A local risk manager argued, “here the first responsible are citizens. They cannot pretend that the mayor of the city helps them to take out their own garbage. Those people have other responsibilities”. In contrast, the residents claimed they have demanded changes in terms of disasters from local management as well as solutions to the collected waste problem. The following pictures illustrate these demands.



Figure 5 Valparaiso Social Demands. Cordillera hill, Valparaiso in April 2015
 Source: Sofía Vargas. Translation: Up picture: “Fires, floods, droughts or earthquakes. They are not nature, they due to the injustice, and abandon the people. Down picture: Valparaiso is Cultural Heritage of the Garbage. Wealthy people give us the money”.

Researchers also argued that Valparaiso residents do not want to be involved in city planning; rather, they believe that citizens do not consider the risk knowledge they possess (this point is further developed in the following dimension). As a local risk manager argued, the lack of confidence started when residents did not show any interest in participating in risk prevention activities organized by the Municipality. This complaint is related to a project developed in 2012 by the local emergency department, which included local meetings with the vulnerable population about their hazards. “In the end you get bored and angry because nobody seems to care about what happens in the

city”, said a local risk manager. This initiative was unsuccessful due to a lack of participation; therefore, the organizer decided not to continue it the following year, which was the year before the wildfire.

At the same time, the lack of confidence was also observed in the residents’ perceptions of local authorities. In interviews, residents complained on several occasions about the lack of information provided by the Municipality as well as that local authorities did not consider them in any prevention plans.

A lack of social cohesion is also observed among Valparaiso residents. The general lack of trust is a result of people’s feelings of insecurity. “We cannot trust in neighbors because there is a lot of crime in the city”, said a resident from Cordillera Hill. She argued that the fear of crime causes that people do not have any contact with their neighbors. “How people could be concerned about the environment or city’s problems, if they do not talk among with each other”. Researchers also mentioned this situation. A professor pointed out, “If the fire had been at night, the number of dead would increase because all the houses are locked due to crime or because at the corner someone sells drugs. In these hills there is a great number of older people, so the catastrophe would be worse if it was at night”.

Additionally, the relationship between researchers and media is also problematic. The information collected indicates that researchers did not use mass media frequently because they had had bad experiences with journalists. “I got bored of giving interviews because they called me only when a fire occurred, then the journalist went to my house with the equipment for an hour. And then, what happened? They used only five seconds. So they finally do not understand what I explained to the public, or interpreted it the wrong way”. Another researcher describes the same experience: “In the newspapers when we are giving an interview, it takes a long time and then they publish a tiny part of the interview. Instead of giving useful information, they focus on sensationalism”.

Residents share this perception. They indicated that even though they acknowledge importance of the role of mass media after an emergency, participants claim that they usually focus on the ‘morbid details’. One participant noted, “Nobody can deny that mass media are useful, but in some way they use us, they show the same

image with people crying all day. They want to show the morbid part of the fire". In terms of the role of mass media before the emergency, none of the resident interviewees mentioned that they had read the newspaper report about Valparaiso's risk before the emergency. They mentioned that they usually do not buy any newspaper; rather, they listen to local radio.

b. Lack of citizen participation

The lack of citizen participation was an issue highlighted by the majority of the participants. A resident from the risk community pointed out, "What happens is that we are living in an individual bubble, not in a community. Here, many times you find out that your neighbor died or is sick after two days, when it is too late. There is no interest in participating in a community". This lack of interest is described by another resident as a house without an owner. "Valparaiso properties are abandoned. There is an owner, but the owner is not present (in a symbolic way). As long as this condition exists the vulnerability will be present, then any accident could trigger a disaster" said a Valparaiso resident. The figurative absence explained by this participant is more complex if we consider the physical absence, especially in the forest area. "If you leave your property abandoned after three years, it is not difficult to predict that it will be affected by different hazards", said a participant. This resident described the place where the wildfire started, which was a forest and private area.

This lack of interest, according to the residents, is reflected in the refuse issue, which is one of the key problems that increase Valparaiso's vulnerability. "Everybody takes away their garbage to the ravine. Not only food residues, but also mattresses, sofas, everything", mentioned one of the residents, who lives in Cordillera Hill. "Valparaiso has more inhabitants than citizens. Because of the nature of the city, people overcome the adversity, but they do not learn from it. It is an ongoing challenge because people live in inhospitable conditions", said a professor from a local university.

The lack of citizen interest in the processes that take place in the city reflects also the "social poverty of the city", according to one participant. "On one hand there is

an environmental poverty, and on the other a social poverty. There is poverty developed by people but another developed by the lack of public intervention and public projects on the peripheries of the city, which ultimately manifested in a systematic abandonment of city activities”, mentioned one Valparaiso resident and researcher from a local university.

c. Risk perception

There was disagreement amongst interviewees about the risk perception of the affected community. Researchers (the majority) and risk managers pointed out that people at risk were well aware of Valparaiso’s risks, while this community mentioned that they did not manage information about the risk before the emergency, so they argue that the level of public awareness was low. One researcher argues that, for the high number of fires that have taken place in the last year in the city, they manage a great amount of information from an empirical perspective⁷: “They understand the fire language from their point of view. Residents can recognize the process”, said a researcher. Even though this perception was predominant among experts, one participant had another opinion. According to a researcher from a local university, Valparaiso residents have a weak social perception of their risk: “This low perception explains in some way the magnitude of the emergency. If they have more information the population would probably address the risk in a different way. I insist that the social perception of Valparaiso territory remains weak”.

The prevalent perception of researchers and local risk managers is contrary to the perceptions of the people at risk. They claim that they were not aware that the area they live was high-risk. One resident shared a critical moment when her risk perception changed. “After the emergency, one day I was in my house, specifically in the place where the balcony was before the emergency and I was shocked. I saw the hills and the forest and I realized that the forest was only a couple of meters away. Only in this moment did I become aware of where my house was. I was almost in the middle of the forest”, she remembered. Moreover, they argue that even though they know that in Valparaiso there are many fires every year, they have never thought that a fire could

⁷ In terms of previous experiences faced, one of the biggest was in 1955 when a mega fire took place. Then, there was another in 1968 where the fire burned about 100 houses in the Gómez Carreño neighborhood. In those years the discussion started about how the fires were the result of illegal occupation (Castillo, 2005).

affect them, nor that they lived in a risk zone. The majority of the residents mentioned that the reason that explains this contradiction is that the fires generally start and finish in the forest area. “Historically the fire has never moved beyond the forest. Here at La Cruz hill when other emergencies have occurred, planes came and wet the land and firefighters arrived, so the fire stops”. Another resident said, “Before the emergency we never knew we were in a risk area. Now, we have a map on the neighbourhood board, but before the emergency we never received any such information”.

4.1.2.2 Economic dimension

a. Lack of budget:

From different perspectives, the majority of the participants pointed out the economic dimensions that affect the preventive information flow. From an academic point of view, the lack of funding affects the number of dissemination activities researchers are able to engage in. “We have no funding for that. So, we have our hands tied. If we had the resources for development and contribution, the situation would be different. There is so little that we can do now”, said one participant. From the perspective of a local risk manager, the situation is similar. “Resources are the first obstacle we have when we want to start a new project”, said a professional from Valparaiso Municipality. The manager pointed out the precarious budget the Valparaiso Municipality has, especially for facing emergencies. “In this city any emergency becomes a disaster”, he said. To illustrate this point he compared Valparaiso’s annual budget with that of Viña del Mar, which is the city adjacent to Valparaiso. “For instance, Viña del Mar authorities celebrate that the casino gives 22 billion (Chilean pesos) to the municipal budget a year. At the end they receive only from one institution the total budget that Valparaiso has for the entire year. Under these conditions, there is nothing we can do”, he emphasized.

In terms of policies, the lack of long-term strategies has hindered the improvement of CONAF’s capacities. Participants highlighted this point. “With all the problems and emergencies faced last year, CONAF’s budget remained the same in 2015”. “People and authorities say that we have to be serious, but we continue to set the

same pace, as usual”, argued one researcher. “Forestry contributes to Chile’s income more than agriculture, but CONAF is absolutely in the background for the government,” said a professor. This lack of financial support affects directly the number of preventives activities CONAF is able to develop. One risk manager from this institution pointed out an example: “there is one project that we have done in public schools in the region but it has been not constant due to the lack of budget. The same problem the municipality has when they want to implement what we suggest to them”.

4.1.2.3 Institutional dimension

a. Researchers’ multitasking

One of the institutional practices highlighted among participants from research institutions (in this case Universidad de Chile and Universidad de Valparaiso) that affect the information flow is the multitasking work they have. They mention that they are aware of the lack of dissemination, but argue that they are not able to address this issue. “We have to do a lot of activities. First of all, our priority is teaching. This is the most important responsibility and takes us most of the time. The other things, like researching the Valparaiso area, are complementary activities and most of the time we do not have funding for that”, said one professor. Another issue mentioned by researchers is that since they have multiple projects in the country, they are not able to concentrate closely on any of them. “Now, for example, I am very busy with requests for evaluations and meetings for all the problems that occurred in the reservation of Nuble where about 40 thousand hectares of native forest burned. Every year we face a similar situation. We are a small research group with a high demand”, he indicated.

b. Closed institutions:

One of the practices that makes the dissemination process more difficult is the hermetic policy of some institutions. This point is linked to a difficult access to studies and public information and a lack of systematized information for non-expert public. Although since 2008 in Chile there has been a Transparency Law that implies that any citizen is able to ask for public information from public institutions, the process still takes time and according to the participants there are some institutions that still have a culture of restricting information. One participant from a local university mentioned, “the

information is compartmentalized. I think that sometimes this is caused by 'selfishness'. And this is a paradox because they are public institutions, then the information is public, they work with public funds, so at least the information could be published on the website". The difficult access to studies' results affects the communication among scientists. "If a website of a public institution has no information about the studies financed by them, then how us, the researchers, can contact people of other areas?" said a participant.

Furthermore, there is a lack of information to non-expert public. Although the knowledge production institutions have a communication department, their functions focus on public-relations activities and reply the press requirements. Journalists are in charge of this section, mostly. The majority of participants from these institutions consider valuable the work made by communication office. However, they acknowledged that this is not enough. "Since we have a journalist in our department, we have published more news in our websites. However we have great challenges to connect this information to people who do use this kind of media".

4.2 Conclusion

This chapter includes the most remarkable finding of this research. In the first part I illustrated in a diagram how the information flowed, making the point that the flow was linear and had a top down approach because there were no two-way exchange activities and vulnerable communities were not included in any initiatives.

In the second part of this chapter I incorporated the dimensions that affected prior information flow. In terms of social and cultural factors I mentioned the lack of social cohesion and the differences in risk perceptions as one of the most remarkable factors. At the same time, the economic dimension and lack of long-term policies are incorporated in the discussion as well as the lack of systemized information for non-expert public.

Chapter 5

Conclusions and considerations for future work

5.1 Conclusions

5.1.1 Lack of intermediaries

The result of this research illustrates that before the emergency faced in Valparaiso any institutions; departments or particular persons played the role of intermediaries between science and practice and among decision makers. On the contrary, there is a clear lack of information flow between the expert and public spheres.

This case provides evidence of the critical roles that mediators play in communicating scientific knowledge to non-expert public and locating people at risk in the risk mitigation plans.

As Rowan, 1991, argues, mediators could build trust among stakeholders for reaching agreement and motivating actions. At the same time, mediator positions, for instance, could fill the communication gaps and support the process of disseminating knowledge and taking on responsibilities those researchers and risk managers are not able to fulfill due o their own limitations (this point is extended in the following chapter).

5.1.2 Crisis management approach and isolated vulnerable communities

The top down communication practices, the isolated and marginalized position of communities at risk as well as the low level of public awareness proved that institutional efforts made by researchers and local risk managers were insufficient, sporadic and

focused on crises. As a result, the Valparaiso emergency illustrates that, in Chile, in terms of fire emergencies, a crisis management approach is still being taken.

Even though Chile has adhered to the guidelines and best practices to reduce risks promoted by international agencies, like the Hyogo Framework of 2005-2015, this case confirms that there is still an emergency response bias. The vertical and linear information flow, the dependence on specialized expertise and the hierarchical relationship among participants confirm this point.

The crisis management approach implemented by risk managers and scientific intuitions reflects the most common model of communication, the linear and vertical one, where there is not communication of any kind with the public (Simmons, 1997). Although participants from research centers and risk management institutions declared that they have the will to work with communities at risk, in 2013 only top-down communication practices were developed. The few preventive activities registered were mostly associated with educating the public into conformity through 'scientific rationality' (Grabill and Simmons, 1998) such as seasonal campaigns and educational projects. These power imbalances are institutionalized through formal and informal rules that structure the various ways in which those institutions operate.

Sustained and concerted efforts to improve public awareness are one of the primary elements of the risk reduction approach. However, few specific dissemination activities were developed in Valparaiso and those that were developed were disarticulated. There are no consistent programs in the city aimed at reducing risks, but there is a robust plan to implement during an emergency and participants declared their willingness to work in a coordinated fashion during the fire. This means there was a focus on disaster response over mitigation.

Additionally, as a result of a technocratic model of communication, people at risk are marginalized from decision-making processes. From Iris Marion Young's perspective, this practice illustrates an example of exclusion, where a particular group dominates and has control over the decision making process. In this case, control is in the hands of the institutions who manage and produce risk knowledge. In regard to this, it is important to note that researchers as well as risk practitioners mentioned being

aware of the lack of connection and that they have the will to get connected each other; however, in practice, the information is only in the hands of those who have the same background and status.

5.1.3 Lack of access rather than a lack of information

The Valparaiso case illustrates that in Chile there is no lack of scientific development or information about its hazards and risks; instead, there is a lack of access to systematic processing of the data. In a risk reduction context, “sorting, analyzing and targeting information for primary interest groups is critical in the dissemination of knowledge” (UN-ISDR, 2004). In regard to this, we could say that Chile is a country where risk information exists in an archived form and there is no systematization or dissemination of those findings. One example that illustrates this point is that in the Valparaiso region fires are geo-referenced but the information remains in an expert sphere. Residents do not have easy access to this information at a non-technical level. This point could be connected to the lack of trust among parties. As Handermer and Dover (2007) point out, asymmetrical access of information could cause a loss of confidence among practitioners, producing misunderstanding and unnecessary risks.

The encapsulated knowledge observed in Valparaiso’s case has several effects. On one hand, it affects the networking capacity of researchers and risk managers. As the results illustrate, in Valparaiso’s case there was an absolute disconnection among participants, even among those who belong to the same party. Due to this disconnection, participants are not aware of the efforts and projects conducted by others.

5.1.4 Lack of contribution of media

This research confirms the results of previous studies: mass media has not been playing its public role in a risk reduction context, as it instead has been focusing on a dramatic aftermath point of view (Vasterman et al, 2005). At the same time, this research confirms the lack of connection between researchers, risk managers and journalists. This cultural gap that has been well described in international reports (UN-ISDR, 2004)

As the UN argues, “it is vital that disaster managers and journalists interact regularly, in particular before a disaster occurs, in order to lay the groundwork for effective working relationships in the aftermath of a disaster” (p. 294). This is precisely one of the weaknesses observed in this case. Before the emergency a great amount of scientific information was published on a technical level, but there were only a couple of news articles published about Valparaiso’s risk before the emergency.

At the same time, this research confirms that “media is a greatly undervalued mean for increasing public awareness and providing information related to disaster reduction” (ibid, p. 210). As the previous chapter illustrates, researchers focused on previous disappointing experiences and they did not mention nor consider the value of mass media in the process of the dissemination of knowledge and improving public awareness. The relationship between mass media and researchers is an area to be considered for future research.

Another key point here is the role of alternative media. Participants from scientific institutions as well as local authorities mentioned only the role of traditional mass media like newspapers; however, residents pointed out that they did not buy or read newspapers. In this context, vulnerable communities could take advantage of these resources, as grassroots platforms able to converge and bridge technologies to citizen empowerment (Rodriguez, 2009), to reach authorities and to organize themselves.

5.1.5 Lack of cohesion as a symptom of a system

One of the issues highlighted by this research is the lack of cohesion observed in Valparaiso. The lack of trust among stakeholders invites to observe the situation from a macro perspective. In this context I incorporate in the discussion the impact of clientelist and short-term policies, where top-down initiatives are commonly implemented.

In order to introduce this point, the following figure correlates the dimensions given by participants at a broader level.

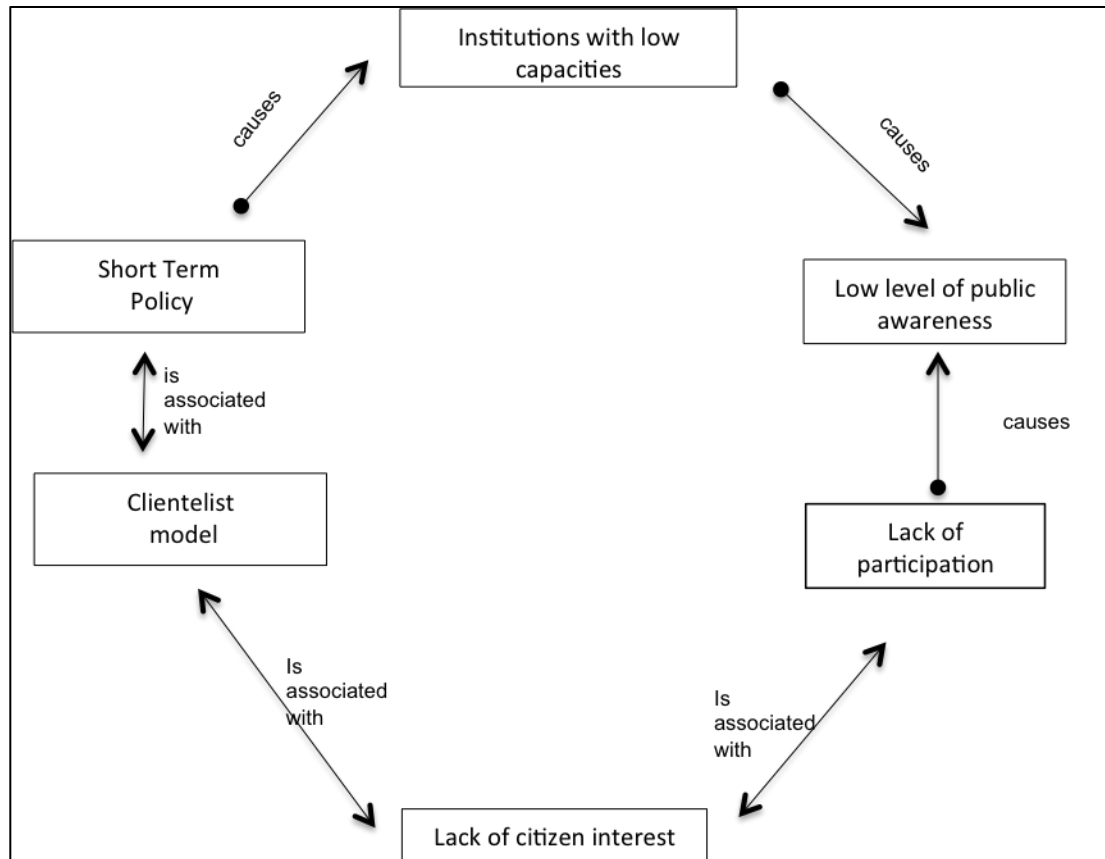


Figure 6 Dimensions that interact in the risk communication flow

These interactions illustrate the complex dynamic shaping risk communication practices and how the political and economic system could affect the way risk management and human vulnerability are comprehended (Wisner, 2003).

The diagram shows a linear chain of causes. First of all, as participants from risk manager institutions pointed out, in the recent years the national emergency system has not changed substantially despite the important emergencies faced from 2010 to 2015,

they argue that the government approach has been primary clientelist⁸, this means they react to an emergency involving material needs but there is a lack of initiative to prevent and empower vulnerable communities. This issue is associated with short-term policies. In this case, this point is illustrated, for example, in the CONAF budget, which remained the same in 2015 despite the emergencies faced in 2014. This situation shows the lack of political support this institution has. Secondly, beside the lack of budget, short-term policies are reflected in institutions with weak capacities, and this situation also affects the level of public awareness. Thirdly, the lack of risk awareness is associated with the lack of citizen interest, an issue pointed out by the majority of the participants. In the end, there is a vicious cycle, where Valparaiso residents wait for the government to help and resolve their precarious situation. Residents remain in a depoliticized position where they only receive material solutions after a disaster.

Moreover, for some researchers and risk managers the emergency is due to a "lack of interest by the citizens". They rely on the idea that citizens "do not want to participate or that they do not want to protect their city because they do not care about it", as one researcher pointed out. In other words, they appeal to individual responsibilities. This situation seems to be more complex than just a lack of citizen participation. As Michael Sandel argues, a citizen with a low level of attachment is a classic result of the neoliberal model. This author argues that an individual under liberalism is rationally selfish, interested only in protecting their property and totally detached and uprooted (Sandel, 2004). At the same time, as Gonzalez, 2006, argues, the neoliberal Chilean context has redefined the logics associated with citizenship and social participation. In this context, the lack of cohesion is also a symptom of a system where interrelation is mediated by the market, where there are transactional relationships among citizens and authorities.

⁸ In this context clientelism is understood as a system or exchange based on "a complex of rules and practices for the organization, representation, and control of the demands and interests of society; these relationships are based on political subordination..." Heredia (1997) p. 4.

5.2. Considerations for future work: Moving forward

Taking into account that “there is no standard set of practices or a uniform methodology to address disaster risk management” (UN-ISDR, 2004, p.126), the following considerations were written in light of the results of this research, and after hearing the different perspectives of participants.

5.2.1. Incorporating different kind of intermediaries in the mitigation management process.

In the context of risk reduction, how much information people manage before an emergency is critical and could make the difference between dying and staying alive. As Davies et al. argue "equal access to resources is needed to understand, reassess the risks and, if you will, to re evaluate the grounds for decisions and discussions" (Davies et al. 1987, p. 34).

Valparaiso case illustrates a clear lack of information flow between the expert and public sphere, highlighting the importance of the information exchange among expert institutions, risk managers and communities at risk in the mitigation and preparedness stages. In this context, one key point to move forward in Valparaiso is to consider different kind of intermediaries able to connect expert and public spheres. The following section includes three potential intermediary positions that could enhance the communication in Valparaiso context.

- **Data management and open principles initiatives**

When we observe Valparaiso case one initial is to have a data management support that allows to have public information systematized, with free access for expert and non expert public. In this context one strategy could be the development of projects that use information and communication technology (ICT) incorporating open science and government principles. This approach looks like an opportunity to counteract the communication breakdowns observed in this case because it could gather risk information from different sources. As Silva et al. (2013) point out, “data which lie on different data solos become more useful and meaningful when interlinked with other

related sources and such sharing is becoming increasingly essential in the case of disaster data management” (p. 593).

There are some international projects that incorporate information technology (IT) with open principles in different stages of risk mitigation. One example are “Responding to Crises and Unexpected Events”, RESCUE, and “Sahara” projects (Silva, et al. 2013). Both initiatives look at technological platforms that include risk information, allowing data integration. I would like to make the point here that these kinds of projects are mainly developed by Free and Open Source Software (FOSS) application. This kind of software has a low cost, thus they fit with organizations that cannot afford to invest a great amount of resources in disaster and information management (Careem et al. 2006). So it could fit with Valparaiso municipality, or CONAF, for example, organizations characterized by low funding for risk reduction projects.

At the same time, local residents could use these tools that provide information with public and easy access. Even though this process would not ensure an in-depth understanding of risks, this practice could be the first step towards a more integrated system where people at risk could participate in the risk communication and decision making process and improving the level of public awareness.

It is necessary to consider here that the majority of current information in Chile is public, but it remains in a repository form with difficult access for non-expert public, and even among researchers, as one participant from a local university mentioned. In this context, open projects could face the challenge of having a scalable management of information.

- **Technical communicator position**

Another intermediary position that could boost communication among Valparaiso stakeholders, and it could be complementary to the previous one, is the technical communicator position promoted by the critical rhetoric of risk communication framework. This position could promote interactive exchange between expert and public sphere, encouraging a dialogue among citizens and local authorities. One

advantage of this approach is that it encourages face-to-face interaction, which in this particular case is quite relevant due to the lack of trust among Valparaiso residents and is key to achieve effective communication practices (Witte, 1995; Sellnow et al. 2009).

The following figure illustrates the multiple positions that a technical communicator could have in Valparaiso context.

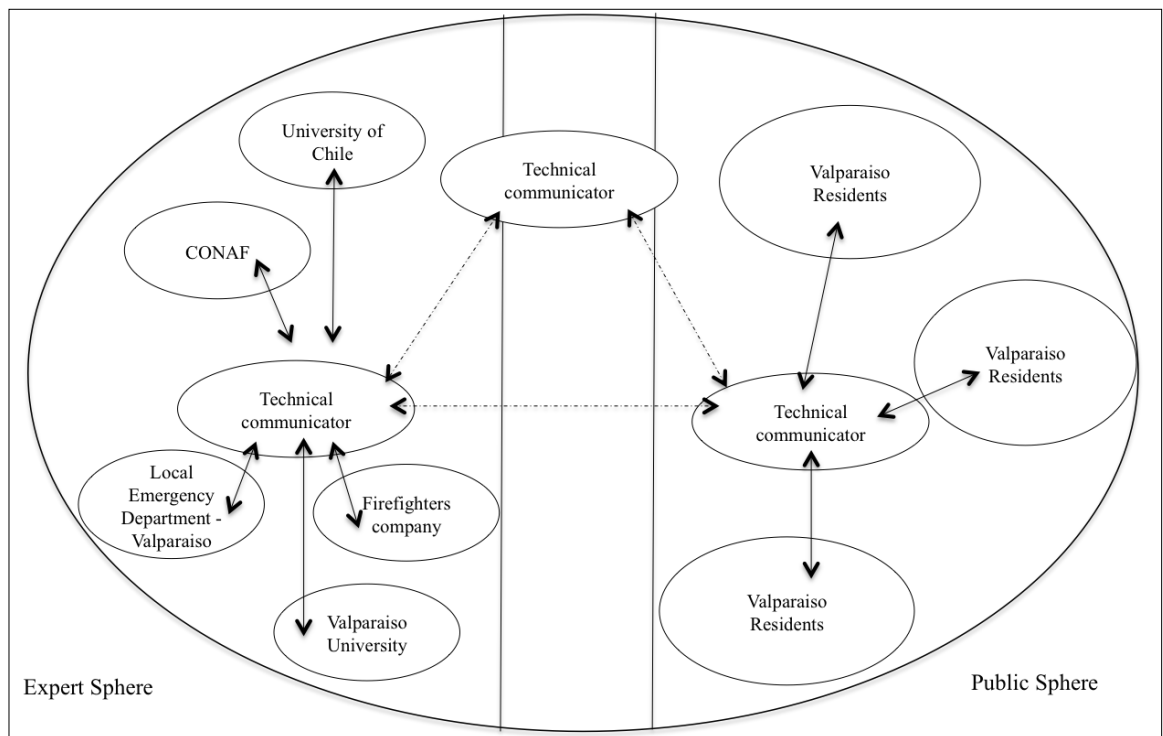


Figure 7 The potential multiple technical communicator positions

This figure shows the parties that participated in this research and how the technical position could connect them. On the left side, the expert sphere, where technocratic practices are mostly developed, is represented. The knowledge production and risk management institutions included in this sphere were located according to their proximity. On the right side, the public sphere, Valparaiso residents, is located. The three figures included on this side symbolize the different kinds of Valparaiso residents (university students, population with a low level of education, population with high incomes, people who live in heritage sites, etc.). The arrows indicate who start and who

receive the information, with emphasis in two ways exchanges, and the dotted arrow illustrates the different places where a technical communicator could operate in a risk communication context.

As the map shows, a technical communicator could play multiples roles in a risk communication context. First of all, they could make connections between the two spheres and even among parties from the same sphere.

Moreover, this position could translate the risk knowledge into concrete practices that strengthen community capacities. Because the technical position looks for an integrated approach, “by moving from information transfer to community knowledge production” (Hughes, 2002), it could insert people at risk into the production of knowledge through two-way activities and incorporating local knowledge in local mitigation plans. In sum, this map illustrates a technical position that works in knowledge production areas, not only information flows.

In this context, this position could be incorporated in the National Emergency Office, ONEMI. Because this institution is in charge of the coordination efforts among different stakeholders, the technical communicator role could promote citizen participation processes and create bridges among risk managers, authorities and community at risk, helping to reduce the distance among these spheres. In this context, ONEMI could boost its intermediary position among different stakeholders.

Building on that and taking into account the idea of usability promoted by Grabill and Simmons (2009), one strategy that a technical communicator position could promote to include vulnerable communities into risk assessment processes in Valparaiso could be using technology and environmental resources to map Valparaiso landfills which are one of the key issues in the city that increase the level of risk. By this initiative, for instance, citizens are involved and the process of knowledge production acknowledges local knowledge and local land uses.

Broader communication and outreach offices

The lack of connection between universities, research centers and society has been well described by literature (Watson et al., 2011, van Schalkwyk, 2004). In Valparaiso case, the fact that research centers and universities are not well connected to non-expert public it is not surprising.

In regard to this, the communication and outreach offices play an important role. In the current Valparaíso context, the university communication departments are in charge of disseminating the knowledge produced. However, they are mainly focus on public relations or respond media requirements.

In this context, one possible consideration could be incorporating broader communication and outreach offices in the knowledge production institutions (universities), and risk manager institutions. These communication departments would be in charge of developing local strategies to strengthen the communication process among the technical sphere and it could link local needs to scientific knowledge. At the same time, because there were observed only linear communication efforts in Valparaiso case, the incorporation of broader communication practices could include to develop two ways information exchanges.

5.2.2. Increasing local capacity

At an institutional level, the Valparaiso case clearly illustrates inefficient risk management practices. Although there is a local emergency office, it is unable to fulfill its tasks for different economic and social reasons. This situation illustrates the need for the improvement of local capacities. To reach this point, from a macro perspective, it is necessary to include a decentralized decision-making risk management approach. Chile is a unitary, highly centralized country. These characteristics are observed in different policy practices, and risk management is no exception. In order to strengthen the local capacities it is necessary to have a decentralized national emergency system.

In a local level, one strategy that risk managers could consider to increase their local capacities could be to take advantage of the fact that Valparaíso is a university town. Although as a result of this characteristic a great number of Valparaíso residents are not permanent, there is a large youth population who are leading social changes in Chile and who are university students. This population could be a partner to local authorities and actively participate in risk prevention plans. Indeed, in 2014 Valparaíso emergency, university and high school students led the recovery stage (Unicef, 2014), helping rebuilding houses and in debris removal.

At the same time, there is an urgent need to rebuild community relationships and trust among Valparaíso residents in order to strengthen community-based organizations. As the result of this research shows residents are not involved in any preventive plan, they are an oppressed community with a high level of vulnerability.

In this context, one strategy that the vulnerable community could address is promoting the work done by neighbourhood boards. Local leaders could connect neighbours to local authorities and push local authorities to incorporate their perspectives into local prevention plans. In this way, local participation could be a way to resist the top-down governance practices that characterize disaster management in Valparaíso.

5.2.4. Mass and alternative media

The importance of mass media as collaborators and partners to reduce the impacts of disasters has been well described by international agencies (UN, 2002, 2004, 2011). This case highlights that mass media are not used as mediators or for political actions; rather, there are breakdowns between researchers and journalists as well as among local risk practitioners and media. In a general sense, this case illustrates the need to strengthen the relationship between journalists and the decision makers and the need of using alternative media.

Building on that, one key point is to strength the relationship between experts and journalists. In the current Valparaíso context, the National Emergency Office, institution in charge of prevention and mitigation plans in the country, could do this work.

ONEMI works on the coordination efforts, so it looks that the suitable institution to face this issue.

Another consideration is taking into account the use of alternative media in the risk mitigation phase. As Rodriguez (2012) argues, alternative mass media such as local radios play an important role as mediators between local authorities and risk communities, especially in risk context. However, in this case no stakeholder considered this resource.

Furthermore, social media, as platforms that engage users to participate in knowledge production (Vasterman, et al. 2005), also could support the precarious communication observed in Valparaiso. Web-based and mobile technologies could be used to promote the two-way exchange of information, and a more interactive dialogue between local risk managers and vulnerable communities. As a result of “the rise of social media, news is no longer gathered exclusively by reporters and turned into a story but emerges from an ecosystem in which journalists, sources, readers and viewers exchange information” (The Economist, 2012). Vulnerable communities also could take advantage of these resources to reach authorities, get connected to among them and alert about risks.

5.3. Final comments

The research’s motivation was to understand how preventive information moved in the emergency faced in Valparaiso, Chile, in 2014, as an effort to examine the disconnection between scientists (expert sphere) and vulnerable communities (non-expert public).

From a critical rhetoric of risk communication framework, this empirical research looked at the communication gaps between scientific world and society as a pattern observed in the recent emergencies faced in Chile.

Valparaiso case, as one of the biggest emergencies that has taken place in the country, underlines a Chilean reality related to social and economic inequality, insecurity and poverty. From a communication perspective, this case is an example of the

enormous disconnection between scientists, policymakers, risk managers and citizens. It reflects a Chilean institutional failure because more than a lack of communication, this case shows stakeholders that work like islands; operating independently, a marginalized vulnerable population, lack of systematized information for experts and non-scientific public, and uncoordinated institutional efforts. The fragmentation between science and practice, in turn, reduces the opportunities for community involvement and public awareness. This case illustrates that Chile still has some distance to travel in order to be a country that consistently does things well to face disasters.

At the same time, the interface fire analysed in this study provides insights into the complex interrelations that takes place in a risk reduction context. This case confirms that in regard to risk communication, rather than being a linear process, “there is instead a very complex set of engagement and relationships that develop over time. Thus instead of needing ‘bridges’ or ‘highways of connectivity’ it may be more appropriate to envision the complex labyrinths of communication and engagement” (Kasperson and Berberian, 2011, p.101).

In this context, this case encourages communicators, policymakers and risk managers to include local participation into the early stages of disaster management, as well as to look for ways to incorporate intermediaries, such as technical communicators, or ICT platforms for communicating scientific knowledge to non-scientists and insert non expert public into decision making process and local prevention plans.

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