The role of translators and interpreters in cascading crises and disasters: towards a framework for confronting the challenges

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Abstract

Purpose – This paper explains the significance of cascading crises for translators and interpreters, and how their work may be affected by such events. It provides a theoretical basis for analysis and field practice.

Design/methodology/approach – We define cascades and explain how they influence the development of preparedness, mitigation and response. We identify key drivers of cascading crises and discuss how they challenge conventional approaches to emergency management. We discuss ways in which use of language could be a key factor in crisis escalation. We define priorities and operational challenges of cascading crises for translators and interpreters. In terms of methodology, this paper develops a conceptual framework that can be used for future enquiry and case history analysis.

Findings – We provide a qualitative description and synthesis of the key instructions to be used in the field. We offer a short list of key questions that can be referred to by linguists and scholars. We identify situations in which translation and interpretation are important ingredients in the success of emergency preparedness and response efforts. These include multilingual populations, migrant crises, international humanitarian deployment, and emergency communication during infrastructure failures.

Research limitations/implications – This work has academic value for the process of understanding cascades and practical relevance in terms of how to deal with them.

Practical implications – Translators and interpreters need to understand cascading crises in order to be prepared for the challenges that such events will present.

Social implications – Society has become more complex and interconnected, with non-linear cascading escalation of secondary emergencies. Emergency planners and responders need to address this in new ways. Effective communication and information strategies are essential to the mitigation of cascading disaster risk.

Originality/value – The study of cascading crises from a socio-economic point of view is relatively new, but it is important because society is increasingly dependent on networks that can propagate failure of information supply.

Keywords: Cascading crises, Disasters, Information, Communication, Translation, Interpretation.

Paper type Research paper

Introduction

On 27 March 1977 two fully-laden Boeing 747 aircraft collided on the runway at Tenerife North Airport. In this, the deadliest accident in civil aviation history, 583 people were killed and only 61 survived (Weick 1990). At Milan's Linate Airport on 8 October 2001, a light aircraft strayed onto the active runway and was struck by a departing flight. All 114 people on board the aircraft died, as did four people on the ground (Catino 2010). Both of these disasters were caused by verbal misunderstandings. At Tenerife, the captain of KLM flight 4805 wrongly believed that he had clearance for take-off. At Milan, the pilot of the light aircraft mistook his position and communicated it wrongly to the control tower. In each case there were issues with safety mechanisms: at Tenerife, lax procedures for the use of the active runway; at Milan, absence of ground radar.

Nevertheless, these two disasters graphically illustrate the essential role of language in risk and safety.

In the so-called information age, much effort has been devoted to the physical mechanisms of communication but, remarkably, much less attention has been given to the use of language and issues of comprehension in crisis situations. In a world in which more that 5,000 languages are spoken, there is an obvious need to ensure that emergency messages are understood so that they can be acted upon (Netten and van Someren, 2011). This is particularly true with regard to the high complexity of networked organisations and societal functions that are the backbone of the global interconnected systems.

It is not only necessary to consider the physical functions needed to maintain and develop operational capacity, but in order to facilitate adaptation and recovery processes the resilience of the system as a whole must be taken into account (Linkov et al., 2014). The information, cognitive and social domains are essential components of this process, including the practical matters of learning, sharing knowledge, finding the locus of meaning and making sense of information. This will help people to take action in response to stimuli from early warning sensors and other sources (Linkov et al., 2013). Despite a prevailing lack of concern for language and translation in emergency planning, they are an essential part of the core of the human determinants of impact and remedy (Alexander, 2000).

The ideas held by people and groups evolve in their developing social and environmental contexts. Evolution embraces the construction of the self, the socialisation of knowledge in the family, and the ways in which people make sense of information (Bateson, 1972). Social models and contexts are dynamic over time. They incorporate individual and collective forms of symbolism that people endow with

meaning. Thus, linguistic and functional representations are key means of understanding events (Alexander, 2005). Cannon (2008) noted that the social construction of disasters takes different forms. These are associated with power relations, but they also stem from psychological phenomena that motivate the beliefs and behaviours of groups. Here, language is a crucial means of understanding the perspectives of the members of social groups.

This paper explores the potential or actual role of translation in cascading disasters and crises. First, we describe the nature of cascades. Secondly, we highlight the role of culture**,** language and interpretation as cross-cutting elements in the escalation of crises. Thirdly, we suggest how translation can act as a possible driver of cascades. Finally, we provide a summary and checklist that could be used by researchers and practitioners to resolve problems associated with the use of language in disasters.

Cascading disasters

In the modern, networked world, most disasters will to a greater or lesser extent be cascading crises (Helbing, 2013). In high-risk technological systems, a certain degree of multiple and non-linear failure must be anticipated because of their great complexity, the tight coupling of their components, and intricacy of the chain of causes and effects. Strong interdependencies in technological systems imply that disturbances may spread rapidly between the elements that cause cascading impacts. They may scale up to the point at which they are unstoppable (Perrow, 1999). Cascades have several distinguishing elements. A cascading disaster or crisis is an event in which an initial physical trigger sets off a series of linked consequences, perhaps through a network. Rather than simple linear progress, a ‘top event’ arises from a series of connected

errors or failures that, through a variety of possible paths, creates the conditions for a greater malfunction with more devastating consequences (Pescaroli and Alexander, 2015).

During the propagation of the cascading impact, interactions among different forms of vulnerability can give rise to escalation points, in which consequences are amplified, conceivably to the point at which the escalation has a more profound impact than the original trigger event. Figure 1 shows that cascades are the manifestations of vulnerabilities accumulated at different scales (Pescaroli and Alexander, 2016). In the top part, environmental triggers are associated with compounding and interacting risks, such as concurrent extreme climatic events (e.g. storms and floods). Below are the different levels of socio-technological systems, from globalisation to local culture, with the incorporation of information and communication. The base of the diagram is distinguished by two elements:-

(a) *Critical infrastructure* involves "the physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society" (UN General Assembly, 2016, p. 12).

(b) *Complex adaptive systems (CAS)* are intricate, interconnected phenomena, such as social networks, that interact dynamically and evolve in mutual ways (Lansing, 2003). In all processes, information flow and communication must be maintained across the interconnected systems. Some elements of complex adaptive systems are associated with linguistics, such as understanding how people learn, employ and teach languages (Cameron and Larsen-Freeman, 2007). Intergovernmental

crisis management can be framed in terms of complex adaptive systems (Comfort 2007).

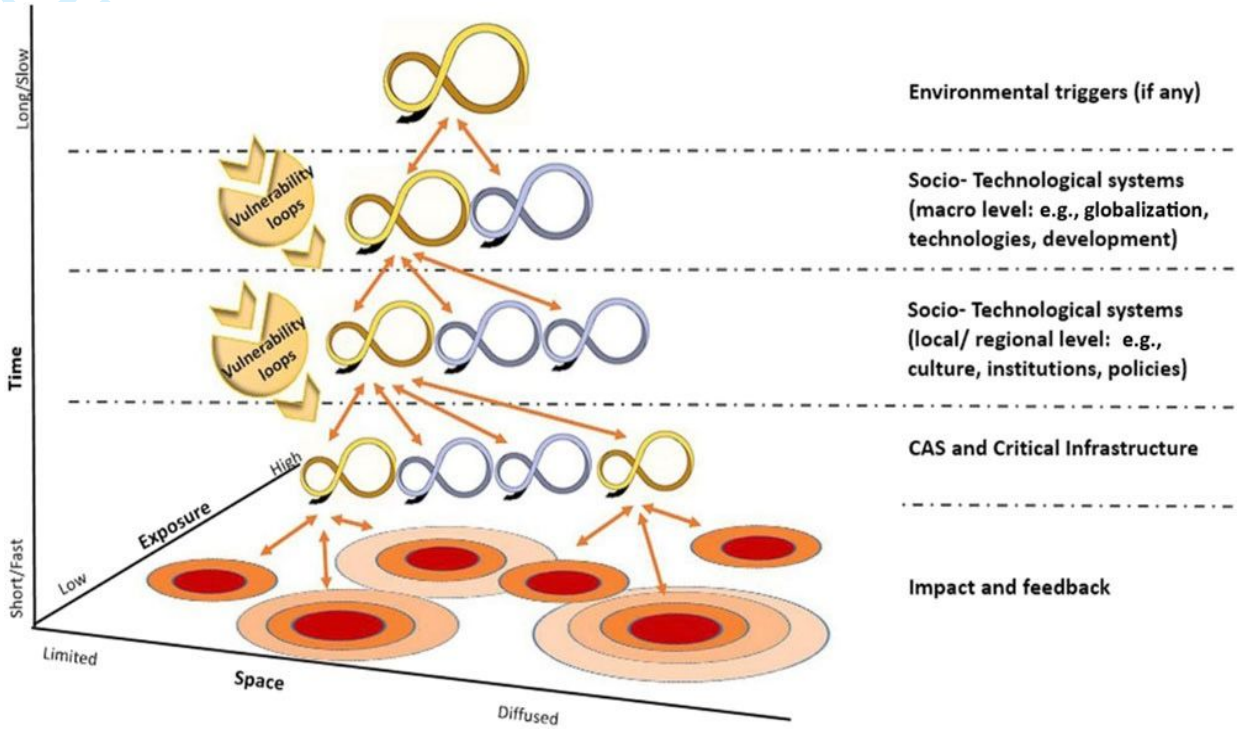

Figure 1. Vulnerability paths of cascading disasters, scale interactions and escalations in time and space (source: Pescaroli and Alexander, 2016, p. 183; reprinted with permission).

The increasing sophistication of modern life has induced an ever stronger dependency upon critical infrastructure. This has naturally generated a corresponding need to understand complex systems better. Different methods are used in this, including linear and networked multi-hazard risk assessment (Clark-Ginsberg et al., 2018). Cascading disasters are often propagated through inefficiencies and failures, which have knock-on effects in terms of risks to human safety, interruptions to normal routines, and challenges in emergency management. The more interconnections there are, the more rapidly and substantially cascading risk builds up. This emphasises the need to understand vulnerability, which is the central element of the root causes of

disaster. It shows how dangerous it is to assess and manage impacts on the basis of weak background knowledge (Pescaroli and Alexander, 2018). Vulnerability is defined here as "those conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards" (UN General Assembly, 2016, p. 24).

In order to plan for and anticipate emergencies, there is a pressing need to develop scenarios for cascading failures and complex events. For example, using a scenario-building process that involves local stakeholders, the cascading effects of hydrological droughts have been explored in the social, economic and environmental domains, including, for example, the effects of groundwater depletion and salinization of aquifers (Parisi et al., 2018). The managers and engineers who run critical infrastructure and their academic counterparts have long studied such conditions in terms of how to prevent or limit the propagation of failure. The disruption of critical infrastructure could propagate cascading effects across different scales. This should stimulate us to map and make local assessments of both vulnerability and resilience (Serre and Heinzlef, 2018). Hence, in the conclusions to this article, we pose some questions about language that we have developed as suggestions for an agenda to extend, improve and clarify our understanding of cascading phenomena. However, much more needs to be done to study the social and economic consequences of cascading failures. Escalation also deserves more attention in the organisational dimensions of management (Pescaroli and Alexander, 2018). Such is the complexity of modern society that all disasters of any significant size are likely to have cascading consequences.

The practice of emergency management often assumes a simple cause-and-effect relationship between an extreme event and its consequences. Instead, there will

be a chain of potential outcomes with factors that directly compromise safety, systems, assets and activities. This can allow further consequences to proliferate in society. For example, prolonged, wide-area power failure is one of the most serious risks in the field of cascading disasters. Electrical power drives almost all mass communication. It is also vital to all other sectors of critical infrastructure, from water and sewerage (electrically pumped) to food supply (refrigeration) and banking (electronic transactions). The possible consequences of power failure include traffic chaos and a surge in accidents, food toxicity and gastric illnesses, entrapment (in elevators and tunnels), inability to make essential purchases via electronic transactions, and dependency upon diesel generators that may fail through overloading or shortage of fuel. Without the benefit of an electricity supply, mass communication in any language with any person or group is rendered very difficult. The practical and psychosocial effects of a prolonged blackout would be experienced at the local scale by individuals, households and communities. Like other changes in the availability of resources there would inevitably be changes in behaviour, and perhaps these would be radical (Miller and Pescaroli, 2018).

Translation, culture, and interpretation

Communication is the primary means of stimulating action in disaster and crisis management. Timely and effective conveyance of information between stakeholders is essential to mitigation, preparedness and response (Lindell et al., 2007). The increased diversity that characterises global society has strong implications for this process. In fact, there is a pressing need to increase access to information by people from diverse cultures who use different languages (O'Brien et al., 2018). Linguistic challenges include issues of translation and interpretation. They also involve cultural

drivers that must be understood in order to reduce vulnerability to disaster risk (Kelman, 2018). For example, given that language and vocabulary are constructs that are continuously developed, adjusted and interpreted, definitions and instruction are interpreted through cultural lenses. In situations of conflict, language is the main vehicle of communication and mediation. This highlights the need for trained interpreters who understand organisational structures and particular cultures (Moser-Mercer et al., 2014, Salama-Carr, 2018). The need for linguistic mediation has developed strongly in recent decades, but in the scholarly literature the study of translation and interpretation for emergencies is only now beginning to receive significant attention (Federici, 2016; Cadwell and O'Brien 2016). Nevertheless, it is possible to find examples of the most critical challenges that arise in complex crises.

Despite the dearth of research, the relevance of translation to disaster studies has been recognised for a long time. For example, in Cameroon in 1986, the Lake Nyos volcanic gas disaster, which killed approximately 1700 people, highlighted how important it is to make risk assessments by taking into account local culture and knowledge. In reporting the event it emerged that local languages used the same word for smell and taste. They also used a word which translates into English as “red” for all colours except black and white. Communication between risk managers (plus disaster researchers) and the local population took place in pidgin English, which initially failed to uncover such details, yet they were vital to the identification of a lethal hazard (Freeth, 1993). Moreover, on a practical level, it is clear that if first responders do not share the same language or culture as the affected population, they are liable to miss out on indigenous knowledge and experience (Bolton and Weiss, 2001). Problems that could arise in complex situations include the existence of words that are not directly translatable, incompatibility of concepts, and existence of social barriers. This is

particularly true when giving training and assistance to local populations in, for instance, psychosocial support. Experience after the 2004 Indian Ocean tsunami in Sri Lanka showed that translation is an essential means of conveying ideas and concepts. In this disaster, at the local level translators required context-specific training, ideally with the aid of complementary tools such as role-playing and simulation (Miller, 2006).

The importance of translation is particularly clear in the health sector. O'Brien and Cadwell (2017) analysed health-related crisis communication in urban Kenya and highlighted the importance of translating information from English into Kiswahili. Similarly, in the United States, it has been demonstrated that limited language proficiency is directly associated with increased vulnerability, highlighting the need for both communication and a relational strategy in order to service the full range of the population (Kreisberg et al., 2016). During patient assessment and the communication of diagnoses, translation can involve technical challenges (Solet et al., 2005). As research is evolving, local authorities are now more aware of the importance of translation in crisis situations. For example, after the Canterbury earthquakes of 2010-2011 in New Zealand, Christchurch City Council learned that resources and information need to be translated in ways that target specific communities, both in terms of content (including cultural and religious elements) and the practical aspects of where to distribute material in order to convey it to the right users. If information needs constantly to be renewed, the translated version should be amended along with the original source. Homepages and websites need to be updated and endowed with fully searchable keywords in all relevant languages. Finally, when key information is distributed to individuals, translated print material is preferable to monolingual telephone or online services (Christchurch City Council, 2012).

Approaches to disaster response at the national level still tend to be fragmented. They seldom formally address the question of how best to translate and disseminate information (O'Brien et al., 2018). This presents multiple challenges. It highlights the need to produce dynamic policies and guidelines. In this context, some key principles have been suggested as a common baseline for progress. For instance, protocols and services should be available. They should be accessible on multiple platforms and in different languages. Messages should be culturally acceptable to their audiences. Services and platforms should be adaptable to multiple and complex scenarios (O'Brien et al., 2018). This last principle may be particularly important in addressing the escalation of cascading crises, as explained in the next section.

Drivers of cascading disasters: translation as a mediator of vulnerability through information flows

The root causes of disasters reside in the negative characteristics of society, such as poverty, lack of equity, marginalisation and corruption (Alexander, 2000). They also lie in political decisions that direct resources to matters other than disaster risk reduction. According to the 'pressure and release' model of Wisner et al. (2004), the root causes combine with dynamic pressures, such as rapid urbanisation and crippling debt, to act upon unsafe conditions, which include vulnerability, to produce disasters when they are triggered by hazard impacts. In cascades, the specific vulnerabilities and pressures that need to be identified are those that could lead to the rapid escalation of a crisis by generating secondary emergencies. These will have physical, socio-economic and information-related dimensions, including the ways in which information and disinformation influence decision making (Helbing, 2013). In the absence of adequate planning and preparedness for disaster, cascading events are likely to concentrate

their effects in three parallel ways, as follows (Pescaroli and Alexander, 2016; 2018):-

(a) The weakest members of society (those who are least able to defend themselves) are at greatest risk, as they suffer disproportionately from the amplification of vulnerability. By and large, the most robust societies are those that are most cohesive, least divisive, most equal, most participatory, most democratic and least troubled by conflict and corruption (Pescaroli and Alexander, 2016). In such societies, language is not used as an instrument of separatism, protest and conflict.

(b) When assets are forced out of service by disaster impact and concomitant lack of preparedness, information flows and mitigation capacities are reduced (Kachali et al., 2018). For example, an increasing number of requests for intervention by the emergency services could be limited by critical infrastructure losses, such as electricity blackouts, which will affect both communication among crisis managers and communication with the population (Hempel et al., 2018).

(c) Physical interaction between elements of the built environment determines physical losses that affect vital services (Pescaroli and Alexander, 2015; Serre and Heinzlef, 2018).

At first reading it seems unlikely that physical interactions between assets could be influenced by translation issues. However, by influencing vulnerability and information flows, the latter could have a critical impact on the resolution or amplification of emergency situations. Although hazards can be the triggers of disasters, root causes are generally found in the human domain, in which elements such local culture and environment interact and mutually reinforce each other (Hewitt, 1983). Vulnerability is a social construct. It is associated with political, cultural, and

historical processes, and it implies that individuals and groups of people have different degrees of access to power, resources and expertise (Wisner et al., 2004). One way to reduce vulnerability is to stimulate those capacities that are used to cope with crises and disasters, Many of these are traditional or indigenous coping mechanisms (Wisner et al., 2012). Before they are officially promoted, they need to be evaluated in terms of their efficacy.

For localities at risk, the pattern of vulnerability reflects a mixture of historical factors and present-day realities. It reflects the propensity of people, businesses and assets to suffer harm and the degree to which people are able to mobilise resources to buffer impacts and recover from them. Diversity in community groups increases the complexity of communication. It requires a communication strategy that takes account of the beliefs, needs and goals of particular social groups (Paton and Johnston, 2001). In this context, translation can convey precise messages that address the needs of marginalised individuals or communities, such as ethnic minorities or non-native elderly people (Alexander, 2000). Thus, translation and interpretation are essential means of ensuring that appropriate risk communication takes place with such communities. A population that lacks proficiency in the dominant language is particularly vulnerable if it fails to understand directives and warnings (Shiu-Thornton et al., 2007; Vihalemm et al., 2012). Lindell et al. (2007) suggested that there are cases in which the fragmentation of local communities is so great that it requires the translation of emergency information into all the languages that are spoken in the affected area. In addition, elderly people may have physical or mental limitations that restrict their ability to absorb information. Indeed, vulnerabilities are easily reflected in people's state of health (Thomas et al., 2013), but not so easily in their ability to express their needs to others. Unless it is presented to people in a manner that they can readily

absorb, the ability to communicate safety measures, evacuation protocols or other matters of public security is likely to vary with the cognitive capacity of the people who receive the information.

For information to flow, constant communication must be maintained between the various parts of complex adaptive systems. This may also stimulate capacity to adapt and be resilient (Lansing, 2003; Cameron and Larsen-Freeman, 2007; Linkov et al., 2013). Paradoxically, in modern society, information and communication are important root causes of instability, as decisions are derived from flows that are increasingly complex, ambiguous and uncertain (Helbing, 2013). Information flows control aspects of all phases of the 'disaster cycle': prevention, mitigation, emergency response, recovery and reconstruction. First, at the operational level, developing adequate communication and information sharing is an essential means of maintaining the capacity to organise response, deliver relief and train responders (Lindell et al., 2007). Secondly, by influencing positively the behaviour of groups and families who depend on local resources, effective information supply fosters resilience in individuals and communities (Miller and Pescaroli, 2018).

Recognition of emerging risks and use the flux of information to take action are essential and dynamic means of understanding and managing crises (Comfort, 2007). They influence all catastrophe-related activities, including strategic policy making and diplomacy (Kelman, 2016). Preparedness for cascading effects triggered by critical infrastructure failures requires the development of scenarios in which different stakeholders understand their roles and share information outside their particular spheres of action (Kachali et al., 2018). Limiting the exchange of information, or conversely suffering information overload, can negatively affect crisis managers, who may then be unable to identify the path of an escalation process (Hempel et al., 2018).

Here, translation is an essential means of developing timely and coordinated actions in cross-border crises, both between different agencies (e.g. international deployment in affected areas) and between agencies and citizens (e.g. delivery of international relief in these places). The failure to maintain a functioning information supply could cause operational failure and escalation to a secondary emergency, in which, due to shortage of emergency resources, collaboration would be needed even more.

These drivers are particularly evident in some phenomena associated with the network of interdependencies that is the global interconnected system. Here, by addressing vulnerabilities and maintaining an effective flow of information, translators and interpreters can be seen as agents of mitigation.

One field that requires translators and interpreters with increasing urgency is human mobility. Migration can be voluntary, induced or forced. It can be temporary, semi-permanent or permanent, although the long-term outcome is often not known in advance. It can lead to permanent residency abroad, the acquisition of a new nationality, or to statelessness. Human mobility is thus an extremely complex phenomenon that is intimately bound up with such contentious issues as welfare, entitlement, sovereignty and identity (IoM, 2018). The largest migrations are the desperate result of proxy wars fought between the dominant powers in third-country locations such as Syria and Yemen. Conflicts of this kind can be very long drawn out, as shown by the 27-year civil war in Angola and half a century of low-level asymmetric warfare in Colombia.

Given the tendency of migrants to establish themselves where there are economic and social opportunities, modern cities thus become polyglot agglomerations. For example, in London, England, 300 languages are spoken daily. In the London Borough of Lambeth, 142 mother tongues have been identified among

the resident population (Demie and Strand, 2006). One consequence of this is that the flow of remittances to countries such as Haiti, the Philippines and Nepal intensifies when there are disasters. Working in Los Angeles County, USA, Lindell et al. (2007) observed that about 100 major languages or dialects were in daily use in the urban areas, which resulted in increased diversity of culture and languages associated with particular communities such as the Hispanic ones. Nepal et al. (2012) found that linguistically isolated populations in the United States need information that is culturally and linguistically appropriate. It must reflect the context of their knowledge and awareness. Because awareness of such needs is inadequate among emergency planners and managers, word of mouth is the preferred source of information for these populations, and it tends to be inadequate. The problem is somewhat mitigated by bilingualism and language brokering from family members and peer groups. Those in the community who are fluent in English tend to be leaders. However, linguistic isolation remains a problem that is not being tackled adequately in terms of a fair sharing of emergency preparedness.

The presence of populations that have limited access to the messages of emergency response increases the barriers to effective first response, for example, by increasing health disparities (Shiu-Thornton et al., 2007). Migrants may have limited reading skills, which highlights the need for simple and accessible translation in line with their cultural and religious backgrounds (Herrick and Morrison, 2010). A relationship of involvement and trust with the vulnerable and marginalised communities becomes an essential asset to the planning process (Herrick and Morrison, 2010; Christchurch City Council, 2012).

Another example refers to the failure of international networks and the need for crisis managers to deal with vulnerabilities that suddenly emerge. In April 2010, ash

emissions from the eruption of the Icelandic volcano Eyjafjallajökull led to six and a half days in which civil aviation was grounded at 70 per cent of Europe's airports. The resulting cost to the airlines was US$1.7 billion. If the 'ground-stop' had continued much longer, faced with unsustainable losses, many of Europe's airlines would have been threatened with becoming unviable as commercial undertakings (Alexander, 2013). The chain of disruption had complex negative effects upon business travel, the movement of perishable goods, and a variety of cultural enterprises (Pescaroli and Alexander, 2015). In this case, translation acquired an important role in the cross-coordination of governmental agencies. It becomes an essential means of assisting vulnerable categories such as stranded tourists and providing them with the information they need in order to plan alternative actions. Translation also saved lives among indigenous people when threatened with the eruption of Nevado del Huila in Mexico (García and Mendez-Fajury, 2018, p. 342). Moreover, translation crosses the boundary between the public and private sectors. It is also essential for companies that have to find a new strategy to deliver products and services during a wide-area emergency (Jensen 2011, p. 69; Martin 2011, p. 91).

One of the greatest demonstrations that we live in a networked society lies in the fact that portable computing by tablet, telephone and laptop computer has brought social media and instantaneous communication to the mass of the population. As used in disasters, social media have a positive and a negative side (Vultee et al., 2014). They can help crowd-source information and resources. They can disseminate warnings and safety information. They provide citizen journalism and instant awareness, and they can bring people together in solidarity. Yet they have a dark side. In any particular crisis situation, the spread of rumour, defamation, false information and unchecked speculation could conceivably outweigh the benefits of instant mass

communication. This is a duality that was first recognised decades ago.

> "Close inspection of technological development reveals that technology leads a double life, one which conforms to the intentions of designers and interests of power and another which contradicts them – proceeding behind the backs of their architects to yield unintended consequences and unanticipated possibilities." (Noble, 1984, p. 325, quoted by Quarantelli, 1997, p. 96).

In managing emergencies, precision and clarity of language are essential if misunderstandings are to be avoided, and that is as true in translation as it is in mono-linguistic situations. The precarious and dynamic nature of disasters means that uncertainty is inevitable, but it should not be compounded by ambiguous orders and unclear instructions. In planning for resilience, it is necessary to work out the level of dependency on services that might fail, assets that might stop functioning and goods that might become unobtainable. For the most part, losses will be a direct function of the duration of the 'down time', taking account of any actions designed to mitigate, prevent or offset the losses during the crisis phase. Although not all losses are preventable, failure to anticipate the need for action and plan accordingly greatly increases the chance of high magnitude losses. Communication is a vital means of reducing down time.

Conclusions

Our globalised society's networks and their interdependencies rely heavily on communication and languages. In a complex adaptive socio-technical system, disruptions can easily escalate to become cascading crises. During attempts to remedy such situations, translation can constitute a serious bottleneck. Indeed, if

misunderstandings result and they have serious consequences, it contribute to the escalation of secondary emergencies.

Lack of adequate translation may amplify the impact of crises on marginalised communities, non-native speakers and international tourists. For example, a primary trigger, such as flooding, could become more lethal by causing contamination due to the disruption of sewer systems or chemical facilities. This may be limited in its extent, but it could require the adoption of safety measures or access to specialised services. In an area with a concentration of marginalised people, such as an urban area full of recent immigrants, lack of adequate translation and cultural mediation could result in failing adequately to explain the characteristics of the risk, its seriousness and the measures required, with possible long-lasting effects upon population health (Hernandez et al., 2015).

Disruption of information flows could hamper the delivery of effective emergency services. For example, translation could be critical to the management of cross-border crises, where differences in the local operational culture and language could cause early warnings or logistics to fail. This could be particularly important for areas that are not used to international cooperation, and those in which civil protection lacks adequate collaboration (Coppola, 2015).

As explained in previous sections, due to the complexity of phenomena such as migration or infrastructure operation, the drivers of cascading failures can recombine. Figure 2 synthesis this process and visualises the possible role of translation, including cultural mediation, in addressing cascading drivers and the escalation of secondary crises (the yellow boxes).

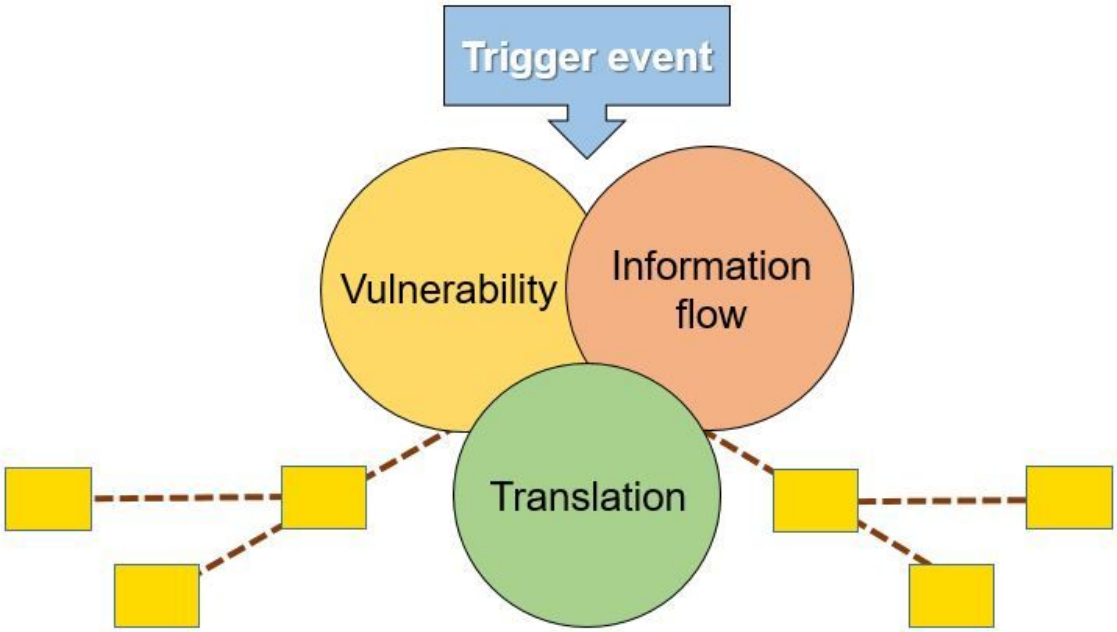

Figure 2. Cascading drivers that mediate translation, and possible escalations of secondary emergencies (yellow boxes).

The following short list of key questions about the practice of translation in cascading events is derived from the work of Herrick and Morrison (2010), to which we have applied the four principles suggested by O'Brien et al. (2018). Most of the questions should be addressed during the planning phase. In order to derive a list that is suitable for action at the local level, the questions should be addressed in scenarios created with the assistance of local authorities.

- What key information should be available and accessible for the most common disaster risks in the area of action (e.g. through local risk registers)?
- What is the principal terminology that needs to be used in information and messages (e.g. for warnings) and how can it be expressed neutrally, economically and clearly?

- How is the local context of language unique and how can it be used to improve the quality of explanations?
- In defining messages, are the categories of vulnerable citizens considered, such as the elderly and people with disabilities?
- Given the nature of the target population, what are the key dissemination tools that need to be considered? Are they equally effective in both natural hazard impacts and technological failures such as electricity blackouts?
- How good are local emergency services at communicating with communities that are less proficient in local languages and is there a risk that the information flow will be compromised?

This paper cannot provide an exhaustive review and this list of questions must therefore be considered preliminary. Further research is needed in order better to understand how cascading drivers can be mediated by translation. Quantitative and qualitative evidence on the subject need to be developed further. Moreover, our work is limited by the lack of literature, in particular on the role and function of language in complex crises and on how to apply knowledge about translation to different kinds of cascading crisis. We propose a first application of different concepts in a common framework, which needs to be developed further and tested. Hopefully, as awareness of the role of translation in disaster management increases, this research will expand and, during its application, more questions will be answered.

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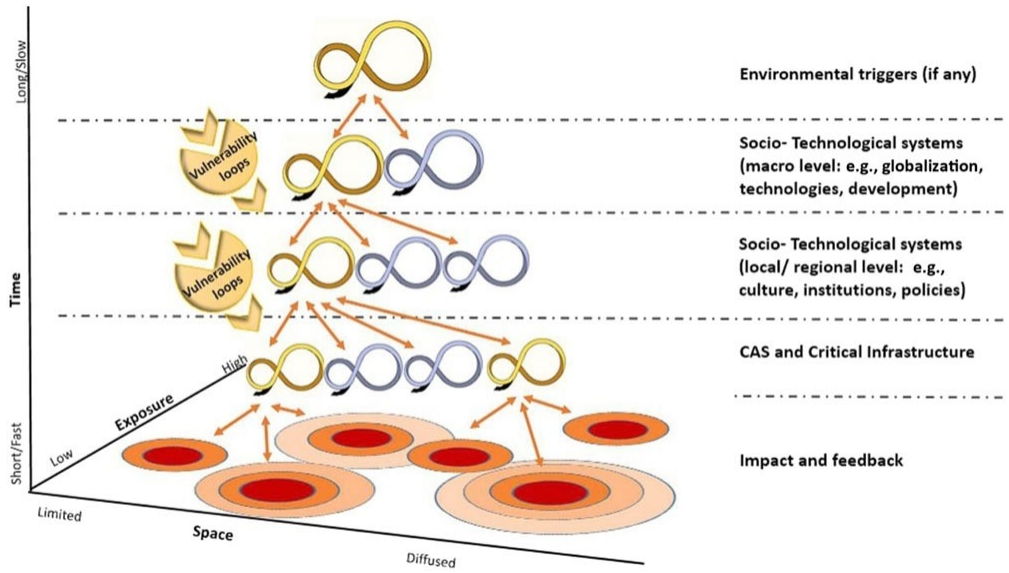

Figure 1. Vulnerability paths of cascading disasters, scale interactions and escalations in time and space (source: Pescaroli and Alexander, 2016, p. 183).

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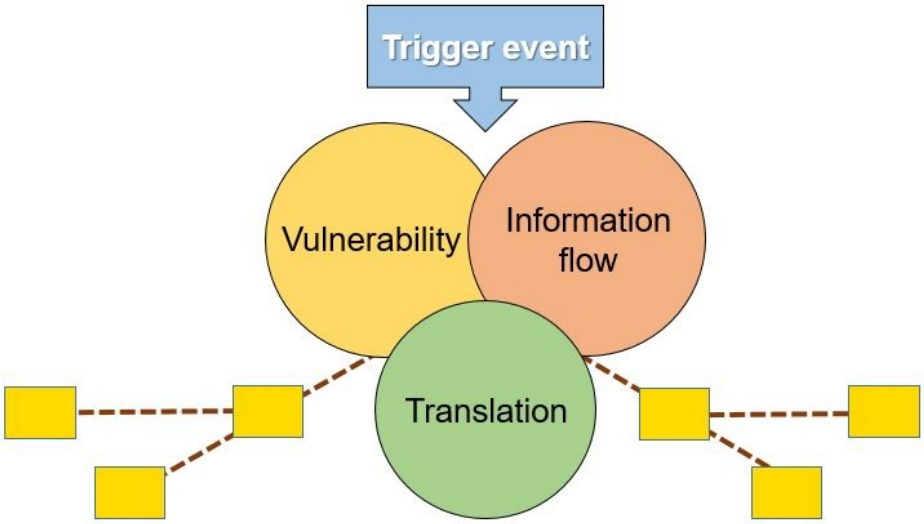

Figure 2. Cascading drivers that mediate translation,
and possible escalations of secondary emergencies (yellow boxes).

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