

# engage

Engage Society for  
Risk Awareness and Resilience



## Deliverable 1.3 – Communication, Social Media and Societal Resilience Among Citizens

**Authors:** Nathan Stolerio (TAU), Moran Bodas (TAU), Kobi Peleg (TAU), Bruria Adini (TAU).

**Contributors:** Jan Woerlein (ENS), Leire Labaka (TECNUN), Sahar Elkady (TECNUN), Alberto Pasquini (DBL), Iliaria Bonanno (DBL), Asbjorn Lein Aalberg (SINTEF), Svein-Eric Bolland (TRC).

**Abstract:** ENGAGE aims at linking the informal resilience naturally inherent in citizens with the formal work of authorities to prevent, prepare for, respond to, and recover from disasters. It brings together 14 partners from 8 countries to show how individuals and local practices can interrelate effectively with planned preparedness and response, practitioners, and technology.

One of ENGAGE's goals is to understand communication's role, with a focus on Social Media, on building societal resilience. More specifically, the goal is to understand the public's communication needs, use of various communication channels to fulfill their information needs, and create guidelines and recommendations for effective communication with impacted societies.

Deliverable 1.3 is based on an empirical investigation of the public's communication needs and their relationship to societal resilience. Building on EmerGent project, this investigation is a mixed-

methods study, incorporating a secondary analysis of the survey findings from T1.2 and qualitative content analysis in Social Media. The proposed integrative study should answer questions such as: (1) what are the communication needs among community members and between them and authorities/first responders? The deliverable will clarify the relationship between these two types of communication. (2) what information sources are preferred by citizens for receiving information from official agencies/governments responsible for promoting resilience? And (3) what are their preferred means for receiving public warnings in case of a disaster? The deliverable will provide illustrative examples of effective communication with impacted communities, drawing conclusions based on digital literacy and cultural and gender diversity.

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## AUTHORSHIP & APPROVAL INFORMATION

EDITOR  
**Nathan Stolero**

25 MARCH 2021

CONTRIBUTORS

**Kobi Peleg (TAU), Moran Bodas (TAU), Bruria Adini (TAU), Jan Woerlein (ENS) Leire Labaka (TECNUN), Sahar Elkady (TECNUN), Alberto Pasquini (DBL), Iliara Bonanno (DBL), Asbjorn Lein Aalberg (SINTEF), Svein-Eric Bolland (TRC).**

DATE  
29 March 2021

REVIEWED BY  
**Matthieu Branlat (SINTEF)**  
**Francesca De Donato (ASL)**

DATE  
13 Jan 2021 – PCOS

19 February 2021 –  
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APPROVED BY  
**Matthieu Branlat (SINTEF)**

DATE  
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## Members of the ENGAGE Consortium

	Stiftelsen SINTEF (SINTEF) NO-7465 Trondheim Norway <a href="http://www.sintef.com">www.sintef.com</a>	<b>Project Coordinator:</b> Matthieu Branlat <a href="mailto:Matthieu.Branlat@sintef.no">Matthieu.Branlat@sintef.no</a>
	Deep Blue Srl (DBL) IT-00198 Rome Italy <a href="http://www.dblue.it">www.dblue.it</a>	<b>Contact:</b> Alberto Pasquini <a href="mailto:alberto.pasquini@dblue.it">alberto.pasquini@dblue.it</a>
	University of Navarra (TECNUN) SP-31009 Pamplona Spain <a href="http://www.tecnun.unav.edu">www.tecnun.unav.edu</a>	<b>Contact:</b> Leire Labaka <a href="mailto:llabaka@tecnun.es">llabaka@tecnun.es</a>
	Tel Aviv University (TAU) IL-6997801 Tel Aviv Israel <a href="http://www.english.tau.ac.il">www.english.tau.ac.il</a>	<b>Contact:</b> Bruria Adini <a href="mailto:adini@netvision.net.il">adini@netvision.net.il</a>
	Trondheim Red Cross (TRC) NO-7465 Trondheim Norway <a href="http://www.rodekors.no/en/">www.rodekors.no/en/</a>	<b>Contact:</b> Marita Hoel Fossen <a href="mailto:marita.fossen@redcross.no">marita.fossen@redcross.no</a>
	European Emergency Number Association (EENA) BE- 1060 Brussels Belgium <a href="http://www.eena.org">www.eena.org</a>	<b>Contact:</b> Alexis Gizikis <a href="mailto:ag@eena.org">ag@eena.org</a>
	Ministry of Internal Affairs, Department for Emergency Situations (DSU) RO- 010086 Bucharest Romania <a href="http://www.dsu.mai.gov.ro">www.dsu.mai.gov.ro</a>	<b>Contact:</b> Raed Arafat <a href="mailto:arafatr@smurd.ro">arafatr@smurd.ro</a>
	Everbridge Norway (EVBG) NO-0663 Oslo Norway <a href="http://www.everbridge.no">www.everbridge.no</a>	<b>Contact:</b> Håkon Straume <a href="mailto:haakon.straume@everbridge.com">haakon.straume@everbridge.com</a>
	Ecole Nationale Supérieure (ENS) FR-75005 Paris France <a href="http://www.ens.psl.eu">www.ens.psl.eu</a>	<b>Contact:</b> J. Peter Burgess <a href="mailto:james.peter.burgess@ens.psl.eu">james.peter.burgess@ens.psl.eu</a>
	ERTZAINZA - Departamento de Seguridad – Gobierno Vasco - (ERTZ) ES- 01010 San Sebastian Spain <a href="http://www.ertzaintza.eus/wps/portal/ertzaintza">www.ertzaintza.eus/wps/portal/ertzaintza</a>	<b>Contact:</b> J. Jesús Alberto Alonso Velasco <a href="mailto:06090@ertzaintza.eus">06090@ertzaintza.eus</a>





Cittadinanzattiva (CA)  
IT- 00183 Rome  
Italy  
[www.cittadinanzattiva.it](http://www.cittadinanzattiva.it)

**Contact:** Annalisa Mandorino  
[a.mandorino@cittadinanzattiva.it](mailto:a.mandorino@cittadinanzattiva.it)



Azienda Sanitaria Locale Roma 1 -  
– Dipartimento di Epidemiologia (ASL)  
IT- 00198 Rome  
Italy  
[www.aslroma1.it](http://www.aslroma1.it)

**Contact:** Francesca de'Donato  
[f.dedonato@deplazio.it](mailto:f.dedonato@deplazio.it)



Katastrofmedicinskt Centrum (KMC)  
SE-58330 Linköping  
Sweden  
[www.lio.se/kmc](http://www.lio.se/kmc)

**Contact:** Carl-Oscar Jonson  
[carl-oscar.jonson@regionostergotland.se](mailto:carl-oscar.jonson@regionostergotland.se)



NTNU Social Research Ltd. (NTNUSR)  
NO- 7491 Trondheim  
Norway  
[www.ntnu.edu](http://www.ntnu.edu)

**Contact:** Stian Antonsen  
[stian.antonsen@ntnu.no](mailto:stian.antonsen@ntnu.no)

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## Executive summary

**Background:** One of ENGAGE's goals is to understand communication's role, in particular social media, in building societal resilience. More broadly, the goal is to understand the public's communication needs and expectations and their use of various communication channels to fulfill their information needs. Another part of this goal is to create guidelines and recommendations for effective communication means with impacted societies. Those who have already been impacted by a disaster or are under potential risk.

**Goal:** The main goal of task 1.3 is to carry out an empirical study of what citizens and social groups need and expect from authorities and first responders to improve communication and societal resilience. This task aims to present the public's communication needs, focusing, but not exclusively, on social media and how authorities and first responders can address them better, creating more effective communication processes. Therefore, the objectives of the study are: (A) To Identify the needs and expectations in the communication process among community members and between them and authorities and first responders; (B) To identify the preferred sources for receiving information about emergencies and disasters and favored means for receiving warnings; (C) To understand the characteristics of effective communication with impacted societies and identify prominent illustrations of such communications; (D) To define the relationship between the communication process among community members and between them and authorities and first responders and its impact on societal resilience; (E) To identify the role of gender, socioeconomic status, culture, digital literacy, and other demographic variables on the abovementioned objectives.

**Methodology:** The study of this deliverable is based on a mixed-methods approach. We conducted a secondary analysis of the survey distributed in deliverable 1.2 from eight countries (Italy, Romania, Spain, France, Sweden, Norway, Israel, and Japan). Also, we conducted a qualitative analysis of content from social media accounts of 21 accounts from 14 authorities and first responders, including user comments. In total, 440 posts and 5,250 comments were selected for analysis.

**Results:** The first two research questions focused on communication needs and expectations among community members and between them and authorities and first responders. The findings showed the hierarchy of communication needs, with cognitive ( $M=4.3$ ,  $SD=.93$ ) and unidirectional ( $M=4.17$ ,  $SD=.96$ ) on top and affective ( $M=3.5$ ,  $SD=1.03$ ) and escapist ( $M=3.22$ ,  $SD=1.09$ ) on the bottom. The qualitative findings highlighted how the public's communication needs and expectations were expressed online, revealing that some less rated needs in the survey were more dominant in practice. Especially affective and escapist needs.

The third research question examined the information sources preferred by the public. While mobile phones topped the list of preferred communication channels ( $M=3.94$ ,  $SD=1.08$ ), social networks ( $M=3.21$ ,  $SD=1.28$ ) were among the last places in most countries. The analysis showed that television ( $M=3.51$ ,  $SD=1.19$ ) still plays an essential role as an information source.

The analysis showed that each communication need is correlated with other information sources. As part of the fourth research question, it was shown that cognitive needs were more correlated with mobile phones ( $r=.42$ ,  $p=.000$ ) and unidirectional needs more with face-to-face communication ( $r=.32$ ,  $p=.000$ ). Escapist needs were more correlated with printed media ( $r=.26$ ,  $p=.000$ ) and affective needs with both mobile media and face-to-face communication ( $r=.38$ ,  $p=.000$ ).

Hypotheses H1, H2, H3 examined the effect of gender, socioeconomic status, and nationality (culture) on the communication needs and preferred information sources of the public. Those were partly accepted. H4 examined the effect of digital literacy on the communication needs and preferred sources and was entirely accepted. The findings showed differences regarding the needs and information sources between men and women and across countries – but not in all cases. Socioeconomic status did not explain the communication needs and expectations, but only some preferred specific information sources. Digital literacy, on the other hand, was a strong predictor in all cases. Even the strongest predictor of all.



The fifth research question examined the characteristics that contribute to effective communication with impacted societies. We suggested that a multiplex approach, integrating more than one or two groups of needs, which were identified in the study, into the messages' design process, would contribute to the effectiveness of the process. These findings are illustrated and exemplified by several results.

The sixth research question examined the relationship between the communication process among community members and authorities and first responders. We show that the communication process between society and authorities and first responders supports the communication process among community members – and vice-versa. We illustrate the relationship between these two communication processes in all three phases of emergencies and disasters.

**Conclusions:** The findings of the study lead to several conclusions aligned with the initial objectives. The first conclusion is that authorities and first responders must address the variety of needs of the public. Even those who are not perceived as very important by the public, but findings showed that they were dominant in the electronic communications analysis in authorities and first responders' social media accounts.

The second conclusion is that the variety of communication channels and sources is essential, with many traditional channels that are still preferred more than new media. This is important because many authorities and first responders, in recent years, started publishing more content on social media at the expense of traditional media. This study's findings suggest reconsidering such decisions significantly since the different communication channels were correlated with other communication needs.

The third conclusion relates to the characteristics of effective communication with impacted societies. We identified effective communication characteristics by addressing the communication needs in a multiplex way: allowing the public to fulfill a comprehensive set of needs by interacting and engaging with the content, emphasizing that it is not just about the characteristics which were identified in the mixed-method analysis, but the combination between them.

The fourth conclusion refers to the relationship between the communication process among community members and between them and authorities and first responders and its impact on societal resilience. We concluded that one type of communication process facilitates the other, and it will be considered an error to focus only on one.

Last, regarding the role of gender, socioeconomic status, culture, digital literacy, the conclusion highlights the need to focus more on gender and digital literacy questions over traditional factors, such as nationality and income.

**Recommendations:** The discussion section describes in details the necessary recommendations for future WP's and deliverables, among them, in short: For D2.4: the necessary comparison between the disaster and emergency agencies' communication approach and guidelines and the public's experience; For D3.1 and D3.2: the effective, less effective, and not effective characteristics of communication processes will define the criteria for promising solutions and serve as guidelines for innovative channels, including AI chatbots; For D4.1: the identified criteria of effective communication processes that can serve the initial validation process of solutions; For D5.1: use the results of this study is shaping ENGAGE's communication and dissemination strategy; For D5.4 and D5.5: the results contribute to the website and knowledge platform of ENGAGE.

# 1 INTRODUCTION

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## 1.1 SCOPE OF THE DELIVERABLE

This deliverable summarizes an empirical investigation of the public's communication needs, expectations, and their relationship to societal resilience. We report on the results of a mixed-methods study based on a secondary analysis of the survey in deliverable 1.2 and qualitative content analysis of electronic communications between citizens and emergency and disaster agencies in social media accounts of emergency and disaster authorities and first responders in Israel, Spain, Norway, Italy, Romania, France, Japan, and Sweden. The results highlight how the public and different communities expect authorities and first responders to communicate emergency, disasters, and preparedness phases. The deliverable can broaden our understanding of how the public experiences the communication process before, during, and after emergencies and disasters and how authorities and first responders can improve the communication process from the public's perspective. Special attention is given to gender diversity, younger populations, and people from less privileged populations, such as low socioeconomic status and low digital literacy.

The deliverable's intended readers are the ENGAGE Consortium (composed of 14 partners from 7 countries), the European Commission and project reviewers, and EU emergency authorities, first responders, and NGOs.

## 1.2 GOALS

The deliverable reports on the result of Task 1.3 "Communication, social media and societal resilience among citizens". It follows tasks 1.1 and 1.2, discussing preliminary models for assessing and improving societal resilience and local perceptions, risk awareness, needs, and expectations about societal resilience. The main goal of task 1.3 is to carry out an empirical study of what citizens and social groups need and expect from authorities and first responders to improve communication and societal resilience.

This task aims to conclude the public's communication needs, focusing, but not exclusively, on social media and how authorities and first responders can address them better, creating more effective communication processes. It is based on the assumption that the communication process between authorities and citizens (top-down), citizens and authorities (bottom-up), and citizens themselves is crucial for improving societal resilience. The study results will highlight recommendations for authorities and first responders on improving the communication process, setting criteria for identifying promising solutions, and creating new solutions, which will aim to fulfill these needs and answer the different expectations.

## 1.3 OBJECTIVES

One of ENGAGE's goals is to understand communication's role, mainly social media, in building societal resilience. More broadly, the goal is to understand the public's communication needs and expectations, their use of various communication channels to fulfill their information needs, and to create effective communication means with impacted societies, which have already been impacted by a disaster or are under potential risk. The deliverable is based on the project EmerGent results,<sup>1</sup> a scientific literature review, and an empirical mixed-methods study. The objectives of the deliverable are:

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<sup>1</sup> <http://www.fp7-emergent.eu/>

- (1) To identify the communication needs and expectations within different communities between members of the community.
- (2) To identify the communication needs and expectations which arise between community members and authorities/first responders.
- (3) To clarify the relationship between the communication inside the community and between the community and authorities/first responders.
- (4) To identify and describe what information sources and means for receiving public warnings are preferred by citizens from official agencies/governments responsible for promoting resilience.
- (5) To understand how specific information sources are correlated with the communication needs and expectations of the public.
- (6) To illustrate effective communication processes with impacted communities, drawing conclusions based on digital literacy, socioeconomic status, culture (through nationality), and gender diversity.

#### 1.4 FIT WITHIN ENGAGE AND CONTRIBUTION TO THE FIELD OF STUDY

D1.3 lays the groundwork for understanding the public's communication needs and expectations. Therefore, it is part of the work conducted in other WPs and deliverables, which encompasses a comprehensive understanding of the public's perspective.

The study carried out in this deliverable allows identifying the public's communication needs and expectations, which are the basis for an effective communication process that contributes to societal resilience. Therefore, the deliverable recommendations are the basis for selecting promising solutions according to criteria of fulfilling communication needs and answering expectations, exploring the innovative use of communication and social media technologies (WP3), and validating the solutions (WP4).

Based on the task's goals, the deliverable documents and analyses social media and other electronic communication between emergency and disaster management agencies and citizens, and among citizens. It presents the public's communication needs and expectations and how authorities and first responders refer to them in effective communications, focusing on variables of gender, socioeconomic status, culture (nationality), and digital literacy.

Therefore, the deliverable contributes to the first general objective of project ENGAGE: "Understand, compare and nurture how citizens, communities, and authorities contribute to societal resilience in different contexts in Europe, considering countries with high-risk experience (e.g., Japan, Israel)", by referring to the role of communication technology including social media in different contexts.

More specifically, D1.3 is strongly related to other deliverables of WP1 and WP2, as follows:

- **D.1.1 Improving societal resilience:** the contextual factors and target aspects identified in this deliverable are part of the general process of clarifying the relationship between contextual factors and target elements of societal resilience.
- **D1.2 Perceptions, risk awareness, needs, and expectations regarding societal resilience:** the communication needs and expectations identified in this deliverable are part of the broader image of the public's needs in general, before, during, and after emergencies and disasters.
- **D2.4 Communication channels and guidelines of authorities and first responders:** the analysis of the communication channels and guidelines of emergency authorities and first responders, as conducted in D2.3, is the public perspective's mirror image. The two

deliverables complete a full examination of an end-to-end communication process, from the organizations to the public and vice-versa.

Also, D1.3 lays the groundwork for WP3, WP4, and WP5. The knowledge produced in this deliverable supports and informs these deliverables as follow:

- **D3.1 Selection of promising solutions:** the identifications of the public's communication needs support the work on selecting promising solutions. The deliverable sets the criteria on which different solutions can be examined (e.g., how they refer to and answer the public's communication needs).
- **D3.2 Innovative use of communication and social media technologies:** existing solutions and the proposed framework for an AI chatbot will be examined and designed based on identifying and classification the public needs described in this deliverable.
- **D4.2 Initial validation of solutions:** the descriptions of the public needs are part of the solutions' validation process. It offers the public's perspective on how these solutions could be improved and better validated.
- **D5.4 Website and knowledge platform & D5.5 Knowledge and innovation community:** The results of the deliverable are part of the knowledge project ENGAGE creates, which will be distributed and presented by the means described in D5.4 and D5.5.

## 1.5 LIST OF TERMS

**Table 1.** List of terms.

Term	Explanation
Risk Communication	Risk Communication refers to the exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being.
Crisis and Emergency Risk Communication	Risk Communication that focuses on crises and emergencies.
Communication Needs	The wide set of needs the public has regarding various communication channels.
Information Sources	Any channel in which the public uses to consume information.
Cognitive Needs	Cognitive/information needs refer to knowledge, understanding, curiosity, exploration, predictability, creativity, discovery, and meaning.
Affective Needs	Affective needs are related to emotions and the psychological state of the public. They include the need to feel positive emotions, relieve stress, be excited, and more.
Micro Integrative Needs	Personal integrative needs examine questions of self-esteem, social status, credibility, and a sense of stabilization.

Macro Integrative Needs	Social integrative needs relate to social cohesion. They encompass the need to socialize with family, friends, and other members of society.
Escapist Needs	Escapist needs, or tension-free needs, include the use of communication channels as means to escapism from the real world and relieve tension and stress.
Unidirectional Flow of Communication	One-way flow of communication (top-down).
Multidirectional Flow of Communication	Two-way flow of communication (bottom-up and top-down)
Contextual Factors	Contextual factors are internal to society and hard to modify. They include personal, social, cultural, economic, and political factors.
Target factors	Target factors are less persistent than contextual factors and can be changed.
Transmedia	The transmedia approach examines the public's communication needs and expectations through an integrative investigation of multiple channels' uses to consume connected messages. Here, every channel is tailored with messages and designs that use the platform's unique affordances.
Authorities	Official national or regional emergency authorities, operated by the country, state or region.
First Responders	Organizations with ability to arrive first in situations of emergencies and disasters.

## 2 SCIENTIFIC BACKGROUND

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### 2.1 COMMUNICATION NEEDS

One of the dominant subjects of this deliverable is the public's communication needs and expectations before, during, and after emergencies and disasters. In this deliverable, we refer to communication needs and elements that the public requires and are related to the communication process (e.g., receiving information, distributing information, serving as a mediator of information to his/her friends and family). Furthermore, their expectations refer to how they wish to fulfill these needs by using various communication channels (e.g., that organizations will respond fast to their inquiries, that information will be updated 24/7).

One of the most common categorizations of communication needs, which we use in this report, divides them into four types (Katz, Haas & Gurevitch, 1973):

- Cognitive/information needs.
- Affective needs.
- Personal (micro) and social (macro) integrative needs.
- Escapist needs.

Cognitive/information needs refer to knowledge, understanding, curiosity, exploration, predictability, creativity, discovery, and meaning (Maslow, 1981). They refer to questions such as: what does the public want and need to know? How can we help the public understand better the occurrences related to the emergency or disaster? How can we trigger the public to gather the information that can build societal resilience actively? Concerning the communication process, it refers to the ways varied communication channels can promote the public's cognitive/information needs and the public's expectations from authorities and first responders to provide for these needs. During emergencies and disasters, the need for information is very high, and thus, individuals tend to look for every possible source to access such information (Boyle et al., 2004; Stiegler, Tiley & Parveen, 2011; Hughes et al., 2008; Skinner, 2013).

Affective needs are related to emotions and the psychological state of the public. They include the need to feel positive emotions, relieve stress, be excited, and more (Lachlan, Spence & Lin, 2014). In this case, we examine how communication channels fulfill these needs. Some of the related questions regarding affective needs are: Does the communication process make people happy? Does the information help them to cope with their fears? Does it decrease their sense of uncertainty?

Integrative needs refer to two types of social connections. Personal integrative needs examine questions of self-esteem, social status, credibility, and a sense of stabilization. The communication process's role is to maintain these needs (Katz, Haas & Gurevitch, 1973). Before during, and after emergencies and disasters, factors such as self-esteem, social status, credibility, and a sense of stabilization may be vulnerable, and the public seeks to maintain them by using the different communication channels (Raynolds & Seeger, 2005; Son, Sasangohar, Neville, Peres & Moon, 2020). Social integrative needs relate to social cohesion. They encompass the need to socialize with family, friends, and other members of society. It is related to the individuals' need to be part of their social groups, on the family, community, national or international levels (Friedkin, 2004).

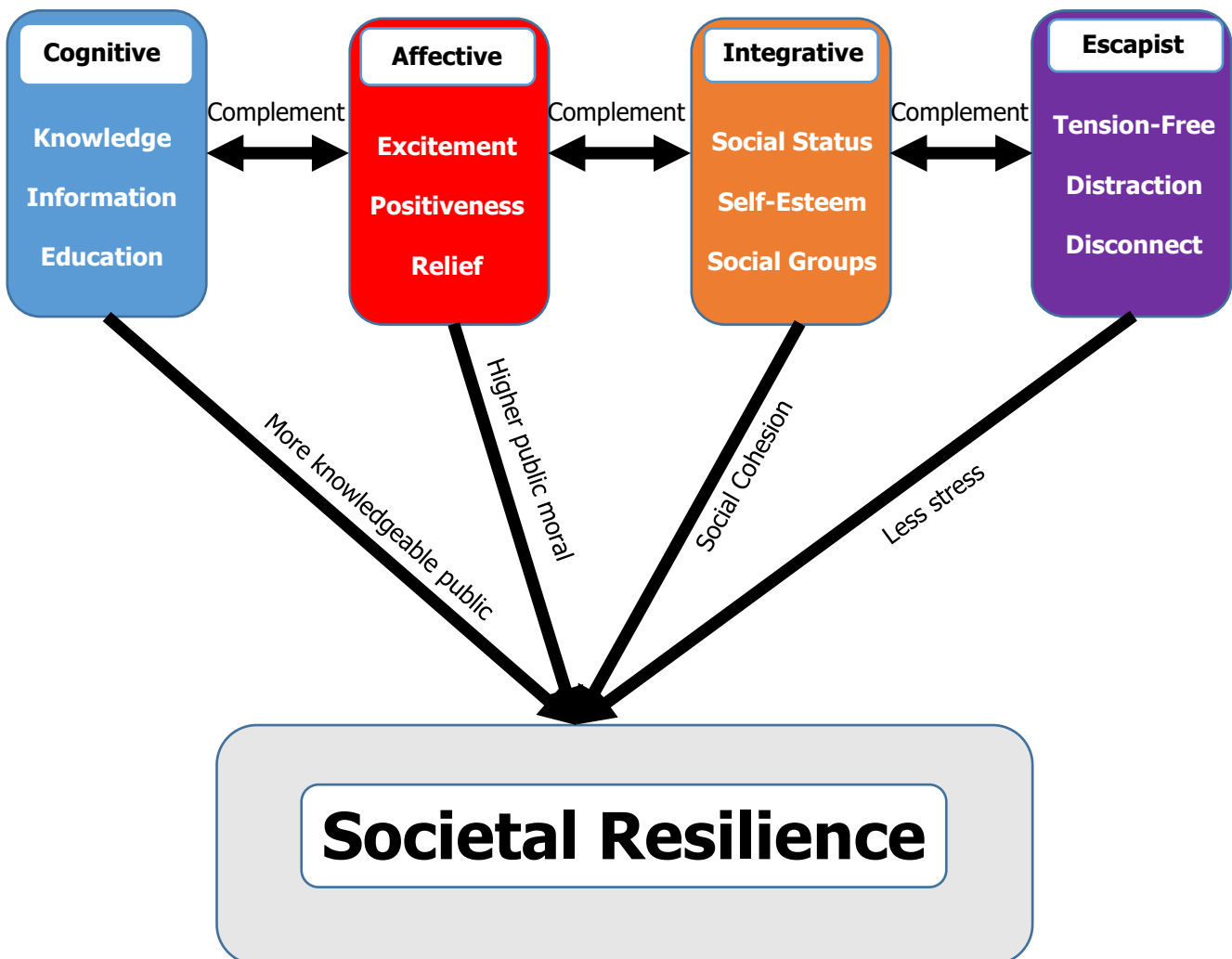
Last, escapist needs, which in some places are referred to as tension-free needs, include the use of communication channels as means to escapism from the real world and relieve tension and stress (Katz, Haas & Gurevitch, 1973). For example, during emergencies, the public does not use the communication channels only to gather crucial information which can help to cope with the situation but also seeks a way to distract the thoughts from the situation, such as watch entertainment programs, play videogames or use social networks, not for emergency information (e.g., Lev-On & Uziel, 2018).



Before, during, and after emergencies and disasters, the public expect to fulfill these needs by using different communication channels. Previous studies have shown that fulfilling the public's communication needs and meeting their expectations can lead to increased use of communication channels before, during, and after emergencies and disasters (e.g., Hiltz et al., 2020). Haataja, Hyvärinen & Laajalahti (2014) also showed the contribution of satisfying the public's communication needs and expectations to societal resilience.

Therefore, the vital question related to communication needs and expectations, in the context of societal resilience, is what are the dominant communication needs to be addressed before, during, and after emergencies and disasters. Figure 1 illustrates the relationship between the different types of communication needs and how they can affect societal resilience, as a model the deliverable suggests.

**Figure 1.** Relationship between communication needs and societal resilience.



The model illustrates the relationship between all communication needs. It has two contributions to societal resilience. First, it shows how each group of needs can contribute to building societal resilience. For example, when the public knows more, has information, and is well educated, the fulfillment of these cognitive needs contributes directly to societal resilience. Second, it raises an essential point regarding whether communication needs can be “stand-alone”, individually, or integrated. Instead of just examining each of the groups individually, it suggests that one group

complements the other. For example, the fulfillment of the cognitive needs can also complement the fulfillment of affective needs, integrative and escapist.

A recent development, especially concerning social and mobile media, connects the fulfillment of the public's communication needs with the medium's interactive nature (Khan, 2017). Fulfillment of public communication needs is achieved not just by improving the communication process from the perspective of authorities and first responders to the public (top-down) and vice-versa – from the public to the authorities responders (bottom-up). Furthermore, there is a need to consider the communication among the public itself, within and between communities (Reuter et al., 2012). While social media and other innovative Information and Communication Technologies (ICT) allow more interactive and multidirectional communication, findings regarding communication channels for multidirectional communication with the public are contradictory. Some emphasize the one-way flow of communication between the organizations and the public, and others claim that organizations started to listen more to the public in recent years, allowing a two-way flow of communication (e.g., Gesser et al., 2015; Wray et al., 2006). Recent studies emphasized the need to allow the public to participate proactively in the communication process (e.g., posting pictures, asking questions and receiving answers, advising the community) (e.g., Villodre & Criado, 2020; Yungeng et al., 2017).

## 2.2 RISK COMMUNICATION, CRISIS AND EMERGENCY COMMUNICATION, AND THEIR IMPACT ON SOCIETAL RESILIENCE

The public's communication needs are a crucial factor in the theory of risk communication, which contributes to building societal resilience. According to the World Health Organization (WHO), Risk Communication refers to *"the exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being"* (WHO, 2015). Other definitions emphasize the importance of the magnitude, significance, or control of the risk (Covello, 1992; 2003), the importance of risk management (McComas, 2006), the need for dialogue between the public and stakeholders (Palenchar, 2010), and ongoing risk monitoring (Coombs & Holladay, 2012).

Risk communication is related to two other concepts: crisis communication and disaster & emergency communication. Crisis communication originated in the field of public relations. It examines how an entity employs communication to face a challenge for its reputation (Bundy, Pfarrer, Short & Coombs, 2017). Disaster and emergency communication refer to all communication means employed to communicate disasters and emergencies (Haddow & Haddow, 2013).

In the ENGAGE project context, we use risk communication as a theory that captures research on communications of crises, emergencies, and disasters. This led to developing an integrative model of Crisis and Emergency Risk Communication (CERC) model (CDC, n.d.; Reynolds & Seeger, 2005). In a broader sense, Kar & Cochran Jr. (2019) claim that risk communication, specifically aimed at building multi-hazard, multicultural and people-centered systems, is a crucial component of resilience building, which is an essential factor in emergency management. It is also crucial in mobilizing the public to take action. However, its effectiveness depends on various factors, among them the public's socio-cultural-economic and psychological traits and their commitment to participate. Resilience campaigns acknowledge the importance of Risk Communication before, during, and after emergencies and disasters, and it is widely used in planning communication strategies (Gesser-Edelsburg et al., 2015; Holmes, Henrich, Hancock & Lestou, 2009; Sandman, 2007). Following from here, we will thus use the term "Risk Communication".

Risk Communication strategy involves using various communication channels and tactics to enable the public to make informed decisions for their protection during risky situations. From traditional communication, mass media, social and mobile media, other innovative communication tools, and also community engagement (e.g., Alaszewski, 2005; Karger, 2005; Larsen, Hanigen, Reich, Qin, Cope, Morgan & Rappold, 2020; Ogie, Rho & Clarke, 2018; Rohemann, 1992; Wendling, Radisch &

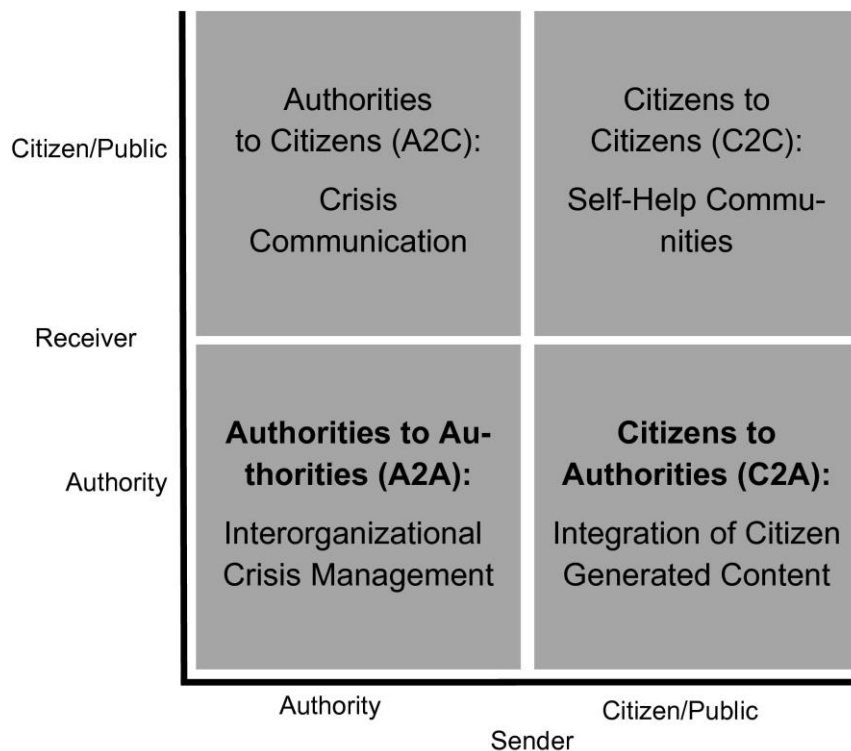
Jacobzone, 2013). Understanding how the public uses these channels and its needs and expectations from the authorities is crucial to building societal resilience.

The traditional Risk Communication approach follows a one-way flow of communication strategy, from the emergency and disaster management agencies to the public. According to Krimski (2007), unidirectional communication flow leads to more accurate information from reliable sources. Recent studies of Risk Communication concerning emergencies and public resilience have highlighted the shift from communicating with the public from a top-down to a more two-way bottom-up communication flow (Gesser-Edelsburg et al., 2014).

Whether in a more traditional, one-way Risk Communication approach or by focusing on public participation, the theory's core relies heavily on understanding the public's perceptions, concerns, beliefs, norms, and more (McComas, 2006; Scholderer & Velfen, 2019). Ample research has emphasized the importance of understanding and referring to the public's communication needs and expectations as a strong predictor of effective risk communication (e.g., Bier, 2001; Covello, McCallun & Pavlova, 2012; Frewer, 2004; Leiss, 2004; Sandman, 1993; Zhang, Li & Chen, 2020).

Communication needs, Risk Communication, and communication flow play an essential role in building societal resilience in regarding to emergencies and disasters. In emergency and disaster management, the communication flow involves the authorities and first responders on the one side and the public on the other side. Reuter, Marx & Pipek (2012) defined the connections and communication processes in a matrix of cooperation, as shown in figure 2. The relationship between the different communication flows in this matrix highlights the importance of understanding the public's communication needs and expectations in risk communication.

**Figure 2.** Crisis Communication Matrix. Taken from Reuter, Mark & Pipek, 2012.



The matrix classifies the communication process according to the sender of the message (x-axis) and the recipient (y-axis), between citizens (C) and authorities (A). The matrix creates four practical information flows: the inter-organization level (between authorities and authorities), the public level (citizens to citizens), the citizens-generated content level, which is analyzed by the authorities (citizens to authorities), and the level of informing the public (authorities to citizens level).

The public's needs and expectations are crucial to understanding three out of this matrix's four levels. They reflect two types of communication means, as discussed broadly in this deliverable: between citizens and citizens (within communities) and between citizens and the authorities.

The matrix illustrated by Reuter, Marx & Pipek (2012) defines the relationship between these two types of communication processes. They are highlighted by this deliverable as: managing a crisis and emergency communication crisis campaign (authorities to citizens), is also based on the integration of citizens' content (citizens to authorities) and can enhance self-help communities (citizens to citizens), leading to societal resilience building. On the other hand, self-help communities constitute a type of content that the citizens generated and should be integrated bottom-up to the authorities as part of the crisis and emergency risk communication employed by the authorities to build societal resilience. Figure 3 describes the circular process, as illustrated in this deliverable.

**Figure 3.** The relationship between communication processes among communities and between communities and authorities and first responders.



Meeting the public's needs and expectations at the authorities-citizens level improves communication effectiveness among community members. Also, fulfilling these needs at the citizens-citizens level can contribute to the communication between community members and the emergency and disaster management agencies. Supporting these two levels is a strong predictor of societal resilience (Hyvärinen & Vos, 2015; Reuter & Spielhofer, 2017).

Last, several factors explain the communication needs of the public. Some are demographic (e.g., gender, socioeconomic status, religiosity), others are psychological (personality traits), and the rest

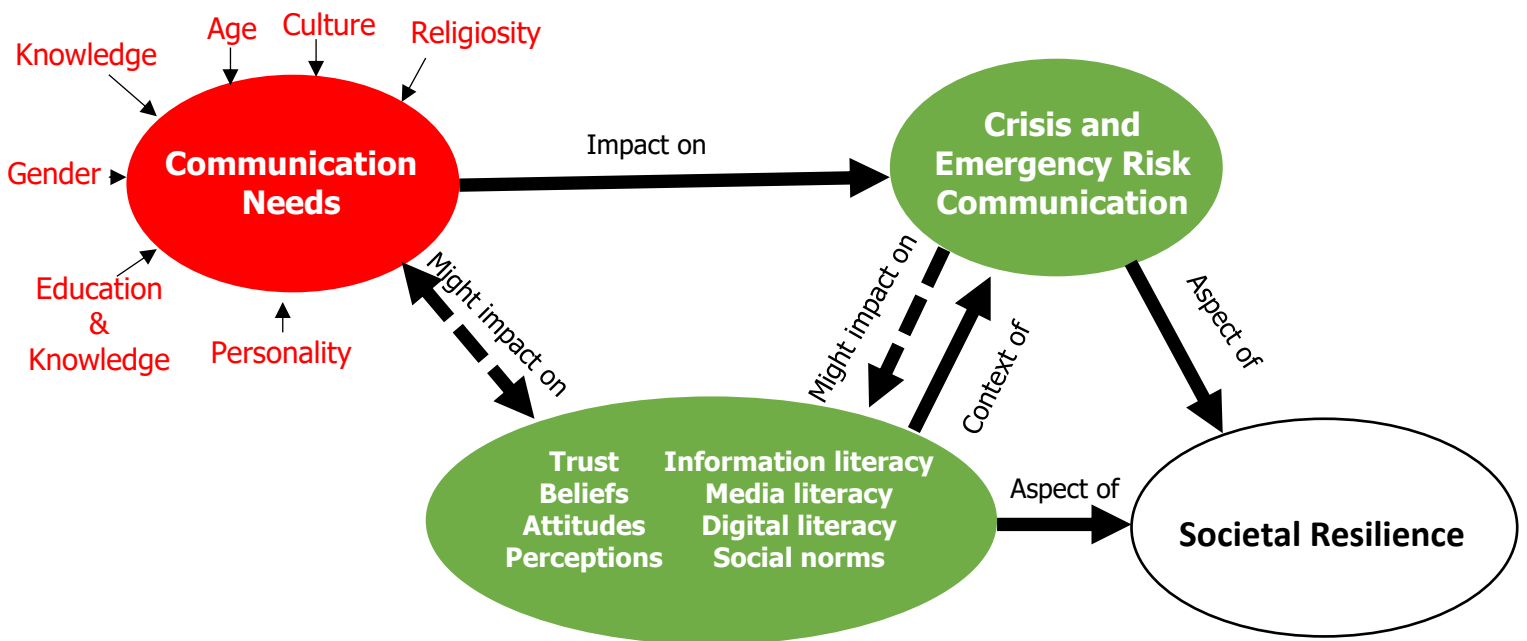
are cultural, political, and educational (e.g., social norms, existing knowledge). Communication needs are part of the development of Risk Communication that affects other factors that impact societal resilience, such as beliefs, attitudes, perceptions, information, digital and media literacy, and more. The different factors affecting communication needs and Risk Communication, which correlate with societal resilience, can be divided into contextual factors and target factors.

## 2.3 COMMUNICATION NEEDS AND RISK COMMUNICATION – CONTEXTUAL FACTORS AND TARGET FACTORS

An essential aspect of WP1, WP2, and WP3 is identifying contextual factors and target factors of societal resilience. Contextual factors are internal to society and hard to modify. They include personal, social, cultural, economic, and political factors. Conversely, Target factors are less persistent. Therefore, disaster and emergency campaigns tend to focus on target factors.

In this deliverable, communication needs can be considered contextual factors, while risk communication is a target variable. Their impact on building societal resilience is illustrated in figure 4.

**Figure 4.** The relationship between communication needs and risk communication, contextual factors (in red), and target factors (in green).



### 2.3.1 CONTEXTUAL FACTORS

As figure 4 presents, additional contextual factors may affect communication needs and expectations:

- Age. Research shows that age is a strong predictor of communication needs. For example, several studies found a correlation between age and affective and integrative needs (boyd, 2014; Evans & Robertson, 2020; Marwick & boyd, 2014; Prensky, 2001; Palfrey and Gasser, 2011).
- Gender. Research shows a significant difference in some of the communication needs of diverse genders, such as different affective needs or diversity in the importance of individual

pieces of information (e.g., Hust & Brown, 2008; Gill & Gill, 2007; Lind, 2004; Knobloch-Westerwick, 2007).

- Socioeconomic status. Differences are found between people's communication needs dependent on their socioeconomic status (e.g., Baumer, 2018; Roberts & Foehr, 2008).
- Religiosity. In very religious communities, communication needs are stringent and must follow religion and traditional laws. Therefore, employing risk communication campaigns in such areas incurs significant barriers (e.g., Almenayes, 2014; Armfield & Holbert, 2003; Nyland & Near, 2007).
- Level of education and existing knowledge. Higher education levels correlate with the complexity of the communication needs (e.g., Ahmed & Cho, 2019; Buckingham, 2013; Eveland Jr. & Scheufele, 2000). The existing knowledge affects the public's communication needs, especially concerning the cognitive and information needs (e.g., Alshahrani & Pennington, 2020; Kwak, 1999).
- Personality traits. Research shows that some personality traits, such as extraversion and introversion, openness and agreeableness, connect to specific communication needs, such as affective and escapist, and vice-versa (e.g., Adamopoulos & Ghose, 2018; Correa, Hinsley & De Zuniga, 2010; Golbeck, Robles & Turner, 2011; Özgüven & Mucan, 2013).
- Culture. Previous studies show that cultural traits, habits, and norms can define the public's communication needs (e.g., Almenayes, 2014).

### 2.3.2 TARGET FACTORS

As presented in figure 4, communication needs may affect risk communication directly, after being affected by several other target factors, or to affect risk communication through these target factors:

- Trust (can also be a contextual factor). One of the Risk Communication goals is to maintain a higher level of trust in emergency and disaster management agencies (Gesser-Edelsburn et al., 2014; Renn & Levine, 1991). According to previous studies, meeting the public's communication needs is an essential contributor to trust in the authorities (e.g., Busa, Musacchio, Finan & Fennell, 2015; Limaye, Sauer, Ali & Bernstein, 2020; Wu, 2015).
- Beliefs (can also be a contextual factor), attitudes, and perceptions. Risk communication campaigns address varied beliefs, attitudes, and perceptions that the public holds. At times, they may contradict the recommended behavior before, during, and after emergencies and disasters (e.g., Rohrman, 2018).
- Information, media, and digital literacies. Information, media, and digital literacies refer to different concepts and are essential aspects of Risk Communication. They refer to the public's ability to seek and process information, understand media content, and work with digital technologies (Buckingham, 2010; Eisenberg, Lowe & Spitzer, 2006; Livingstone, 2011; Livingstone, van der Graaf, 2008). They can also be considered as communication needs. Risk communication includes increasing the levels of information, media, and digital literacies of certain groups, affecting societal resilience (Glick, 2007; Rudd, Comings & Hyde, 2003).
- Social norms (can also be a contextual factor). Risk Communication affects social norms of groups, communities, and the general public (e.g., Scholderer & Veflen, 2019). For example, by promoting new norms. In some cases, there are gaps between the descriptive norms (e.g., what happens in practice) to the perceived norms (e.g., how the public perceives the norms' popularity). In this case, risk communication may effectively advertise prevalent descriptive norms that the public mistakenly perceives in the minority. Also, risk communication can raise other social norms for discussion.

## 2.4 USE OF COMMUNICATION CHANNELS

During emergencies and disasters, the public expects to access the government, authorities, first responders, and other emergency management agencies, all at the individual, community, province, region, state, and national levels. Therefore, several factors need to be addressed (CDC, 2014).

The use of communication channels to communicate with the public before, during, and after disasters and emergencies is crucial in designing effective Risk Communication. Stiegler, Tilley, & Parveen (2011) argued that during an emergency, the public seeks familiar and immediate communication channels (e.g., text messages, emails, phone calls), and only then approaches other sources (e.g., official websites). Other studies added that during disasters and emergencies, the public tries to learn about the situation from any available source of information (Boyle et al., 2004; Stiegler, Tilley & Parveen, 2011; Hughes, Palen, Sutton, Liu, & Vieweg, 2008).

These findings call for a multichannel communication approach, allowing the public to connect with disaster and emergency agencies in varied ways and channels (e.g., Cheng & Mitomo, 2019). The multichannel approach allows the fragmented audience, diverse groups with different communication needs, a more tailored-made experience before, during, and after disasters and emergencies (Savoia, Lin, Bernard, Klein & James, 2017). The use of communication channels by disaster and emergency management agencies is covered in D2.4. The focus of deliverable 1.3 is on the use, needs, and expectations of the public who uses these channels before, during, and after disaster and emergencies.

The media plays a vital role in catering for the public's communication needs, in general (e.g., Katz, Blumler & Gurevitch, 1973; Rubin, 2009; Whiting & Williams, 2013) and concerning disaster and emergency management in particular (e.g., Lev-On & Uziel, 2018; Maxwell, 2012). Communication channels have different characteristics, and they offer the public unique potentials and ways to satisfy their needs (Bakker & de Vreese, 2011; Gil de Zúñiga, Jung, & Valenzuela, 2012; Gil de Zúñiga, Puig-I-Abril, & Rojas, 2009; Pasek, Kenski, Romer, & Jamieson, 2006; Tolbert & McNeal, 2003). Research also shows that the public has varied expectations from different media and communication channels, in general, and in the different phases of disasters and emergencies in particular (e.g., Reuter & Spielhofer, 2017; Reuter, Kaufhold & Schmid, 2019).

There are two approaches to examine the public's needs and expectations of the communication process before, during, and after disasters and emergencies. The first approach examines the set of needs and expectations of the public from each channel (e.g., television, social media, mobile phones). Every channel is examined separately, and the public's perceptions of it are investigated (Reuter & Spielhofer, 2017; Reuter, Kaufhold & Schmid, 2019). The second approach employs Transmedia and communicating messages through multiple platforms, which complete one another (Pratten, 2011). We suggest for ENGAGE project that the second approach, which refers to the communication needs and communication strategy as a whole – is the preferred approach.

The transmedia approach examines the public's communication needs and expectations through an integrative investigation of multiple channels' uses to consume connected messages. Here, every channel is tailored with messages and designs that use the platform's unique affordances (Kalogeris, 2014). For example, the public learns how to behave in the event of a hurricane from a YouTube video of an official agency; then learns about the occurrence of the hurricane and its effect on their town in the local news; after that, uses a mobile app to receive continuous tailored-made information about the progress of the hurricane; and, participates in discussion with other members of the community in a local social media group. Therefore, the transmedia approach does not seek to understand how each communication channel fulfills the public's communication needs, but rather how the public perceives the integrated communication process with authorities and first responders (e.g., Gutiérrez, Luque, Manigilo, Casado & García-Guerrero, 2020). Its advantages are in referring to all the messages as one story that needs to be connected. Compared to the first approach that accepts taking one message from one medium and putting it, as is, in another one. The disadvantage is that by using that approach, we must consider that not all people are exposed to all channels.



Therefore, we must allow all of them to receive sufficient information, even if they use only part of the “story”.

Transmedia evolved from science fiction, fandom (a term that describes fans' communities of popular culture), entertainment, and storytelling (Bertetti, 2014; Pratten, 2011). However, it since affected other disciplines and research areas, including societal resilience and disaster and emergency management (e.g., Ding, 2012; Loque et al., 2020; Gutiérrez et al., 2020; Preston, 2014). Transmedia storytelling before, during, and after disasters and emergencies may build societal resilience (Preston, 2014).

In the following subsections, we review the public's perspectives (e.g., needs, expectations, barriers) of using different communication channels before, during, and after disasters and emergencies. We use a standard classification of communication channels (e.g., Dutta-Bergman, 2004; Lariscy, Reber & Paek, 2010): Traditional communication channels and mass media, electronic communication (excluding mobile phones and social media), interpersonal communication, social media, and mobile phones. Another subsection examines innovative communication channels concerning the public needs.

### 2.4.1 TRADITIONAL COMMUNICATION CHANNELS AND MASS MEDIA

Traditional communication channels include long-serving methods for communicating with the public (e.g., flyers, information, or emergency call-centers). Mass media refers to channels such as television, radio, and newspapers. Despite the rise of Social Media, mobile, and other innovative channels, traditional communication channels and mass media still play an essential role in the communication process between disaster and emergency management agencies (e.g., Reuter & Spilhofer, 2017; Reuter, Kaufman & Schmid, 2019; Spilhofer, Hahne, Reuter & Kaufhold, 2019). While there are differences in uses within each category of channels, all, in general, play an essential role in building societal resilience (Steensen & Eide, 2019).

Traditional communication channels, such as flyers and information call centers, address the public's and specific groups' needs and expectations. Flyers are used by older people who are less accustomed to reading information from a screen and communities that suffer from frequent infrastructure malfunctions (Paci-Green, Varchetta, McFarlane & Iyer, 2020). More age-groups use information call centers, usually to fulfill the needs for getting information that does not require active information seeking, finding an answer for an unanswered question, and in situations of urgency (Al-Rousan & Rubenstein, 2014; Helsloot & Ruitenbergh, 2004).

Among all traditional communication channels and mass media, television is the most dominant source for information in all stages of emergencies (e.g., Rahmi, Joho & Shirai, 2019). Shaikh (2017) found that people tend to use television to seek information more than the internet. The use of television for information seeking was also examined in the 6<sup>th</sup> wave World Values Survey (WVS, 2014), conducted between 2010-2014, among citizens in 56 countries worldwide<sup>2</sup>. The overall percentage across the countries presented that 74.7% used the television daily for information seeking, compared to 30.1% who used the internet daily.

The WVS also shows that more people use television daily to fulfill the need for information seeking, even among daily internet users. On the other hand, vast data, even from developed countries, showed fewer people used the internet for information seeking among daily television viewers. Data were consistent in the USA (62.9% daily television users who use the internet daily versus 55.6 daily internet users who use the television daily), Sweden (71.9% versus 69%), Germany (76.9% versus 50.9%), and Japan (94.6% versus 35.4%). Romania, a developing country according to the human development index (HDI, 2020), showed similar results (79.1% versus 28.8%). These findings are

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<sup>2</sup> The 7<sup>th</sup> wave of WVS started on 2017 and is due to end during 2021. The 7<sup>th</sup> wave includes more up to date information and covers more countries, however, the results are still partial.

supported by more recent studies, which showed that across all age groups (18+), television is still a preferred channel for receiving information in disasters and emergencies (Reuter & Spielhofer, 2017; Tam, Huang and Ying Yang Chan, 2018).

**Figure 5.** The use of the internet for fulfilling the need for information seeking among daily television viewers vs. the use of television to fulfill the need for information seeking among daily internet users. Data is taken from Shaikh, 2017 & World Values Survey.



Apart from television, radio is another channel that is widely used, especially during disasters and emergencies. The radio responds to the public's expectation to receive the information as fast as possible (CDC, 2014). According to Reuter & Spielhofer (2017), 54% of the citizens surveyed, as part of project EmerGent across 30 European countries, reported using local radio stations concerning emergencies. Similar results were found in an earlier case study of a storm-related disaster in New South Wales in 2007, conducted by Cretikos et al. (2008).

In general, from the public's point of view, previous studies identified some advantages and disadvantages in the communication process before, during, and after disasters and emergencies, among community members and between them and authorities and first responders. Recent surveys showed that the information disseminated in traditional channels and mass media (e.g., call centers, television, radio, newspapers) is believed to be more trustworthy and accurate (e.g., Burger, Gochfeld, Jeitner, Pittfield & Donio, 2013; Martin-Shields, 2019). Compared to the information disseminated on social media, the full perceived advantage of traditional channels and mass media is that the provided information is refined, excluding massive amounts of information to select from (e.g., Hiltz & Plotnik, 2013; Kaufhold, Rupp & Reuter, 2020; Paci-Green, Varchetta, McFarlane & Iyer, 2020). Traditional channels and mass media, which are also considered as more "official" channels, serve as a priming tool for the public to make sense of what pieces of information are more critical than others (e.g., Advani, Naess & Kurz, 2016; Paek, Hilyard, Freimuth & Barge, 2010).

On the other hand, television and newspapers are perceived as slower means for disseminating information. Television, radio, and the internet are also perceived as less flexible for constant information changes, especially during emergencies, and less accessible (Case & Given, 2016).

#### 2.4.2 ELECTRONIC COMMUNICATION: INTERNET WEBSITES, EMAILS, AND ONLINE NEWSLETTERS

Electronic media such as internet websites, emails, and online newsletters allow uni- and multidirectional communication flow with the public. They can be used in a one-way, unidirectional, flow of communication, two-way, multidirectional, communication flow. They can be used for dissemination of top-down information from disaster and emergency management agencies to the public or to serve as tools for interactive, including bottom-up, communication with the public (e.g.,

contacting the organization, posting messages on message boards, responding to emails, or sending emails to the authorities and first responders). (e.g., Chan, Huang, Lo & Hung, 2020). Each medium can be used for both ways of communication. An email can be used just to distribute messages but also to contact disaster and emergency organizations. Even social media, which is considered an interactive medium and designed mainly for a two-way communication flow, can be used for one-way flow of communication, ignoring the user feedback.

In the last decade, there is an increase in the number of users using the internet for information seeking before, during, and after emergencies and disasters (Abbasi, Hossain, Hamra & Owen, 2010). According to Reuter & Spielhofer (2017), 80% of the responders in a survey of project EmerGent across EU countries reported using online news websites as information sources. 31% reported getting information from online websites of disaster and emergency management agencies. Emails and online newsletters are sources that are more frequently used before and after emergencies and disasters (Burger, Gochfeld, Jeitner, Pittfield & Donio, 2013).

Ample research shows that internet websites and emails can support the public's information needs, expecting accurate and refined information. Emails also provide, both among the community members and between them and the emergency and disaster management agencies, to maintain a two-way flow of communication (e.g., Hong, Fu, Wu & Frias-Martinez, 2018; Gesser et al., 2015; Gurman & Ellenberger, 2015), fulfilling the expectations for response and feedback. In general, internet websites are considered a reliable source of information by the public in all phases of emergencies and disasters (Procopio & Procopio, 2007).

### 2.4.3 FACE TO FACE AND MEDIATED INTERPERSONAL COMMUNICATION

Interpersonal communication involves a direct (face to face) or mediated (e.g., phone, computer, smartphone) contact between at least two people, up to a small group (Lazarsfeld, Berelson, & Gaudet, 1944; Rogers, 2010[1962]). Direct or mediated contact allows the flow of information to be more effective, tailored, flexible, and fast during all phases of disasters and emergencies (e.g., Danczyk, 2007; Kumar, 2007; Patton, 2007).

Heath, Lee & Ni (2009) and Kapucu, Arslan & Demiroz (2010) argue that interpersonal communication and building relationship inside the community is one of the most critical aspects of disaster and emergency management. Their indication heavily relies on Palen & Liu's (2007) determination that people are "natural information seekers", addressing during crises, first and foremost, their immediate social network.

Interpersonal communication includes community opinion leaders, telephone information call centers, and even digital channels (e.g., emails, chats). It includes all channels through which the public can have an interactive, two-way flow, multidirectional, synchronous (or almost synchronous) conversation with another community member or a representative of a disaster and emergency management agency. Previous studies suggested that interpersonal communication channels, such as family and friends, are considered a frequent source of information (14.2%) before known emergencies (e.g., hurricanes), more than the internet and first responders (Heath, Lee & Ni, 2009).

Previous studies examined interpersonal communication's role in satisfying the public's communication needs and expectations in the communication process between the community, authorities, first responders, and community members. Studies revealed that by using interpersonal channels, the public fulfills many cognitive, affective, integrative, and even escapist needs, perceive the information as more trustworthy, tailored-made, and pleasant (e.g., Brooks, Dunn & Amlôt, 2019; Kaniasty, 2020; Lindell & Prater, 2003).

However, despite the advantages of interpersonal communication, it is almost impossible for authorities and first responders to reach a significant percentage of the society before, during, and after disasters and emergencies, only by using interpersonal communication channels (Bishop, Press, Mendelsohn & Casalino, 2013; Huq, Koehlmoos & Azmi, 2012). Therefore, the study of the public's

communication needs and expectations concerning interpersonal communication focuses more on communication among the community members (e.g., Dynes, 2006; Heath & Palencher, 2000; Kim & Kang, 2010; Toppenberg-Pejcic, Noyes & Allen, 2019). Before, during, and after disasters and emergencies, many recommendations come directly from community members that serve as official or non-official experts (Heath, Lee & Ni, 2009). They are defined as opinion leaders, members of the community (e.g., friends, peers, family members), that are considered by their group or community members as credible sources of information (Lazarsfeld, Berelson, & Gaudet, 1948; Rogers, 2010[1962]). Opinion leaders can better tailor the information to community members, fulfill their communication needs, and meet their expectations from the communication process. By opinion leaders, we refer to lay people who can directly interact with other individuals, not internet opinion leaders, who have many followers. However, they cannot reach every one of them based on interpersonal communication (e.g., Shanshan, 2010).

Interpersonal communication among community members is helpful in gratifying communication needs. The effective interpersonal communication process can answer the community members' information needs, offer them relief, integration, and even escape from their current reality (e.g., Sutton, Rivera, Sell & Moran, 2020). Therefore, part of an emergency campaign includes recruiting such opinion leaders to improve the community's communication process (e.g., Nisbet & Kotcher, 2009).

#### 2.4.4 SOCIAL MEDIA – EMERGENT PROJECT

EmerGent project, conducted between 2013-2017 with funding by the EU, was a consortium that had the overall objective of understanding the positive and negative impact of social media in emergencies in order to enhance objective and perceived safety and security of citizens before, during, and after emergencies, and strengthen the role of European companies supplying service and products related to the projects' results. The consortium partners were academic institutions, emergency authorities, social media consulting agents, and more. The project laid the groundwork for ENGAGE regarding social media in emergencies.

The use of social media around the world is growing every year. Approximately 3.5 billion people (45% of the world population) use social media worldwide (Emarsys, 2019). [Deliverable 2.4 of EmerGent project](#), focusing on the impact of social media for emergency services and citizens, and [deliverable 2.5](#), focused on emergency management in social media generation (Reuter, Kaufhold & Spielhofer, 2017), showed that most UK citizens (85%) occasionally use social media, with Facebook identified as the most popular social media source (Reuter, Ludwig & Kaufhold, 2016; Spielhofer et al., 2017).

Large corporates have made an effort in recent years to connect users from less developed countries. For example, Google and Facebook support and lead projects for promoting internet and wi-fi infrastructures in developing countries, rural areas, and villages (Lieskovsky & Paris, 2015; Kaur & Randhawa, 2018). In 2015, Facebook announced "Facebook Lite", a simpler version of their app that allows cheaper and less advanced phones to run the app, even with slower connections and limited infrastructures. Since then, other companies have adapted similar technologies to help increase the penetration of their technologies worldwide (Ng, 2019).

The use of social media, like other technologies, is affected by various sociodemographic variables. Young people tend to use social media more frequently, although a survey conducted as part of deliverable 2.4 in EmerGent and previous studies showed that 39% of people aged 75 or more use it daily and 55% occasionally (Reuter, Ludwig & Kaufhold, 2016; Spielhofer et al., 2017). Furthermore, women use social media more than men, while there are differences regarding specific social media sites used more frequently by men (e.g., LinkedIn, Twitter) and others by women (e.g., Facebook, Instagram). (e.g., Altenburger, De, Fraizer & Avteniev, 2017; Perrin, Thaller & Anderson, 2019). Social media use also correlates with socioeconomic status (e.g., Feng, Zhang & Lin, 2019).

Comprehensive research studies social media use before, during, and after disasters and emergencies and social media applications in disaster and emergency management (e.g., Bhuvana & Aram, 2019; Crowe, 2012; Lovari & Bowen, 2020). Recent studies showed that social media had become a central source of information for the public in all phases of disasters and emergencies, not just from official sources, but also as a way to receive information from their family and friends, and even strangers (e.g., Page-Tan, 2020; Tandoc Jr. & Takahashi, 2017). Studies also showed that social media engagement increases perceived and actual societal resilience (e.g., Jurgens & Helsloot, 2018; Spialek, Czapinski & Houston, 2016; Zhang & Shay, 2019). [Deliverable 3.1 of EmerGent project](#), focused on emergency management in social media generation, also claimed that it is essential for authorities and first responders to understand how the public uses social media before, during, and after disasters and emergencies and their expectations from it (Reuter et al., 2014). A claim supported by other studies (e.g., Jdaitawi, Uren & Rodriguez, 2019; Kaufhold, Gizikis, Reuter, Habdank & Grinko, 2018; Strader & Ashley, 2018).

The frequency of social media use before, during, and after emergencies was also widely examined in the EmerGent project from the public's perspective. Based on the project, in deliverable 2.4, Reuter & Spielhof (2017) showed that 42% of the public across 30 European countries used social media to get information about an emergency. The findings from this project also showed differences in social media use as a result of sociodemographic variables. Younger people tended to use it more than those aged 45 and above, women more than men, and a positive correlation was found with socioeconomic status. Similar data was also supported by other publications from the project, [such as deliverable 3.7](#), focused on the potentials of social media use by EMS and citizens involvement (Reuter & Ameluxen, 2016) and other data which was published outside the deliverables (Reuter, Ludwig & Kaufhold, 2016; Reuter, Kaufhold, Schmid & Spielhofer, 2019)

Social media usage, especially during emergencies, fulfills various communication needs and expectations of the public. In an extensive review of research on social media use in emergencies, Simon, Goldberg & Adini (2015) addressed several needs that social media fulfills. According to the authors, during emergencies, social media becomes a space for timely information, facilitates a feeling of connectedness, provides reassurance, support, and assistance. Abbasi, Hossain, Hamra & Owen (2010) claimed that one of the strongest motivations for using social media concerning the different phases of emergencies and disasters is to activate relationships that the users can later address in interpersonal channels.

Reuter & Spielhofer (2017) and Reuter, Kaufhold, Schmid & Spielhofer (2019) identified, based on a survey conducted across 30 European countries and another survey conducted in Germany, Italy, the Netherlands, and the United Kingdom as part of deliverable 2.4, the communication needs and expectations of the public from social media. They show that social media is used more to look for information than to share information, mostly on weather conditions or warnings, road or traffic conditions, damage caused by the event, and eyewitness photographs or videos. The motivations of using social media in disasters and emergencies are based on the speed and accessibility of the information, compared to the accuracy of the information that did not significantly impact the public's motivations.

Weather conditions or warnings also topped the list of types of information that the public shared over social media, followed by sharing feelings or emotions, road or traffic conditions, locations, videos, and reassurances, representing a mixture of cognitive/information needs and affective and integrations needs.

Concerning both looking for and sharing information, some demographic differences were found. Young people tended more to use social media to look for and share information. Women used social media to share information more than men, especially regarding weather conditions and their emotions. However, men tended to share more information regarding their location and advice on how to stay safe.

Project EmerGent also elaborated on the different patterns of social media use. By a series of deliverables focusing on social media use, based on several case studies (e.g., the London riot in

2011, Elbe floods in Germany in 2013, Tbilisi floods in 2015), [such as deliverable 2.2](#) on the impact of social media on emergency services and citizens (Junge, Spielhofer, Gieve, Cullen & Drabble, 2014), the project identified some patterns of use and roles that the public holds in using social media during emergencies and disasters. Aside from information seeking and mobilization, [deliverable 2.3 of project EmerGent](#), focused on the impact of social media for EMS and citizens (Spielhofer et al., 2016), found that the public used social media also to broadcast the occurrences live, respond to queries, disseminate, moderate, and mediate information to close family and friends, and even report on occurrences as citizen journalists (e.g., Kaufhold & Reuter, 2017; Spielhofer, Junge, Cullen, Hahne, Castellanos & Gieve, 2017).

Regarding the public's expectations, deliverables 2.4 and 2.5 of project EmerGent found that emergency services were expected by the respondents (69% in the survey by Reuter & Spielhofer, 2017) to monitor social media. 46% of the respondents in Reuter, Kaufhold, Schmid & Spielhofer (2019) expected to get a response from the emergency services within an hour. Young people expected the emergency services to respond within an hour more older people.

Last, while ample research reviews the motivations for using social media in disasters and emergencies, there is also evidence regarding the public's barriers and reasons for not using social media. Among them, the concern of false information, fear of social media not working correctly during an emergency, the reliability of the information, data privacy concerns, the quantity of information, and perceived digital literacy (Kaufhold, Gizikis, Reuter, Habdank & Grinko, 2018; Reuter & Spielhofer, 2017; Reuter, Kaufhold, Schmid & Spielhofer, 2019; Spielhofer, Junge, Cullen, Hahne, Castellanos & Gieve, 2017). We could also add technical constraints, such as interruption of power and communications such as phone and internet lines.

#### 2.4.5 MOBILE PHONES

The use of mobile phones refers to a broad set of uses, from calling and texting to social media. While previous sub-sections discussed communication channels that can relate to mobile phones, the discussion focuses on the medium's unique affordances and the public's communication needs and expectations from authorities and first responders.

In resilience studies, one of the prominent advantages of mobile phones, as perceived by the public, is the ability to contact someone or call for help when outside of the home or when the landline infrastructure collapses (e.g., Kobayashi, 2014). However, most studies focus on mobile phones' role in building societal resilience during emergencies and disasters as a digital platform. Such studies focus on the technological affordances of the mobile phone, such as installing emergency and disaster apps (e.g., Gazieli-Yablowitz & Schwartz, 2018; Mythili & Shalini, 2016; Repanovici & Nedelcu, 2021), location-based warnings or services (e.g., Rahman & Alam, 2012; Soni, Sharma, Kumar & Verma, 2014), the use of GPS (e.g., Bengtsson, Lu, Thorson & Garfield, 2011; Laituri & Kodrich, 2008) and more.

According to the Silver (2019) survey of Pew Research Center, while mobile phone and smartphone ownership are growing, there are still gaps between geographical locations. South Korea is the country with the highest penetration rate of mobile phones, with 95% with a smartphone and the other 5% with other mobile phones which are not smart. Following South Korea is Israel (88% smartphones and 10% other mobile phones), while the Netherlands is the EU Country with the highest penetration rate (87%, 11%). The developed countries' median penetration rate is 76% smartphones, 17% other mobile phones, and only 6% with no mobile phones. In developing countries, however, the situation is different. Here, only 45% hold smartphones, and 33% with other mobile phones, leaving 17% with no mobile phone at all.

Moreover, ownership of mobile phones does not necessarily mean use. The survey carried out in project EmerGent found that around 20% of the UK population did not use a mobile phone, even when owning one (Reuter, Ludwig & Kaufhold, 2016). In the age group of citizens above 75, around



half did not use them, compared to younger age groups that almost 100% used. Therefore, some early and recent studies offer different approaches for encouraging citizens, mostly the elderly, to use mobile phones concerning emergencies and disasters. They suggest improving their literacy, creating designs that apply to them, meeting religious constraints, and more of their communication needs (e.g., Bouri & Ravi, 2014; Kurniawan, 2007; Kurniawan, Mahmud, Nugroho, 2006; Lerslip, Putthinoi, Lertrakarnnon & Silsupadol, 2020).

In particular, the use of mobile phones and smartphones reflects some of the communication needs identified in previous studies. It allows for public mobility during emergencies and disasters, supports disseminating information to family and friends, and encourages citizen journalism when the public uses their phones to take pictures and videos during emergencies and disasters (e.g., Paul & Sosale, 2020; Norris, 2017).

The question of communication needs is explored in another function of mobile phones before, during, and after emergencies and disasters – emergency apps (e.g., weather reports, emergency warnings, contact emergency services). While studies show that the number of emergency mobile apps is on the rise (Wang, Li, Zhao, Feng & Luo, 2020), surveys conducted as part of project EmerGent found that a relatively low number of citizens use emergency apps. When asked about the use of emergency mobile apps, Reuter & Spielhofer (2017) showed that only 22% of the respondents across 30 European countries use them. Data from the UK showed that men and young citizens from high socioeconomic status tended to use emergency apps more than others. However, only 7% of the population downloaded an emergency app (Reuter, Ludwig & Kaufhold, 2016).

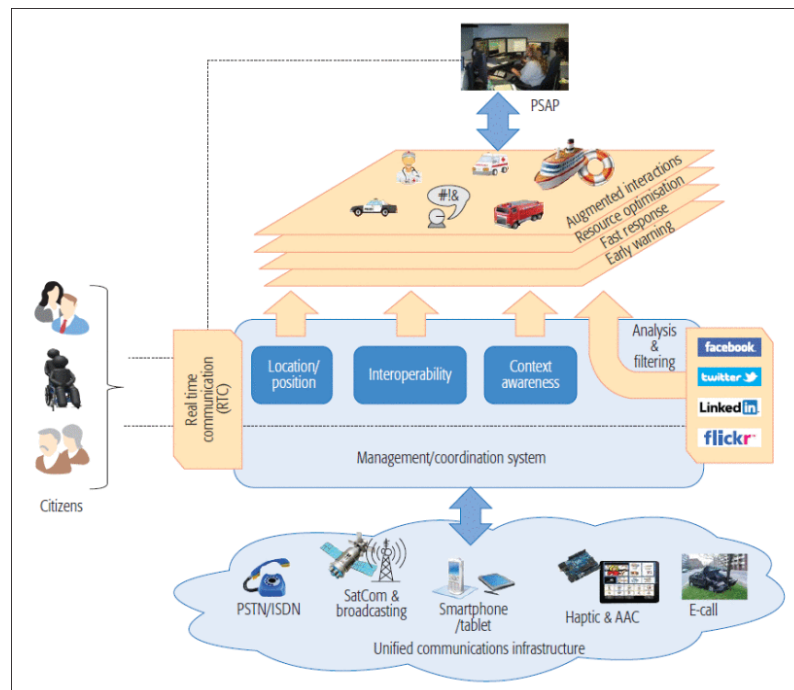
Despite the relatively low reported use of emergency apps, recent studies offer a more optimistic perspective on this issue, focusing on public communication needs and expectations. First, user experience studies suggest that it is not the content that prevents the public from downloading such apps. It is the elements that are connected to low usability – hard to use apps, complicated, malfunctioned and with low perceived usefulness (Amores, Vasardani & Tanin, 2019; Gaziel, Yablowitz & Schwartz, 2018; Sarshar, Nunavath, Radianti, 2015; Tan, Prasanna, Stock & Doyle, 2020a; Tan, Prasanna, Stock & Doyle, 2020b). Furthermore, when delving more deeply into what types of emergency apps the public uses, weather and first aid top the list, with warning apps in the middle and emergency call apps with low numbers (Reuter, Ludwig & Kaufhold, 2016). Surveys show that respondents claim that they prefer to call the emergency services by phone instead of using the app to contact them (Spielhofer, Junge, Cullen, Hahne, Castellanos & Gieve, 2017).

#### 2.4.6 OTHER INNOVATIVE MEDIA CHANNELS

Simon, Goldberg & Adini (2015) claim that while most users prefer to use familiar technologies to gather information before, during, and after disasters and emergencies, some prefer to try new technologies. They quote Shklovski, Palen & Sutton (2008) which explain that new technologies concerning emergencies and disasters are used to fulfill the users' unmet needs. Recent studies started to cover new and innovative methods for communication – allowing the emergency and disaster management agencies new ways to connect with the public, but more importantly, more ways for the public to fulfill yet unanswered needs and expectations. These innovative channels, which will be discussed broadly in T3.2, raise many questions regarding the public's communication needs and expectations, inside the community and with authorities and first responders.

An example of an innovative communication channel is EMYNOS, a platform that can combine text, voice, and video, coordinating communication among citizens, call centers, and first responders. As illustrated in figure 6, the system's architecture is based on integrating real-time communication, constant analysis of social media data to identify important information regarding emergencies and disasters, and automatically generated content adapted to the end-user device. The advantage of such technology is in merging various communication channels that support different communication needs and expectations, integrating them into one system (Markakis et al., 2017).

**Figure 6.** EMYNOS architecture. Taken from Markakis et al., 2017.



Another still premature, innovative technology is artificial intelligence for emergency and disaster communication before, during, and after emergencies and disasters. While T3.2 will focus on such technologies, the focus will be given to the public's communication needs and expectations from artificial intelligence communication before, during, and after disasters and emergencies.

The use of artificial intelligence in the communication process with individuals and groups was studied mainly concerning sales (e.g., Agnihotri, 2021), customer service (e.g., Grover, Kar & Dwivedi, 2020), marketing (Kose & Sert, 2017), and other related fields (e.g., Salaverria-Aliaga, 2019; Wartman & Combs, 2018). Hofeditz, Ehnis, Bunker, Brachten & Stiegliz (2019) argue that while social bots, based on AI, are gaining popularity and complexity, there is currently little evidence of actual use concerning the disaster and emergency management.

The main disadvantage of artificial intelligence regarding the public's communication needs and expectations is not talking to an actual human, which is a frustrating experience for the users (e.g., Edwards, Edwards & Spence, 2018; Sidaoui, Jaakkola & Burton, 2020).

Concerning emergencies and disaster management, Imran, Ofil, Caragea & Torralba (2020) identify the potential of AI-based content but address some challenges regarding the public's communication needs and expectations. For example, the need to receive accurate information, process the information gathered from social networks fast but in a meaningful way, and the public's need for a humane response – and not a machine. However, while some studies suggest using such innovative technologies to meet the public's communication needs and expectations, very few studies examined the public's actual perceptions (e.g., Cheng & Jiang, 2020).

## 2.5 INITIAL CONCLUSIONS FROM THE LITERATURE – ADDRESSING THE GAPS BETWEEN CITIZENS, DISASTER AND EMERGENCY AUTHORITIES, AND FIRST RESPONDERS

The scientific literature emphasizes the importance and relationship between communication needs, risk communication, and societal resilience. The current section introduces the contextual factors that influence the public's communication needs and expectations. It explains how previous studies suggest addressing target factors that can affect crisis and emergency risk communication

campaigns before, during, and after disasters and emergencies. It also shows how they can promote societal resilience building in all three phases. Furthermore, the studies' review provided a broad observation of the public's known communication needs and expectations, including cognitive/information needs, affective needs, integrative needs, and escapist needs.

As presented in the literature, the image of the public's communication needs and expectations from authorities and first responders is intricate. Adding to that, Hong, Fu, Wu & Frias-Martinez (2018) argue that there are communication differences between emergency and disaster management agencies and the public. Using a semi-automatic topic extraction method in Twitter, they show that emergency and disaster management agencies do not meet the public's needs.

The literature and data presented highlight the importance of the deliverable and its goal – in broadening understanding of the public's communication needs and expectations, identifying the gaps between the public, authorities, and first responders, and offering insights based on an empirical investigation that improve this communication process.

## 3 METHODS

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### 3.1 METHODOLOGICAL APPROACH

The study of this deliverable is based on a mixed-methods approach. Contrary to the multi-methods approach, in which first a quantitative or qualitative measure is used to answer a research question and then the other method for the other questions, the mixed-methods approach is used when quantitative and qualitative measures answer the same research questions (DeCuir-Gunby, 2008).

### 3.2 STUDY QUESTIONS AND HYPOTHESES

The study explores the public needs and expectations of the communication process among the community members and between them and authorities and first responders before, during, and after emergencies and disasters. The main research question is, *"what citizens and social groups need and expect from first responders and authorities to improve communication and societal resilience"*? Based on this, the particular research questions of the study are:

***RQ1: What are the public's communication needs and expectations in the communication process among community members?***

***RQ2: What are the public's communication needs and expectations in the communication process with authorities and first responders?***

***RQ3: What information sources and means for receiving warnings from official organizations responsible for promoting resilience are preferred by the public?***

***RQ4: How do the communication needs and information sources correlate?***

Based on the scientific review and previous findings of EmerGent project, four additional research hypotheses are:

***H1: Men and women differ in their communication needs, preferences for information sources, and preferred means for receiving public warnings.***

***H2: Socioeconomic status is correlated with communication needs, preferred information sources, and preferred means for receiving public warnings.***

***H3: Citizens from different countries differ in their communication needs, preferred information sources, and preferred means for receiving public warnings.***

***H4: Digital literacy is correlated with communication needs, preferred information sources, and preferred means for receiving public warnings.***

These questions and hypotheses are analyzed by a series of visualizations, highlighting the needs, expectations, and differences.

Furthermore, another research question that infers from the study goals examines examples for effective communication:

***RQ5: What are the characteristics of effective communication with impacted societies?***

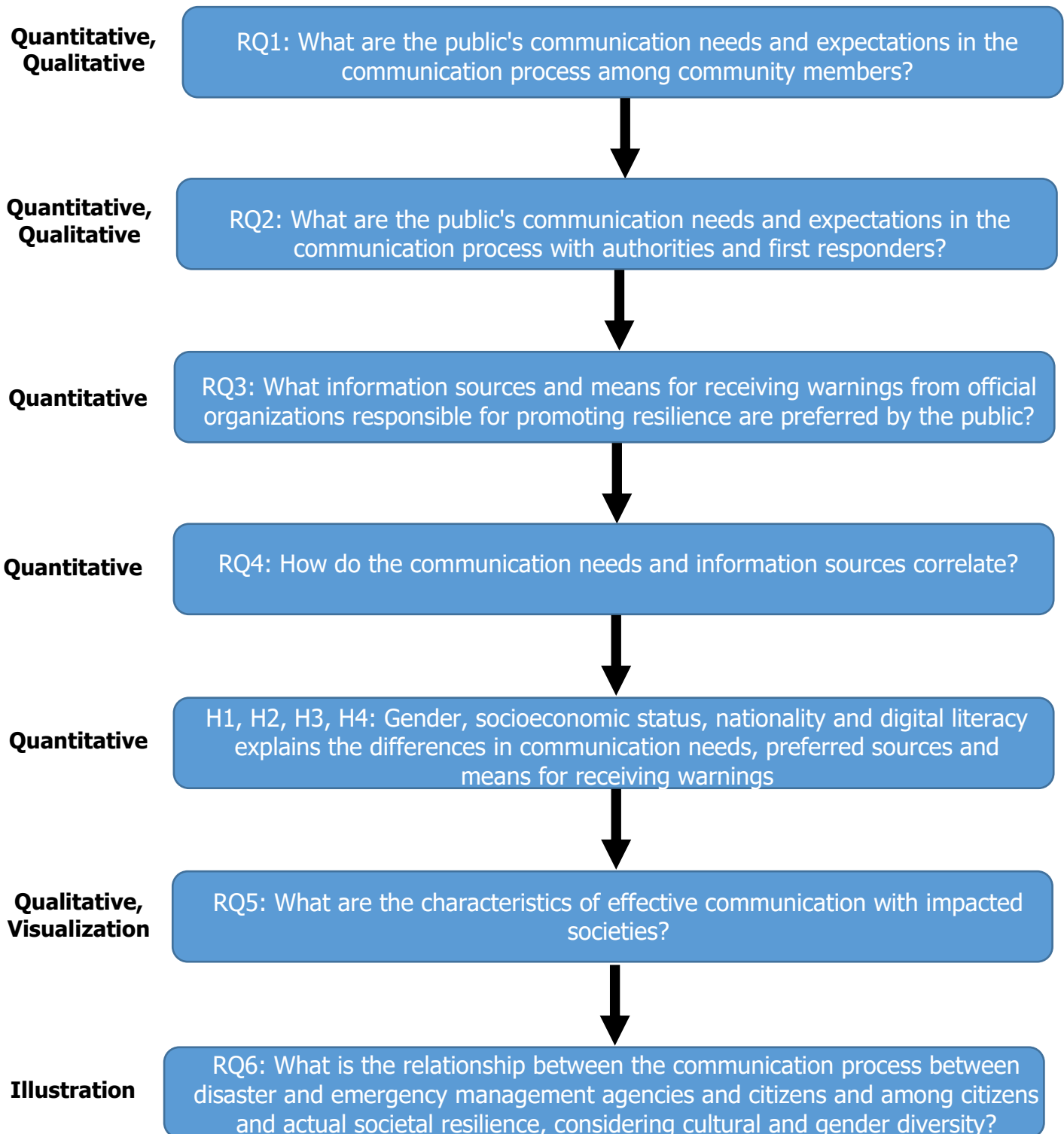
This question will also be answered based on the first four research questions, using examples and illustrations of authorities' and first responders' electronic communication with the public.



The last research question is:

**RQ6: What is the relationship between the communication process between disaster and emergency management agencies and citizens and among citizens and actual societal resilience, considering cultural and gender diversity?**

**Figure 7.** Study procedure.



### 3.3 SECONDARY ANALYSIS OF SURVEY DATA FROM WP 1.2

The study results are partly based on a secondary analysis of the survey distributed and reported in deliverable 1.2 across eight countries. Mainly on two constructs:

- **Communication Channels** – In deliverable 1.2, the construct of communication skills was broadly discussed. In deliverable 1.3, we make a secondary analysis of this construct by examining six out of the seven questions, measuring what communication channels people prefer as sources for information during an emergency. The question for these six items was: *What is the likelihood that you will use the following media sources for information during a disaster?* The different items covered the communication channels in this deliverable: television, face-to-face personal communication, printed communication, mobile phones, and other electronic communication.
- **Communication Needs** - this construct was assessed with a seven items questionnaire. Each item was assessed on a Likert scale ranging from 1 ("Not important at all") to 5 ("Very important"). The tool was validated based on the Uses and Gratification measurement scale (Kaye, 2010). The tool assesses the participant's assigned importance of different communication outcomes during disasters. An example of an item in this scale is "To be able to actively share information with the authorities/relevant organizations acting on the situation". The construct had a Cronbach's  $\alpha$  of 0.85 (varying between 0.79-0.92 in the seven countries).

The analysis also uses data on the respondents' sociodemographic characteristics and on the digital literacy scale, which was also reported in deliverable 1.2. The questions from the questionnaire which were analyzed are attached in Appendix A.

Statistical analysis was conducted using SPSS (ver. 27). The analysis included descriptive methods, one-way ANOVA, Spearman's R, and multivariate linear regression.

### 3.4 QUALITATIVE CONTENT ANALYSIS IN SOCIAL MEDIA

The study also employs a qualitative content analysis method in social media. Ryu (2020) suggests that qualitative content analysis in social networks is an effective method for analyzing group interaction or any interaction between an organization and its followers or among the followers. It allows the researchers to link messages to their responses in a specific context of an interaction.

This study employs qualitative content analysis within social network accounts of authorities and first responders from seven countries: Italy, Romania, Spain, France, Sweden, Norway, and Israel, excluding Japan, which was included in the survey.

#### 3.4.1 BUILDING A CORPUS FOR THE ANALYSIS

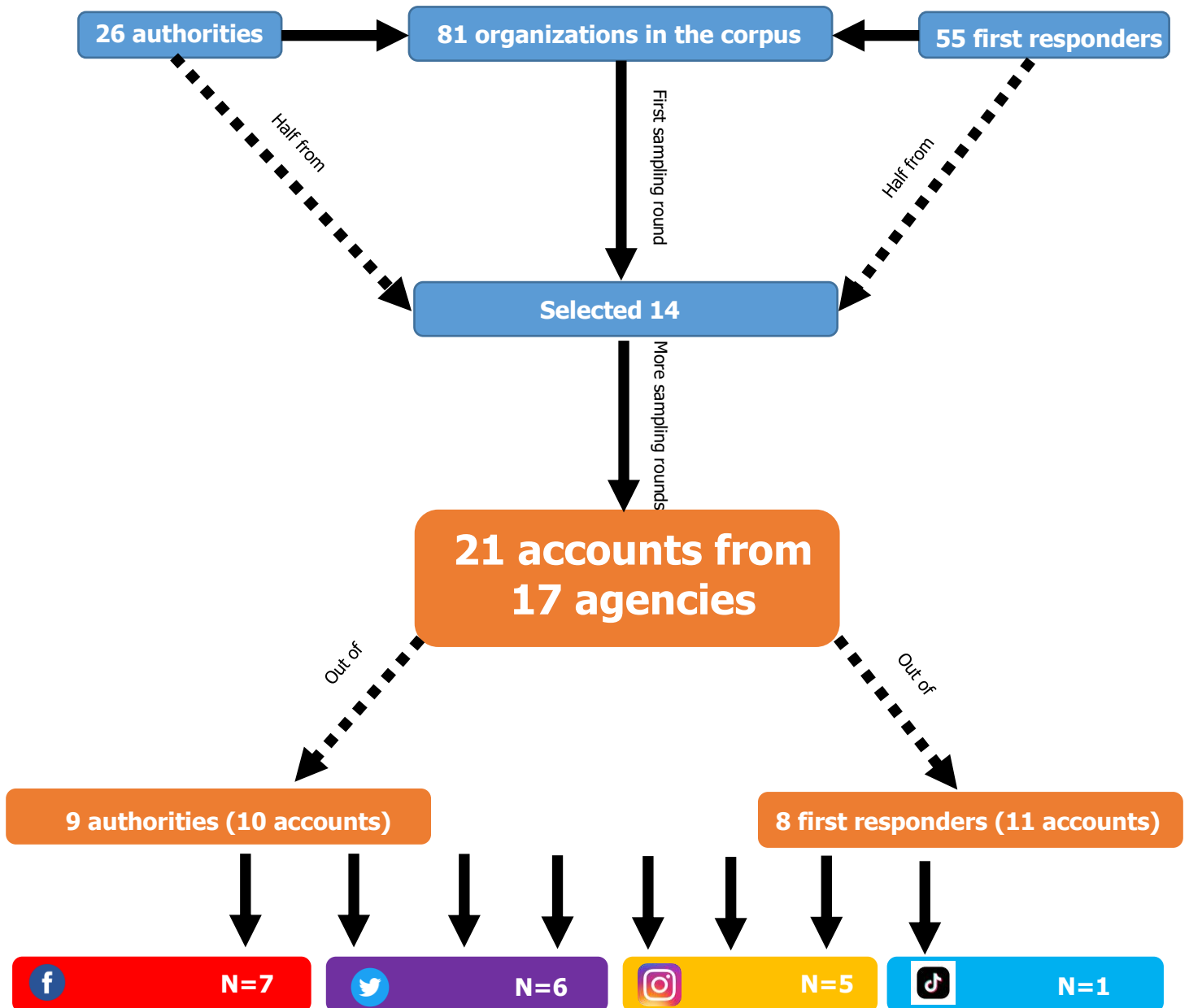
For each county, we formulated a list of authorities, first responders, and NGOs based on various sources: government websites, reports, Ki-CoP members, and previous studies. Then, to follow a criterion that allows a comparison between countries, only disaster and emergency management authorities on the national level were included, excluding all regional organizations. The organizations represented health agencies, environment, welfare, security, law and order, and more. The list included 81 disaster and emergency management agencies.

For each organization, we documented the social network platforms in which it is active, out of the following four: Facebook, Twitter, Instagram, and TikTok. Social apps such as Telegram, Viber, and WhatsApp were not included because they are used more for a one-way communication flow, not allowing discussion and public response.

### 3.4.2 SELECTION CRITERIA

In the next stage, we divided the list between emergency authorities and first responders/NGOs. We randomly selected two agencies for each country – one from the authorities list and one from the first responders/NGOs list. Three agencies, all of them first responders/NGOs, who had very little or no social media activity, were excluded from the analysis, and three others were sampled. We randomly sampled the social media account out of all the agency's available accounts to analyze. Therefore, the final list for analysis did not include most social media channels used by the organizations. The random sampling of agencies and social media accounts continued until each country was represented by at least two general audience social media accounts (i.e., Facebook or Twitter). If exists – one addressing the younger population (Instagram or TikTok) and one addressing specific national or social groups. No social media accounts which address diverse genders were found in the corpus. Finally, 21 social network accounts representing 17 agencies from the seven countries were included in the analysis. Figure 8 presents the selection process of the sample. Table 2 summarizes the list of agencies and social media accounts that were analyzed.

**Figure 8.** Selection process.



**Table 2.** List of disaster and emergency management agencies and social media accounts for analysis.

Country	Agency	Type	Represent	1 <sup>st</sup> social media account	2 <sup>nd</sup> social media account
Israel	Home-front command	Authority	General + Social Group	Facebook (Hebrew)	Facebook (Arabic)
	Magen David	First Responder/NGO	General	Twitter	
	Ministry of Defense	Authority	Young	Instagram	
Spain	Dirección General de Protección Civil y Emergencias	Authority	General	Twitter	
	Emergencias Madrid	Authority	General	Twitter	
	Policia Nacional	First Responder/NGO	Young	TikTok	
Norway	Ministry of Justice and Emergency Preparedness	Authority	General	Facebook	
	Red Cross	First Responder/NGO	General + Young	Facebook	Instagram
Italy	Dipartimento Protezione Civile	Authority	General	Facebook	
	Guardia Costiera	First Responder/NGO	General	Twitter	
	ASLROMA1	First Responder/NGO	Young	Instagram	
Romania	Departamentul pentru Situații de Urgență	Authority	General	Facebook	
	Crucea Rosie Romana	First Responder/NGO	General	Facebook	
France	Fédération des acteurs de la solidarité	Authority	General	Twitter	
	Pompiers de France	First Responder/NGO	General + Young	Twitter	Instagram
Sweden	Ministry of Environment	Authority	Young	Instagram	
	Sweden Red Cross	First Responder/NGO	General + Young	Facebook	Instagram

In the next step, we used data mining tools (e.g., Facepager, Twitter Capture and Analysis Toolset, Instagram Scraper, and TikTok Scraper) to scrape public posts from these accounts<sup>3</sup>. We scraped public posts from the last three months of every year in the last three years (2018-2020). Some exceptions were made, especially within Instagram and TikTok, for which data was not available for

<sup>3</sup> For Instagram and TikTok, some of the data was scraped manually, due to some limitations of the scraper.

all of these time frames. Therefore, more or only data from 2020 was scraped. Finally, 20 posts from every account, with all their comments, were randomly selected for analysis. In total, 440 posts and 5,250 comments were selected for analysis.

### 3.4.3 ANALYSIS METHOD

The selected posts and comments were then analyzed manually. They were coded for categories and themes based on two rounds. In the first round, the posts and comments were coded according to their content. In the second round, categories and themes were unified, revised, or replaced.

### 3.4.4 LIMITATIONS

The chosen method focuses more on authorities-citizens-authorities communication. It does not include citizens-citizens communication. The limitation is due to limited platform affordances. However, even with this limitation, the comments' analysis can identify messages (in comments) addressing other users, representing the citizens-citizens dimension. Future deliverables could consider focusing more on the citizens-citizens channel, and other community-based actors (e.g., parishes, associations) to broaden our understanding of communication needs and preferred sources of information.

## 3.5 ETHICAL CONSIDERATIONS

This deliverable contains analyses on data scraped from official and public social network pages in the EU and Israel, using text and data mining techniques. Directive (EU) 2019/790 of the European Parliament and of the council of 17 April 2019 on copyright and related rights in the Digital Single Market (DSM) and amending directive 96/9/EC and 2001/29/EC (text with EEA relevance)<sup>4</sup> set the guidelines for mining, using, storing and analyzing such online data from electronic sources. According to the directive, data was not stored online but locally. By this, we meet the requirements of articles 3 and 4 of the DSM EU directive. Therefore, the posts and comments are not included in the appendices. For privacy reasons, content generated by the users was rephrased to refrain from tracking it.

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<sup>4</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019L0790&rid=1>

## 4 RESULTS

### 4.1 COMMUNICATION NEEDS AND EXPECTATIONS

The first research questions examined the public's communication needs and expectations inside the community and with authorities and first responders. As a first step, we conducted a secondary analysis of the survey distributed in eight countries in T1.2. Table 3 presents the distribution of the communication needs construct in all seven countries for the question: "How important is it for you to [...] during a disaster". The table presents the aggregated results in all countries. The entire table appears in the appendices.

**Table 3.** The distribution of answers of communication needs construct. Aggregated results of 4,013 participants from Israel, Italy, Norway, Romania, France, Spain, Sweden, and Japan.

Variable	1	2	3	4	5	M (SD)
<b>Cognitive</b> (Credible)	69 (1.7%)	119 (3%)	547 (13.6%)	1086 (27.1%)	2192 (54.6%)	4.3 (.93)
<b>Affective</b> (Feel better)	161 (4%)	447 (11.1%)	1345 (33.5%)	1364 (34%)	696 (17.3%)	3.5 (1.03)
<b>Integrative – Micro</b> (Talk with others)	153 (3.8%)	308 (7.7%)	1134 (28.3%)	1587 (39.5%)	831 (20.7%)	3.66 (1.01)
<b>Integrative – Macro</b> (Part of society)	139 (3.5%)	385 (9.6%)	1179 (29.4%)	1562 (38.9%)	748 (18.6%)	3.6 (1.01)
<b>Escapist</b> (Distract thoughts)	290 (7.2%)	688 (17.1%)	1400 (34.9%)	1133 (28.2%)	502 (12.5%)	3.22 (1.09)
<b>Flow – Unidirectional</b> (Fast)	78 (1.9%)	130 (3.2%)	690 (17.2%)	1243 (31%)	1872 (46.6%)	4.17 (.96)
<b>Flow - Multidirectional</b> (Active)	105 (2.6%)	263 (6.6%)	1118 (27.9%)	1570 (39.1%)	957 (23.8%)	3.75 (.98)

Table 3 shows that cognitive needs, represented by receiving credible information, were the essential needs to be addressed during emergencies and disasters ( $M=4.3$ ,  $SD=.93$ ), with 81.7% of the responders perceiving it as "important" or "very important". Needs related to the flow of information (unidirectional), represented by receiving information "as fast as possible", were also dominant ( $M=4.17$ ,  $SD=.96$ ), with 77.6% of the respondents perceiving it as "important" or "very important". Another group of needs that are connected to the flow of communication, however multidirectional, was represented by "being able to share information actively". This need was the third most popular among the respondents in the seven countries ( $M=3.75$ ,  $SD=.98$ ), with 62.9% perceiving it as "important" or "very important".

The two integrative needs, talking with others on the micro-level ( $M=3.66$ ,  $SD=1.01$ ) and being part of the society on the macro-level ( $M=3.6$ ,  $SD=1.01$ ), were ranked fourth and fifth in popularity, with 60.2% and 57.5% of the respondents perceiving them, accordingly, as "important" or "very important". Followed by the group of affective needs, represented by feeling better ( $M=3.5$ ,  $SD=1.03$ ), with 51.3% perceiving it as "important" or "very important". Last, but still high, were the escapist needs, expressed in the need of "distracting thoughts" ( $M=3.22$ ,  $SD=1.09$ ), with 40.7% of the respondents perceiving it as "important" or "very important".

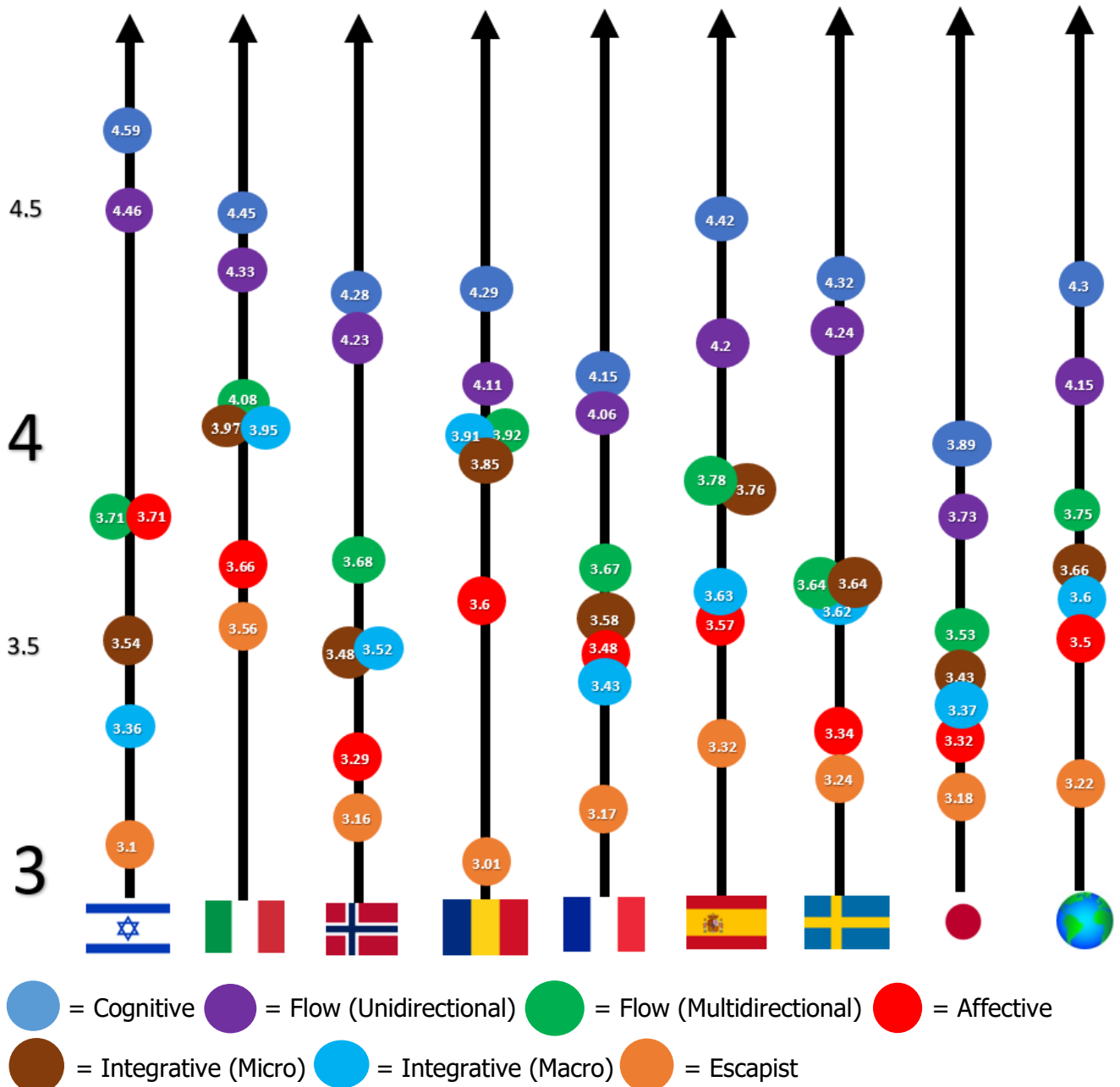
The distribution of communication needs also shows that all received high importance scores, emphasizing the communication process's crucial role. With cognitive needs (credible information) and unidirectional flow (fast information) being the most important to address, followed by multidirectional flow (active), the two integrative needs (talking with others and being part of the society) and the affective need (feeling better), and then the escapist need (distracting thoughts).

### 4.1.1 NATIONAL COMPARISON

Figure 9 presents the distribution of communication needs between the different countries in the survey. The figure shows many similarities between the countries and some minor differences. In general, the order of communication needs in all countries was almost identical. With cognitive needs in the first place, followed by unidirectional and multidirectional flow, the integrative needs (macro and micro level), affective needs, and last, the escapist needs.

In some countries, the order was slightly different (e.g., in Sweden, multidirectional flow and the integrative needs received almost the same score, and in Israel, affective needs were rated in the third place as multidirectional flow). While in Israel, the range of the needs score was broad, with the score of cognitive needs being the highest among all countries (4.59) and of escapist needs (3.1) the second-lowest of all countries. In Japan, the range was the narrowest, while in general, most of the communication needs were rated with lower scores than other countries (e.g., Japan was the only country in which cognitive needs received a score lower than 4, 3.89).

**Figure 9.** Illustration of the communication needs in each country.



In addition, there were differences between the scores of all communication needs between countries: cognitive needs ( $F(7, 4012)=27.393, p=.000$ ), affective needs ( $F(7, 4012)=12.783, p=.000$ ), integrative needs – micro ( $F(7, 4012)=18.018, p=.000$ ), integrative needs – macro, escapist needs ( $F(7, 4012)=11.829, p=.000$ ), unidirectional flow ( $F(7, 4012)=27.27, p=.000$ ) and multidirectional flow ( $F(7, 4012)=16.023, p=.000$ ). Table 4 highlights the significant differences in the scores of the communication needs between the countries.

**Table 4.** Multiple comparisons between the communication needs' scores in the eight countries, using Bonferroni's post-hoc test.

		Israel	Italy	Norway	Romania	Spain	France	Sweden	Japan
<b>Cognitive</b>	Israel	-	.474	<b>.000</b>	<b>.000</b>	.065	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Italy	.474	-	.089	.138	1	<b>.000</b>	.491	<b>.000</b>
	Norway	<b>.000</b>	.089	-	1	.6	.532	1	<b>.000</b>
	Romania	<b>.000</b>	.138	1	-	.859	.363	1	<b>.000</b>
	Spain	.065	1	.6	.859	-	<b>.000</b>	1	<b>.000</b>
	France	<b>.000</b>	<b>.000</b>	.532	.363	<b>.000</b>	-	.094	<b>.000</b>
	Sweden	<b>.000</b>	.491	1	1	1	.094	-	<b>.000</b>
	Japan	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	-
<b>Affective</b>	Israel	-	1	<b>.000</b>	1	.806	<b>.011</b>	<b>.000</b>	<b>.000</b>
	Italy	1	-	<b>.000</b>	1	1	.186	<b>.000</b>	<b>.000</b>
	Norway	<b>.000</b>	<b>.000</b>	-	<b>.000</b>	<b>.000</b>	.084	1	1
	Romania	1	1	<b>.000</b>	-	1	1	<b>.001</b>	<b>.001</b>
	Spain	.806	1	<b>.000</b>	1	-	1	<b>.008</b>	<b>.004</b>
	France	<b>.011</b>	.186	.084	1	1	-	.653	.378
	Sweden	<b>.000</b>	<b>.000</b>	1	<b>.001</b>	<b>.008</b>	.658	-	1
	Japan	<b>.000</b>	<b>.000</b>	1	<b>.000</b>	<b>.004</b>	<b>.004</b>	1	-
<b>Mic-Integrative</b>	Israel	-	<b>.000</b>	1	<b>.000</b>	<b>.011</b>	1	1	1
	Italy	<b>.000</b>	-	<b>.000</b>	1	<b>.023</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Norway	1	<b>.000</b>	-	<b>.000</b>	<b>.000</b>	1	.246	1
	Romania	<b>.000</b>	1	<b>.000</b>	-	1	<b>.001</b>	<b>.035</b>	<b>.000</b>
	Spain	<b>.011</b>	<b>.023</b>	<b>.000</b>	1	-	.127	1	<b>.000</b>
	France	1	<b>.000</b>	1	<b>.001</b>	.127	-	1	1
	Sweden	1	<b>.000</b>	.246	<b>.035</b>	1	1	-	<b>.016</b>
	Japan	1	<b>.000</b>	1	<b>.000</b>	<b>.000</b>	.395	<b>.016</b>	-
<b>Mac-Integrative</b>	Israel	-	<b>.000</b>	.271	<b>.000</b>	<b>.000</b>	1	<b>.001</b>	1
	Italy	<b>.000</b>	-	<b>.000</b>	1	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Norway	.271	<b>.000</b>	-	<b>.000</b>	1	1	1	.535
	Romania	<b>.000</b>	1	<b>.000</b>	-	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Spain	<b>.000</b>	<b>.000</b>	1	<b>.000</b>	-	<b>.029</b>	1	<b>.001</b>
	France	1	<b>.000</b>	1	<b>.000</b>	<b>.029</b>	-	.07	1
	Sweden	<b>.001</b>	<b>.000</b>	1	<b>.000</b>	1	.07	-	<b>.002</b>
	Japan	1	<b>.000</b>	.535	<b>.000</b>	<b>.001</b>	1	<b>.002</b>	-
<b>Escapist</b>	Israel	-	<b>.000</b>	1	1	<b>.025</b>	1	1	1
	Italy	<b>.000</b>	-	<b>.000</b>	<b>.000</b>	<b>.013</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Norway	1	<b>.000</b>	-	.746	.531	1	1	1
	Romania	1	<b>.000</b>	.746	-	<b>.000</b>	.448	<b>.04</b>	.4
	Spain	<b>.025</b>	<b>.013</b>	.531	<b>.000</b>	-	.861	1	.97
	France	1	<b>.000</b>	1	.448	.861	-	1	1
	Sweden	1	<b>.000</b>	1	<b>.04</b>	1	1	-	1
	Japan	1	<b>.000</b>	1	.4	.97	1	1	-
<b>Unidirectional</b>	Israel	-	.905	<b>.004</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.006</b>	<b>.000</b>
	Italy	.905	-	1	<b>.005</b>	.688	<b>.000</b>	1	<b>.000</b>
	Norway	<b>.004</b>	1	-	1	1	.079	1	<b>.000</b>
	Romania	<b>.000</b>	<b>.005</b>	1	-	1	1	.771	<b>.000</b>
	Spain	<b>.000</b>	.688	1	1	-	.419	1	<b>.000</b>
	France	<b>.000</b>	<b>.000</b>	.079	1	.419	-	<b>.049</b>	<b>.000</b>
	Sweden	<b>.006</b>	1	1	.771	1	<b>.049</b>	-	<b>.000</b>
	Japan	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	-
<b>Multidirectional</b>	Israel	-	<b>.000</b>	1	<b>.018</b>	1	1	1	.095
	Italy	<b>.000</b>	-	<b>.000</b>	.267	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Norway	1	<b>.000</b>	-	<b>.003</b>	1	1	1	.425
	Romania	<b>.018</b>	.267	<b>.003</b>	-	.626	<b>.001</b>	<b>.000</b>	<b>.000</b>



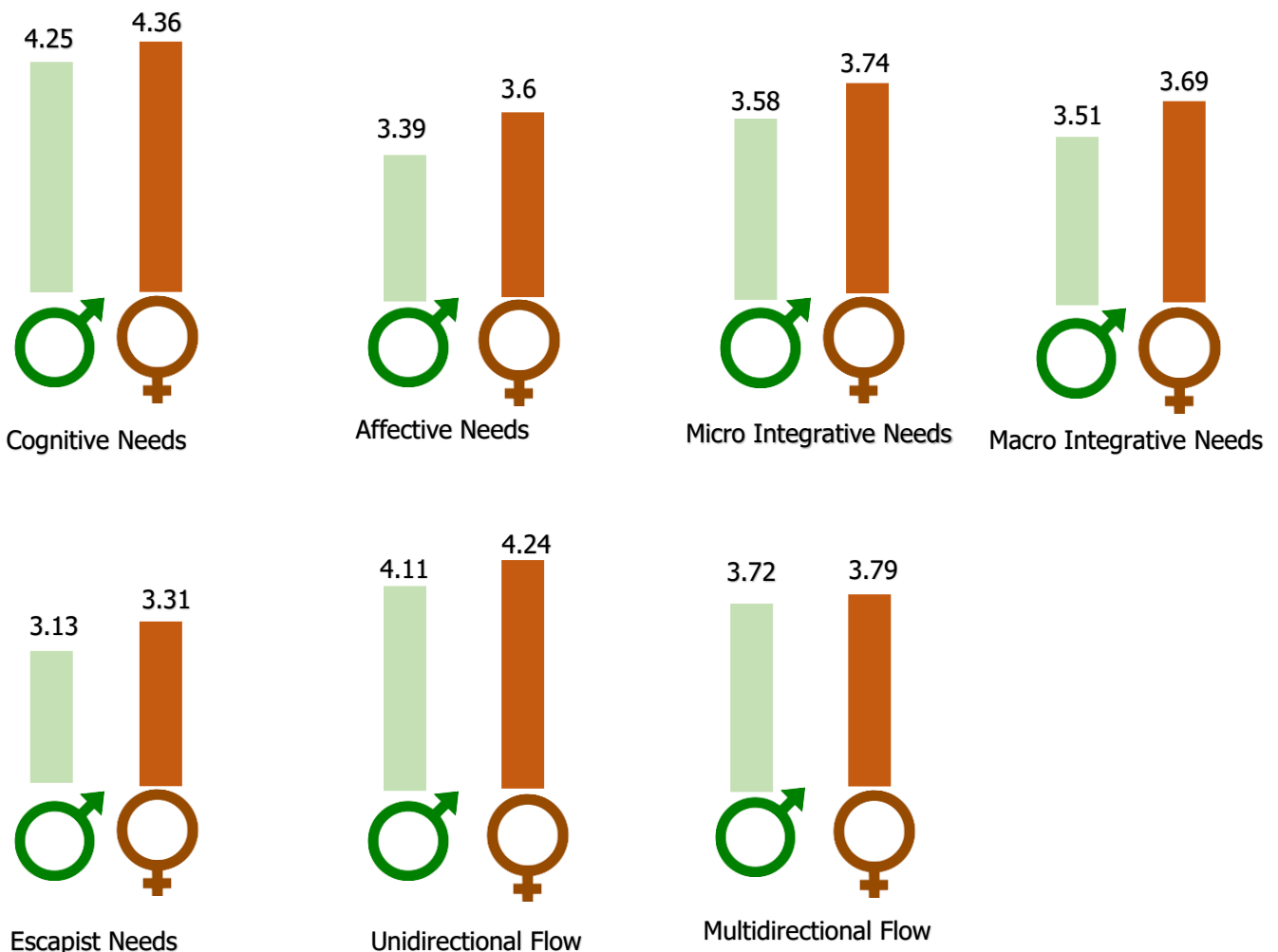
	Israel	Italy	Norway	Romania	Spain	France	Sweden	Japan
Spain	1	.000	1	.626	-	1	.595	1
France	1	.000	1	.001	1	-	1	.655
Sweden	1	.000	1	.000	.595	1	-	1
Japan	.095	.000	.425	.000	.001	.655	1	-

The table shows that Japan had the highest number of significant differences from other countries in the various communication needs scores while Norway had fewer differences.

#### 4.1.2 GENDER

Another aspect of communication needs and expectations that was examined in the survey referred to gender differences. Figure 10 summarizes the differences between the communication needs of men and women respondents in all eight countries. We conducted a MANCOVA test with gender and nationality as independent variables, and communication needs as dependent variables, sociodemographic variables (age, marital status, number of children under 18, religion, religiosity, education, and income) covariates. Table 5 presents the effect of nationality, gender, and the interaction between nationality and gender. The whole table, presenting the complete analysis with a comparison between the countries and the other sociodemographic variables, appears in the appendices.

**Figure 10.** Differences between the communication needs of men and women across eight countries.



**Table 5.** Effect of nationality (country), gender, and nationality\*country on communication needs.

Source	Communication Need	F	Sig	Partial Eta Squared
<b>Country</b>	Cognitive	33.45	.000	.056
	Affective	9.19	.000	.016
	Integrative – Micro	13.42	.000	.023
	Integrative – Macro	17.56	.000	.03
	Escapist	12.21	.000	.021
	Unidirectional Flow	29.24	.000	.049
	Multidirectional Flow	11.26	.000	.019
<b>Gender</b>	Cognitive	18.28	.000	.005
	Affective	42.22	.000	.011
	Integrative – Micro	32.9	.000	.008
	Integrative – Macro	44.01	.000	.011
	Escapist	27.96	.000	.007
	Unidirectional Flow	25.12	.000	.006
	Multidirectional Flow	7.32	.007	.002
<b>Country * Gender</b>	Cognitive	1	.429	.002
	Affective	.96	.462	.002
	Integrative – Micro	1.37	.214	.002
	Integrative – Macro	1.14	.333	.002
	Escapist	2.19	.032	.004
	Unidirectional Flow	.7	.675	.001
	Multidirectional Flow	.6	.758	.001

The results show that significant differences between genders were found regarding all communication needs in the survey. Women tended to rate all group of needs higher than men: Cognitive (Men: M=4.25, SD=.96; Women: M=4.36, SD=.89), affective (Men: M=3.39, SD=1.05; Women: M=3.6, SD=1), integrative-micro (Men: M=3.58, SD=1.03; Women: M=3.74, SD=.89), integrative-macro (Men: M=3.51, SD=1.02; Women: M=3.69, SD=.98), escapist (Men: M=3.13, SD=1.09; Women: M=3.31, SD=1.09), unidirectional flow (Men: M=4.11, SD=.97; Women: M=4.24, SD=.94) and multidirectional flow (Men: M=3.72, SD=.96; Women: M=3.79, SD=.98). In general, the results indicate that women give more emphasis to communication needs in general, and not to specific types of needs. It suggests that regarding gender, more focus should be given to fulfilling communication needs, in general, of women.

The analysis results also show that almost no interaction effects were found between gender and nationality (country of respondent). Only in escapist needs (distract my thoughts), differences were found in Israel ( $F(1, 7)=2.331, p=.023$ ) between men ( $M=2.85, SD=.07$ ) and women ( $M=3.31, SD=.07$ ), but with a low effect size ( $\eta^2=.004$ ).

#### 4.1.3 OTHER SOCIODEMOGRAPHIC VARIABLES

The full MANCOVA table 5 presented in the appendices also shows the effect of various sociodemographic characteristics on the respondents' communication needs in the eight countries. It shows that all sociodemographic variables affected almost all types of communication needs. Besides age with affective needs, marital status with cognitive needs, unidirectional and multidirectional flow, religion with integrative needs (micro), unidirectional and multidirectional flow, religiosity with integrative needs (micro) and multidirectional flow, and education with escapist needs and affective needs. Surprisingly, income did not affect (primary or interaction with country) the respondents' communication needs.

#### 4.1.4 DIGITAL LITERACY

Deliverable 1.2 showed that the digital literacy level among the respondents was very high ( $M=4$ ,  $SD=.96$ ), with Israel being with the highest digital literacy score among the respondents, followed by Spain ( $M=4.22$ ,  $SD=.84$ ) and Italy ( $M=4.22$ ,  $SD=.76$ ), and Japan on the other side, with respondents with the lowest score of digital literacy ( $M=3.32$ ,  $SD=.89$ ). There were no differences between men and women ( $t=-1.34$ ,  $p=.18$ ) in the whole sample. However, local differences were found in Japan ( $t=1.98$ ,  $p=.049$ ), when men ( $M=3.39$ ,  $SD=.88$ ) were with a little bit more digital literacy than women ( $M=3.24$ ,  $SD=.9$ ).

Table 6 shows that digital literacy was positively correlated, using Spearman's R, with all communication needs: cognitive ( $r=.449$ ,  $p=.000$ ), affective ( $r=.2$ ,  $p=.000$ ), integrative-micro ( $r=.32$ ,  $p=.000$ ), integrative-macro ( $r=.29$ ,  $p=.000$ ), escapist ( $r=.11$ ,  $p=.000$ ), unidirectional flow ( $r=.44$ ,  $p=.000$ ) and multidirectional flow ( $r=.31$ ,  $p=.000$ ). The table presents only the total score across eight countries, while each country's results appear on the full table in the appendices.

**Table 6.** Correlation table of digital literacy and communication needs ( $N=4,013$ ).

Country	Communication Need	Spearman's R	p-value
<b>Total</b>	Cognitive	.45	.000
	Affective	.2	.000
	Integrative – Micro	.32	.000
	Integrative – Macro	.29	.000
	Escapist	.11	.000
	Unidirectional Flow	.44	.000
	Multidirectional Flow	.31	.000

However, as shown in the full table, the picture regarding the correlation between digital literacy and communication needs was different. In countries such as Italy, Norway, Spain, and Japan, digital literacy was correlated with all communication needs. However, in Romania, Sweden, and France, no correlation was found between digital literacy and escapist needs. In Israel, digital literacy was positively correlated only with cognitive needs ( $r=.27$ ,  $p=.000$ ), unidirectional flow ( $r=.22$ ,  $p=.000$ ) and multidirectional flow ( $r=.13$ ,  $p=.004$ ).

Finally, to predict the citizens' communication needs, a multivariate linear regression analysis was conducted. All variables correlated with the various communication needs (cognitive, affective, integrative-micro, integrative-macro, escapist, unidirectional flow, and multidirectional flow) were included in the regression analysis. Table 7 presents the results of the regression. The full table, including also insignificant results, is located in the appendices. The analysis was done in Enter mode:

- The regression model of cognitive needs is statistically significant ( $F=75.596$ ,  $p=.000$ ) and accounts for 24.1% of the dependent variable's total variance.
- The regression model of affective needs is statistically significant ( $F=21.02$ ,  $p=.000$ ) and accounts for 8.2% of the dependent variable's total variance.
- The regression model of integrative needs (micro) is statistically significant ( $F=43$ ,  $p=.000$ ) and accounts for 15.5% of the dependent variable's total variance.
- The regression model of integrative needs (macro) is statistically significant ( $F=43.75$ ,  $p=.000$ ) and accounts for 15.7% of the dependent variable's total variance.
- The regression model of escapist needs is statistically significant ( $F=14.36$ ,  $p=.000$ ) and accounts for 5.8% of the dependent variable's total variance.
- The regression model of unidirectional flow is statistically significant ( $F=70.92$ ,  $p=.000$ ) and accounts for 23.2% of the dependent variable's total variance.

- The regression model of multidirectional flow is statistically significant ( $F=32.88$ ,  $p=.000$ ) and accounts for 12.3% of the dependent variable's total variance.

**Table 7.** Result of linear regression analysis to predict communication needs (N=4,013).

Communication Needs	Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
<b>Cognitive</b>	(Constant)	2.395	.097		24.612	.000
	Country=Israel	.515	.163	.184	3.17	.002
	Country=Italy	.231	.058	.082	3.947	.000
	Country=Norway	.203	.056	.072	3.646	.000
	Country=Spain	.186	.057	.066	3.248	.001
	Country=Sweden	.225	.056	.08	4.039	.000
	Gender (Female)	.084	.026	.045	3.26	.001
	Digital Literacy	.417	.014	.431	39.317	.000
	Religion=Muslim	-.342	.103	-.057	-3.306	.001
	Marital Status	.084	.028	.044	3.002	.003
	Number of kids under 18	-.063	.01	-.09	-6.045	.000
<b>Affective</b>	(Constant)	2.95	.12		24.84	.000
	Country=Norway	-.25	.07	-.08	-3.64	.000
	Country=Sweden	-.24	.07	-.08	-3.47	.001
	Gender	.21	.03	.1	6.71	.000
	Digital Literacy	.22	.02	.21	12.69	.000
	Marital Status	.09	.03	.04	2.7	.007
	Religiosity	-.14	.03	-.09	-4.85	.000
<b>Integrative-Micro</b>	(Constant)	2.32	.11		20.76	.000
	Country=Norway	-.2	.06	-.07	-3.14	.002
	Gender	.15	.03	.07	5.02	.000
	Digital Literacy	.366	.02	.35	22.41	.000
	Marital Status	.13	.03	.06	3.97	.000
	Religiosity	-.08	.03	-.05	-2.93	.003
<b>Integrative-Macro</b>	(Constant)	2.49	.11		22.39	.000
	Country=Israel	-.44	.19	-.14	-2.35	.019
	Country=Norway	-.16	.06	-.05	-2.5	.013
	Country=France	-.26	.06	-.09	-4.17	.000
	Country=Spain	-.18	.07	-.06	-2.69	.007
	Gender	.18	.03	.09	5.96	.000
	Digital Literacy	.33	.02	.31	20.17	.000
	Religion=Christian	.18	.07	.09	2.48	.013
	Marital Status	.15	.03	.07	4.69	.000
	Religiosity	-.14	.03	-.09	-5.18	.000
<b>Escapist</b>	(Constant)	2.9	.13		22.75	.000
	Country=Norway	-.2	.07	-.06	-2.73	.006
	Country=Romania	-.46	.08	-.14	-5.82	.000
	Country=France	-.2	.07	-.06	-2.71	.007
	Country=Sweden	-.17	.07	-.05	-2.27	.023

	Gender	.2	.03	.09	5.79	.000
	Digital Literacy	.16	.02	.14	8.74	.000
	Religion=Muslim	.36	.14	.05	2.68	.007
	Marital Status	.12	.04	.05	3.17	.002
	Religiosity	-.12	.03	-.07	-3.92	.000
	(Constant)	2.18	.1		21.6	.000
	Country=Israel	.5	.17	.17	2.97	.003
	Country=Italy	.2	.06	.07	3.35	.001
	Country=Norway	.26	.06	.09	4.54	.000
	Country=Sweden	.25	.06	.09	4.35	.000
<b>Unidirectional Flow</b>	Gender	.11	.03	.06	4.16	.000
	Digital Literacy	.43	.02	.43	29.04	.000
	Religion=Muslim	-.26	.11	-.04	-2.39	.017
	Marital Status	.14	.03	.07	4.81	.000
	Number of kids under 18	-.04	.01	-.05	-3.48	.001
	(Constant)	2.53	.11		22.99	.000
	Country=Italy	.18	.07	.06	2.77	.006
	Country=Sweden	-.13	.06	-.05	-2.12	.034
<b>Multidirectional Flow</b>	Gender	.06	.03	.03	1.96	.05
	Digital Literacy	.31	.02	.31	19.4	.000
	Religion=Jewish	-.49	.19	-.17	-2.62	.009
	Marital Status	.1	.03	.05	3.11	.002

- For country, the reference is Japan.
- For Religion, reference is another religion.

The regression analysis results presented in Table 7 suggests that the following variables, shown in the table, are predictors for the following communication needs. Digital literacy was the strongest predictor of all communication needs. Increase in digital literacy predicted that the respondents gave more importance to cognitive ( $\beta=.43$ ,  $t=39.32$ ,  $p=.000$ ), affective ( $\beta=.21$ ,  $t=12.69$ ,  $p=.000$ ), micro-integrative ( $\beta=.35$ ,  $t=22.41$ ,  $p=.000$ ), macro-integrative ( $\beta=.31$ ,  $t=20.17$ ,  $p=.000$ ), escapist ( $\beta=.14$ ,  $t=8.74$ ,  $p=.000$ ), unidirectional ( $\beta=.43$ ,  $t=29.04$ ,  $p=.000$ ) and multidirectional needs ( $\beta=.31$ ,  $t=19.4$ ,  $p=.000$ ). For escapist needs, residing in Romania was an equally strong predictor for, however, for a decrease in the escapist needs ( $\beta=-.14$ ,  $t=-5.82$ ,  $p=.006$ ).

For cognitive needs, living in Israel also predicted an increase in the need ( $\beta=0.23$ ,  $t=2.77$ ,  $p=.006$ ). Women tended to perceive these needs as more important than men ( $\beta=0.23$ ,  $t=2.77$ ,  $p=.006$ ) for affective needs. For macro-integrative needs, residing in Israel predicted a decrease in this category of needs ( $\beta=0.23$ ,  $t=2.77$ ,  $p=.006$ ), but an increase in the unidirectional communication flow needs ( $\beta=0.23$ ,  $t=2.77$ ,  $p=.006$ ). For the multidirectional flow of communication, being Jewish predicted a decrease in the need's perceived importance ( $\beta=0.23$ ,  $t=2.77$ ,  $p=.006$ ).

The table also shows that besides digital literacy, gender (female) predicted an increase in all communication needs. Religion and religiosity variables also contributed to predicting all communication needs, along with several nationality variables, which changed for each category of needs.

#### 4.1.5 AMONG COMMUNITY MEMBERS

The survey results highlighted the critical role of fulfilling the public's communication needs in all phases of emergencies and disasters, especially regarding cognitive needs and needs related to the unidirectional communication flow (e.g., receiving fast information). It emphasized their importance in the public's expectations from authorities and first responders on building and maintaining societal resilience. However, the survey examined the public's perceptions of these needs in general, without differentiating between various communication situations.

The first research question asked about the public's communication needs and expectations in the communication process between the citizens (e.g., among community members, family members and friends, and other citizens who are not professionals of emergency and disaster authorities and first responders). Therefore, to complete the answer to the first research question, we analyzed social media posts and comments. They were analyzed according to the needs which were identified in the survey. The examples refer to both situations of ongoing crises, but also to calm routine, which is considered the "before" (or "after") crises.

As mentioned in the method section, some quotes were changed, keeping the original meaning, but refraining from the possibility that they will be tracked. Some were translated to English. Original posts by authorities and first responders are brought in their original way.

##### **Cognitive Needs**

As identified in the survey, the most dominant category of needs in all countries was cognitive needs. It was represented in the survey by referring to credible information. Indeed, the need for credible information has also emerged as a dominant theme in the social media content posted by the followers of emergency and disaster authorities. The users expressed the need for credible information in order to talk about emergency and disaster situations with other community members, family, and friends, as seen in the following comment to a post by the Israeli home-front command, which was published in 2018: "I keep hearing my friends talking about the chance for an earthquake in Israel... is it really true?? Where can I read about it from a credible source, so I can also give information about this topic????". The comment, written by a woman, referred to the need for credible information about earthquakes in Israel to discuss other community members' issues. The author of the comment claimed that she wants to discuss with others based on credible information, defining it as an essential need for the communication process.

In another example, from a comment on a post of the Norwegian Red Cross (Røde Kors), a man mentioned that the information published in the post (regarding providing shelter to homeless people in extreme weather situations) was not enough. Therefore, he said that he had to address other members of the community for answers which he was not sure whether they are credible or not: "You cannot just say that sleeping outside is illegal, and then you also need to give them a place to sleep. The information in this post is not enough. How can I host homeless people in my house? I asked my neighbors, but I am not sure the information they gave me is correct". In this case, the need for credible information in the community's communication process was not met.

##### **Affective Needs**

During crises and after them, the need to fulfill the community's communication process's affective needs increases. People seek comfort to feel better, and they look for their family, friends, and other community members to fulfill these needs. As shown in the qualitative analysis, the public sometimes addresses the authorities and first responders to request these needs' fulfillment. For example, the ongoing coronavirus pandemic created many humanitarian situations. People in need of food and shelter, others who lost their jobs and homes, and lonely people due to isolation and quarantine policies were left alone in their homes, far from their families. On Twitter, between October and December 2020, several users tagged the account of Fédération des acteurs de la solidarité in France, asking how can they locate which people in their community need help. While these requests can be an example of cognitive needs of information, these requests were connected to affective



needs in several cases. People explained these requests in their need to feel better (“I want to feel better with myself by doing to the community”) or to affective needs of other people (“I want to make them feel better”).

In other cases, users commented on social media content and replied to one another to fulfill affective needs. They did not even refer to the original content and only used the post to interact among themselves. For example, in a TikTok video uploaded by “Policia Nacional” from Spain, a policewoman entered a police car, showing its interior with a musical track in the background. The Policia Nacional commented on the post, writing “the feeling of getting into a police car”. 243 users commented to the post, while some received affective responses from others use, such as icons of hearts, other symbols of love and excitement, and more.

**Figure 11.** A video uploaded to “Policia Nacional’s” TikTok account.



### **Integrative Needs - Micro**

Micro integrative needs refer, as described before, to feelings of connection to the close circle of family, friends, and immediate community. The social media content of authorities and first responders served, in some cases, as a facilitator for fulfilling these needs. Following the last example of affective needs, users sometimes used the comment section to talk to one another. In the abovementioned TikTok of policia nacional from Spain, some users used the comments to talk to one another. Comments such as “how are you?”, “can you follow my account, and I will follow yours?” and more were very common. This shows how the organizations' social media platform also served as a facilitator of micro integrative needs in the internal communication process between society members.

The last example represents a fulfillment of integrative needs that is not directly related to an ongoing crisis. However, many other examples showed the fulfillment of micro integrative needs also directly related to a crisis. For example, in December 2020, the Facebook page of Israel Homeland Security in Arabic, addressing the Arab population, published an update regarding Israel's coronavirus regulations. The post received many comments from users who protested the new regulations, especially those who restrict the number of mosques. Users also used these comments to talk to one another about the situation, sharing their feelings and thoughts, talk about religion, and more. All of this with the situation of crisis which the Facebook post referred to.

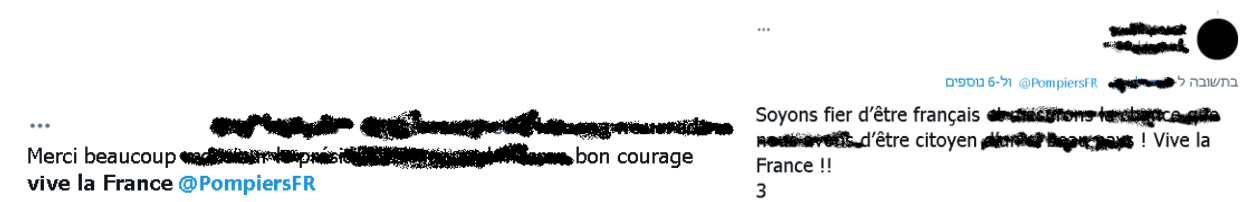
### **Integrative Needs – Macro**

In comments of social media content published by authorities and first responders, the conversations mentioned above between the users also served as facilitators of macro integrative needs, feeling a part of society. In December 2018, the Swedish Red Cross published a post telling the story of a young Iranian guy living in Sweden reunited with his family. Among the positive responses, some of

them emotional and refer to affective needs. Some commenters chose to highlight the fact that the Swedish were the ones helping the man. “Way to go, Sweden!” wrote of the commentators. This led to an entire conversation between other users about being part of Sweden and contributing to the sense of nationality.

Another example comes from France. In November 2018, the yellow vests protests started in France. While the protests were an act of democracy, road blockades, fires, and some violence contributed to identifying this event as a crisis. *Pompiers de France*, the firearms in France, retweeted some of the updates tweeted by *Pompiers de Paris* regarding several fires set by the protesters. These tweets were also retweeted by other Twitter users, writing “Vive la France!”, replying to one another about the sense of “being French” (“Soyons fier d’être français) in these protests. Such replies show how this content fulfilled the macro integrative needs in the citizens’ internal communication process.

**Figure 12.** Tweets tagging @PompiersFR.

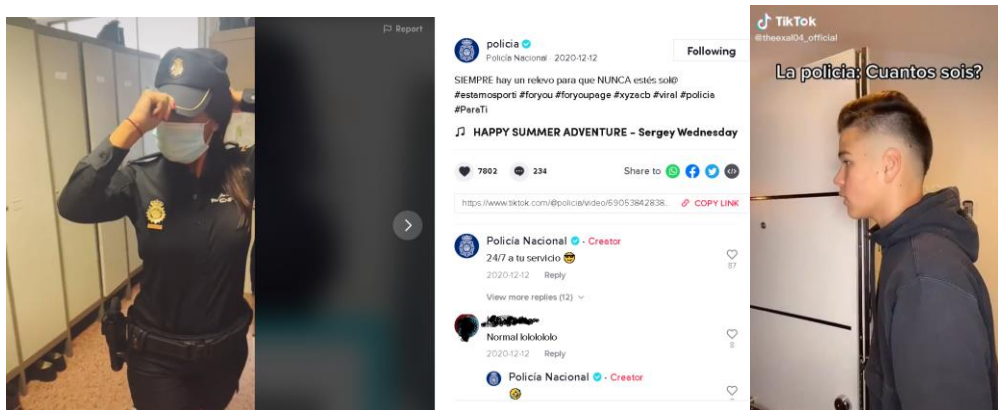


### Escapist Needs

Escapist needs, focusing on entertainment and distraction, received the lowest scores in the survey. In the communication process among community members and the general public, the role of escapist needs resulting from authorities and first responders’ activity was indirect. For example, especially in the “younger” platforms, Instagram and TikTok, in which authorities and first responders published “lighter” content, the entertaining content served as a facilitator of escapism among the users. They imitated TikTok trends that the organizations posted, repeated Instagram hashtags used by the organizations, and even talked between themselves in the comments about “lighter” content.

For example, In December 2020, *Policia Nacional* in Spain published a TikTok video under the title “A day in the police”. Many other TikTok videos were soon posted under similar titles, such as “A day in how I help the police” and “A day in me keeping the police busy”. They were humorous and entertaining, and users also commented on imitating the TikTok trends. This interaction represents how first responders’ content can facilitate escapist needs in the internal communication process between the citizens to themselves.

**Figure 13.** The original post of “a day in the police” and one example of an imitation.



#### 4.1.6 BETWEEN THE COMMUNITY AND AUTHORITIES/FIRST RESPONDERS

The second research question asked about the public's communication needs and expectations in the communication process between them and authorities and first responders. The same analysis served the second question.

### Cognitive

Under the set of cognitive needs, there is the need for knowledge. In the communication process between the public to authorities and first responders, the need to know was very dominant. Simple questions could express this. For example, in November 2020, the Swedish Red Cross published a couple of posts regarding a rescue mission in Central America. Dozens of users replied to these posts, with a significant proportion of the comments asking questions such as: "where can we donate for this mission?" and "where can we get information regarding this mission?". Other commenters asked more complex questions such as: "Do you have any job regarding the earthquake in Turkey?" referring to another disaster in another part of the world. The social media workers from the Swedish Red Cross replied to all questions, fulfilling this need.

Another example relates to risk communication. In December 2018, Madrid activated the "contamination protocol", setting limits on driving contaminating vehicles due to the increased pollution caused in certain continuous weather conditions, lacking wind and rain. In the following days, the Twitter page of "Emergencias Madrid", Madrid's emergency information office, published a Tweet with the following information about it. For example:

**Figure 14.** The activation of "contamination protocol" from "Emergencias Madrid".



The tweet, which was part of a series of tweets on the different stages of the protocol, received many replies, comments, and retweets, some of them raising questions regarding the situation. Whether it is allowed to drive there or not, people asked about certain roads about the protocol's activation during the holiday, and other questions. Given that the protocol had a significant impact on transportation, failing to answer such questions and provide the necessary information could lead to chaos and confusion. However, the replies were answered with relevant information, and later on, in the following days, other tweets added that information to clarify previous questions raised. This is an example of fulfilling the cognitive needs and expectations of the users who asked the questions.

However, in several cases, users could not fulfil their need for knowledge. For example, in December 2020, the Department of Emergency Situations (DSU) in Romania Facebook page published an interview with Dr. Raed Arafat, Head of DSU. One of the comments was out of the context of the post, reporting on technical issues with the DSU app regarding the possibility to get information: "DSU app is not working again. I do not get a notification when there is a warning [...] only after I opened the app I saw that there were two warnings". Here, the user reported a failure to meet a cognitive need to know, which is also related to the unidirectional flow of information (e.g., receiving the information fast). However, the comment was left with no visible answer, leaving the need unanswered.

Considering risk communication, in October 2020, the ministry of health in Sweden published a post on Instagram reporting on a declaration on the increased use of shore-side electricity in Nordic ports. The post explained the new decision and explained the risks of air pollution and its contribution to environmental crises. Many users asked questions about the declaration, giving examples of places where it does not, and in their opinion even will not, take effect. They asked about the ministry's plans to facilitate this decision, prevent future crises and were left without any answer – some of them expressing their frustration.

**Figure 15.** An Instagram post by the Swedish ministry of environment and an unanswered comment.



## Affective

Affective needs received a relatively low score in the survey across almost all countries. However, in analyzing the public's discourse with authorities and first responders, it was very dominant. Posts by the emergency organizations received a significant number of affective responses. Statements such as "Kudos!", "We praise you!", "You are wonderful!" and such appeared many times in response to posts on the different social media channels. Negative affective responses were also dominant. They were usually in the form of people expressing anger about something, as in an Instagram post by the Israeli ministry of defense, published in October 2020. The post, showing weapons confiscated in a security event, received alongside many positive responses ("🙏❤️", "👏👏👏", "Way to go!", "You are the champions!") also negative responses. For example, cursing the people who tried to smuggle these weapons from the Palestinian territories into Israel, and some lighter negative responses ("They should rot in jail!", "Where is the law here?", "This is madness!!!! They are animals!!!!").

In some cases, the comments implied that the users came to achieve an affective need, as in the following case. In October 2018, "Dipartimento Protezione Civile" published a video on Memorial Day for an earthquake. Referring to one of the workers of the organization who died in the two years since the disaster. One of the responses for this post was that workers' daughter, replying "Mom would be proud of you. Thank you ❤️". Other responses highlighted the affective needs of

the users, such as feeling better (“Thank you, you made my day”) and even feeling sad (“This is a sorrowful day. You made me cry while remembering this story. We should not forget it”).

**Figure 16.** Post by “Dipartimento Protezione Civile” which received affective responses.



### **Integrative Needs – Micro**

Micro integrative needs, focusing on talking to others, being part of the immediate environment (e.g., family and friends), were in the middle in the survey's rank of needs. In the communication process between the public and authorities, and first responders, micro integrative needs were almost non-existent. References to these needs were in comments mentioning the users as part of their close social group. For example, in a comment on the Twitter page of “Emergencias Madrid” from Spain, which was published in December 2019, one of the users replied to a tweet reporting on the result of a security event: “Me and my family are proud of you”. Similar comments appeared in other few examples, connecting the users who commented to their family and friends.

Another example is taken from the Norwegian Red Cross. In a post from December 2020 about the freeze and weather conditions that endangered older people who live alone, users asked questions about how they can help people they know from their community. One user asked: “I know an old person in my neighborhood that I think needs help. How can I help him? This is what we should do as a community”. In this example, also showing cognitive needs, the micro integrative needs are reflected by the sense of community the user tries to feel. However, as already mentioned, these examples were rare.

Micro integrative needs were achieved by the users also by the primary interaction with authorities and first responders. Across all seven countries and most of the social media accounts, users commented on the organizations’ posts, and in many cases, also received answers (“thank you”, information, and more). In some cases, the users replied to these comments, trying to develop some sort of discussion. For example, in a TikTok video from “policia nacional” on November 2020, one of the users commented on the post, writing: “It looks so awesome to be a policeman”. The official TikTok account of the police replied: “Yes, it is”. Following that comment, a short discussion emerged between the account facilitator and the user that concluded: “It is so nice of you to answer. I enjoyed the conversation”. This example reflects another way of fulfilling a micro integrative need of talking to others and maintaining social interactions.

### **Integrative Needs – Macro**

On the contrary to micro integrative needs, macro integrative needs were very dominant. Posts by authorities and first responders, especially those who reported on the outcomes of taking care of crises, received praise that reflected a large society's integrative needs. In a tweet published in October 2018 by the Italian Coast Guard regarding a rescue mission, many replies referred to being part of the Italian nation: “I am proud this day to be Italian!”, “This is my country!” and “We are one big nation”. Similar responses appeared almost across all countries and pages, for different events, from positive outcomes to adverse disasters.

In October 2019, Magen David Adom, The Israeli EMS, tweeted an Israeli news website article. The article reported about 1,000 blood donations in an army base in Samaria. The blood donors were soldiers and settlers living nearby. A Twitter user replied to this tweet, writing: "They are saying that we are parasites. That we take care only to ourselves. Give us respect... Kudos settlers!". This comment refers to the debate regarding the legal status of the settlers. Expressing the need of the user to be a see the more positive parts in the representation of the settlers in the media.

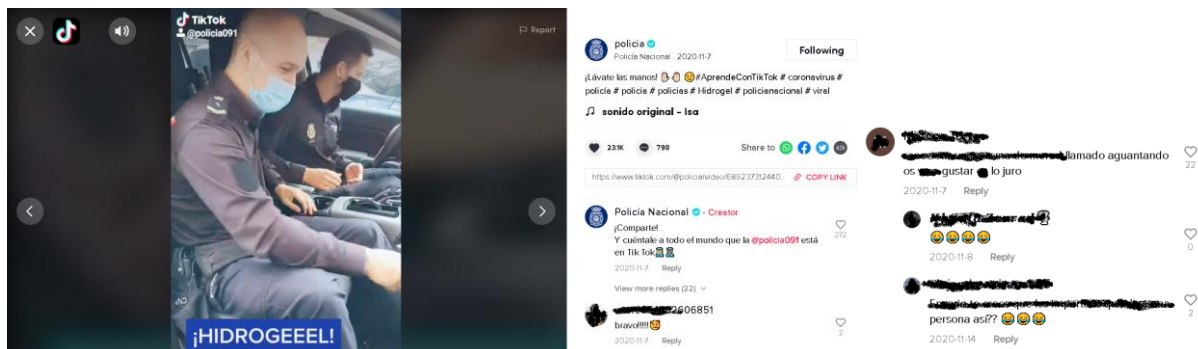
**Figure 17.** An example from Israeli Magen David for macro integrative needs.



### Escapist

While the group of escapist needs received the lowest scores in the survey across all eight countries, it was very dominant in the qualitative analysis of the "younger" platforms – Instagram and TikTok. Both platforms served the authorities and first responders for lighter content or distributing information more entertainingly during emergencies and disasters. As were expressed in the comments to the posts on Instagram and TikTok, the public's needs from the emergency organizations focused on requests for more entertaining content. For example, In November 2020, "Policia Nacional" of Spain uploaded a TikTok video imitating a video-trend of hand hygiene, followed by a pop-track in the background. Comments by many users asked for similar videos, employing other TikTok trends that they wished to see. For example, one user wrote: "Could you please react to the song 'Aguantado' by Morad? People will like it! I Swear!". TikTok allows the user to use short musical samples, from popular songs, as background music to videos. They are used for lip-syncing and other video trends. In this case, the user's suggestion was to distribute the police's content, whether regarding hand hygiene or other covid-19 related content, using that tune for entertainment (escapism). Another user replied to him, saying: "Why do you think they care about what you say?" reflecting the gap between what people want and their expectation whether the emergency organizations will respond to their needs or not.

**Figure 18.** Escapism and discussions in "Policia Nacional's" TikTok page.



## Unidirectional Flow of Communication

The unidirectional flow of communication was very dominant in the survey, second only to cognitive needs. These needs are mainly related to the top-down distribution of information: fast, convenient, and reachable. As in the survey, the qualitative analysis found these needs to be very dominant in the users' content. The need for fast information, for example, was very dominant. Users regularly criticized the authorities and first responders for not publishing the information fast enough. For example, a post published by the Israeli home-front command in November 2019 reported a missile attack from Gaza to Israel. Many Facebook users responded angrily to the post, complaining that the alarm and information were not fast enough: "We heard the boom and only then the alarm went off", "the explosion was almost 20 minutes ago! And only now you explain what it was? I was going crazy!". In a post by the Romanian Red Cross (Crucea Rosie Romana) regarding how to behave in an earthquake, one of the users commented: "will you be as fast as you ask us to be in letting us know that there is an earthquake?".

**Figure 19.** Examples for a post with unidirectional flow of communication needs from Romania.



However, referring to the need to receive fast information was not related only to complaints as part of the unidirectional communication flow. As a reply to a tweet by Fédération des acteurs de la solidarité, from November 2018, one user wrote "Thank you for the fast information", showing her content from the timing.

## Multidirectional Flow of Communication

The multidirectional flow of communication represents the public's ability to receive information and share information with authorities and first responders, to comment, to receive a response to him or her comments and inquiries, and in general, to feel that information is flowing in both ways.

The first need related to the multidirectional flow of communication is to let the public post information. Across all seven countries, in all social media accounts which were analyzed, it was found that users can post and comment with no limitations. In some of the pages, the public's comments and messages on social media accounts received attention. Questions received answers,

comments received responses, and in general, authorities and first responders' presence was felt not just in the main posts but also in the comments and the public's discussion.

Users and followers of authorities and first responders expected this multidirectional flow. When comments were replied to, and questions were answered, users usually replied with interactive signals (e.g., giving a "like" on Facebook, replying "thank you," etc.). When authorities and first responders failed to reply, it was noted in some cases. For example, one user replied to a post of Romanian Departamentul pentru Situații de Urgență. After not receiving a reply, he wrote: "Don't I deserve an answer? Why is this page for if not for answering questions?". This type of comment, representing other similar comments, shows the importance of a multidirectional communication flow.

The importance of multidirectional communication flow was dominant not just by replying or not replying but also by referring to the topics related to the freedom of speech. In November 2018, the Norwegian Red Cross published a post reporting its actions in a crisis in Africa. One of the comments claimed that some comments were censored: "Dear Red Cross, I want to know why was my comment deleted? Is not it allowed here to say what we think? Isn't it possible to criticize? Isn't it possible to write also unpleasant things?". This comment reflects another dimension in how vital is the multidirectional flow of communication to the users – that deleting what they have to say, or even thinking that it was deleted, is perceived against this need.

## Summary

The qualitative content analysis elaborated on the findings of the survey. While the survey created a hierarchy of communication needs and expectations, as perceived by the respondents, the qualitative content analysis allows in-depth reading on the actual needs and expectations, as expressed by the users. The survey put cognitive needs and unidirectional communication flow at the top of the list of needs and escapist and affective needs at the bottom. However, the qualitative content analysis showed that all four could be very dominant in the communication process among community members, authorities, and first responders.

Also, the survey ranked to importance score of every group of need. This is while the qualitative content analysis showed in detail in which areas they affect the users. For example, the survey showed the importance levels of micro and macro integrative needs. Simultaneously, the content analysis revealed precisely how the fulfillment of these needs, and not less importantly, the unfulfillment of these needs, could affect the users (making them feel contempt towards the organizations and possibly decreasing their resilience levels).

Last, we could see a clear connection between fulfilling the users' communication needs and expectations inside the community (among themselves) and outside (between them and the authorities and first responders). In all three phases of emergencies and disasters, the public's communication needs and expectations, inside and outside the community, were intercorrelated. Their communicating needs inside the community, such as talking to one another, knowing things, and entertaining one another, were significantly affected by authorities and first responders' information. The information that authorities and first responders provided led to fulfilling the communication needs and expectations in the communication process with other people. Furthermore, on the other side, the information that was produced in the communication process inside the community affected the communication needs and expectations from authorities and first responders.

## 4.2 PREFERRED INFORMATION SOURCES AND MEANS FOR RECEIVING WARNINGS

The third research question (RQ3) examined the public's preferred information sources and means for receiving warnings from authorities and first responders. Table 8 presents the distribution of the



preferred information sources in all seven countries for the question: “What is the likelihood that you will use the following media sources for information during a disaster?”. The table presents the aggregated results in all countries. The entire table appears in the appendices.

**Table 8.** The distribution of answers of preferred means for information. Aggregated results of 4,013 participants from Israel, Italy, Norway, Romania, France, Spain, Sweden, and Japan.

Communication Channel	1	2	3	4	5	M (SD)
Face to Face	122 (3%)	399 (9.9%)	1289 (32.1%)	1390 (34.6%)	813 (20.3%)	3.59 (1.01)
Printed Communication	622 (15.5%)	987 (24.6%)	1319 (32.9%)	774 (19.3%)	311 (7.7%)	2.79 (1.15)
Television	339 (8.4%)	417 (10.4%)	1027 (25.6%)	1324 (33%)	906 (22.6%)	3.51 (1.19)
Mobile Phone	154 (3.8%)	274 (6.8%)	725 (18.1%)	1360 (33.9%)	1500 (37.4%)	3.94 (1.08)
Social Networks	529 (13.2%)	640 (15.9%)	1047 (26.1%)	1064 (26.5%)	733(18.3%)	3.21 (1.28)
Other Electronic Media	310 (7.7%)	629 (15.7%)	1359 (33.9%)	1142 (28.5%)	573 (14.3%)	3.26 (1.12)

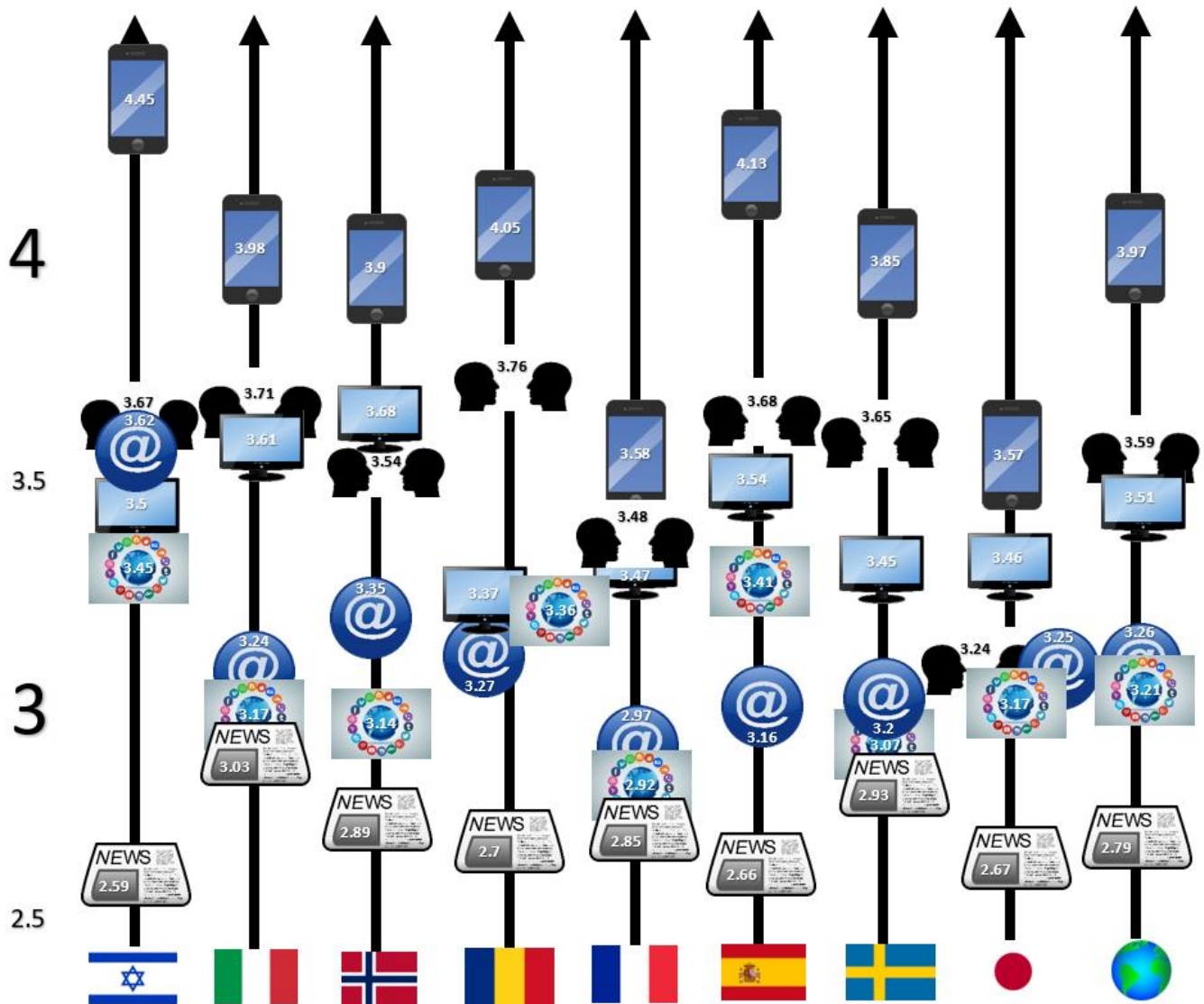
Table 8 shows that mobile phones were the preferred means for receiving information during emergencies and disasters ( $M=3.94$ ,  $SD=1.08$ ), with 71.3% of the respondents responding “much” or “very much”. Surprisingly, face-to-face communication ( $M=3.59$ ,  $SD=1.01$ ) was more dominant than social networks ( $M=3.21$ ,  $SD=1.28$ ), with 54.9% of the respondents responding “much” or “very much” (compared to 44.8% among the respondents of social networks). Television was the third most preferred medium ( $M=3.51$ ,  $SD=1.19$ ), with 55.6% of the respondents responding “much” or “very much”. The last channel was printed communication ( $M=2.79$ ,  $SD=1.15$ ). With only 27% of the respondents responding “much” or “very much”, and 40.1% responding “not at all” or “a little”.

#### 4.2.1 NATIONAL COMPARISON

Figure 20 presents the distribution of the preference of information sources across the seven countries in the survey. The ranking of preferred information sources was almost identical, with minor differences. In all countries, mobile phones topped the list, and printed communication closed it. While Israel was the country with the highest preference for mobile phones (4.45), it was also the country with the lowest printed communication preference (2.59).

Regarding the differences, France (3.58) and Japan (3.57) expressed the lowest ranks for mobile phones. However, all other information sources were not ranked significantly lower in these countries, and, therefore, the variance between information sources was minor. While in most countries, social networks were ranked only before printed communication, in Romania (3.36) and Spain (3.41), they received a slightly higher ranking. Television, as previously mentioned, was dominant, ranked third in all countries. In Norway (3.68) and Japan (3.46), it received the second-highest score, compared to Israel (3.5), in which it was only fourth. In general, face-to-face communication was ranked in second place, ranked third in Norway (3.54), and only fourth (3.24) in Japan.

**Figure 20.** Illustration of the preferred information sources in each country.



Also, there were differences between the score of the preferred information sources across the eight countries: mobile phones ( $F(7, 4012)=37.948, p=.000$ ), social networks ( $F(7, 4012)=10.617, p=.000$ ), television ( $F(7, 4012)=3.326, p=.002$ ), other electronic media ( $F(7, 4012)=13.981, p=.000$ ), printed communication ( $F(7, 4012)=9.289, p=.000$ ) and face to face communication ( $F(7, 4012)=14.186, p=.000$ ). Table 9 highlights the significant differences in the scores of the communication needs between the countries.

**Table 9.** Multiple comparisons between the preferred information sources scores in the eight countries, using Bonferroni’s post-hoc test.

	Israel	Italy	Norway	Romania	Spain	France	Sweden	Japan
<b>Mobile Phones</b>	Israel	-	.000	.000	.000	.000	.000	.000
	Italy	.000	-	1	1	.623	.000	1
	Norway	.000	1	-	.718	.015	.000	1
	Romania	.000	1	.718	-	1	.000	1
	Spain	.000	.623	.015	1	-	.000	.001
	France	.000	.000	.000	.000	.000	.000	.001
	Sweden	.000	1	1	.075	.001	.001	-
	Japan	.000	.000	.000	.000	.000	1	.001
<b>Social Networks</b>	Israel	-	.017	.004	1	1	.000	1
	Italy	.017	-	1	.578	.084	.041	.000
	Norway	.004	1	-	.201	.023	.139	1

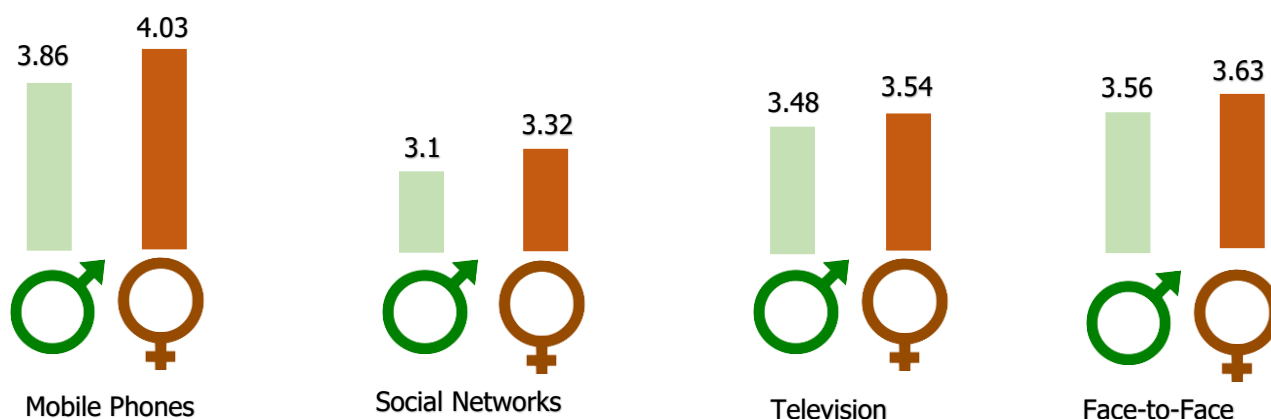
		Israel	Italy	Norway	Romania	Spain	France	Sweden	Japan
	Romania	1	.578	.201	-	1	<b>.000</b>	<b>.003</b>	.473
	Spain	1	.084	<b>.023</b>	1	-	<b>.000</b>	<b>.000</b>	.066
	France	<b>.000</b>	<b>.041</b>	.139	<b>.000</b>	<b>.000</b>	-	1	.053
	Sweden	<b>.000</b>	1	1	<b>.003</b>	<b>.000</b>	1	-	1
	Japan	<b>.013</b>	1	1	.473	.066	.053	1	-
<b>Television</b>	Israel	-	1	.491	1	1	1	1	1
	Italy	1	-	1	<b>.047</b>	1	1	1	1
	Norway	.491	1	-	<b>.001</b>	1	.128	1	.535
	Romania	1	<b>.047</b>	<b>.001</b>	-	.814	1	1	1
	Spain	1	1	1	.814	-	1	1	1
	France	1	1	.128	1	1	-	1	1
	Sweden	1	1	1	1	1	1	-	1
	Japan	1	1	.535	1	1	1	1	-
<b>Other Electronic</b>	Israel	-	<b>.000</b>	<b>.003</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>
	Italy	<b>.000</b>	-	1	1	1	<b>.004</b>	1	1
	Norway	<b>.003</b>	1	-	1	.152	<b>.000</b>	.907	1
	Romania	<b>.000</b>	1	1	-	1	<b>.001</b>	1	1
	Spain	<b>.000</b>	1	.152	1	-	.191	1	1
	France	<b>.000</b>	<b>.004</b>	<b>.000</b>	<b>.001</b>	.191	-	<b>.022</b>	<b>.001</b>
	Sweden	<b>.000</b>	1	.907	1	1	1	-	1
	Japan	<b>.000</b>	1	1	1	1	1	1	-
<b>Printed</b>	Israel	-	<b>.000</b>	<b>.001</b>	1	1	<b>.008</b>	<b>.000</b>	1
	Italy	<b>.000</b>	-	1	<b>.000</b>	<b>.000</b>	.463	1	<b>.000</b>
	Norway	<b>.001</b>	1	-	.223	<b>.033</b>	1	1	.06
	Romania	1	<b>.000</b>	.223	-	1	.96	<b>.039</b>	1
	Spain	1	<b>.000</b>	<b>.033</b>	1	-	.189	<b>.004</b>	1
	France	<b>.008</b>	.463	1	.96	.189	-	1	.318
	Sweden	<b>.000</b>	1	1	<b>.039</b>	<b>.004</b>	1	-	<b>.009</b>
	Japan	1	<b>.000</b>	.06	1	1	.318	<b>.009</b>	-
<b>Face to Face</b>	Israel	-	1	1	1	1	.069	1	<b>.000</b>
	Italy	1	-	.171	1	1	<b>.006</b>	1	<b>.000</b>
	Norway	1	.171	-	<b>.003</b>	.613	1	1	<b>.000</b>
	Romania	1	1	<b>.003</b>	-	1	<b>.000</b>	1	<b>.000</b>
	Spain	1	1	.613	1	-	<b>.032</b>	1	<b>.000</b>
	France	.069	<b>.006</b>	1	<b>.000</b>	<b>.032</b>	-	.139	<b>.005</b>
	Sweden	1	1	1	1	1	.139	-	<b>.000</b>
	Japan	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.000</b>	<b>.00</b>	<b>.004</b>	<b>.000</b>	-

The table shows that Israel tended to differ more than other countries regarding mobile phones and other electronic media. Television was a medium in which fewer differences were found between countries, even less than printed communication, which generally received lower scores.

#### 4.2.2 GENDER

The preference for specific information sources was also examined in the survey concerning gender. Figure 21 summarizes the differences between the information preferences of men and women respondents in all eight countries. We conducted a MANCOVA test with gender and nationality as independent variables, the preference for the different information sources as dependent variables, sociodemographic variables (age, marital status, number of children under 18, religion, religiosity, education, and income) as covariates. The short version of table 10 presents the analysis of nationality (country) and gender. The complete analysis, with a comparison between the countries, appears in the appendices.

**Figure 21.** Differences between the preferred sources of men and women across eight countries.



**Table 10.** MANCOVA for the effect of country and gender on preferred sources for information.

	Source	Communication Need	F	Sig	Partial Eta Squared
<b>Country</b>		Mobile Phones	35.92	.000	.06
		Social Networks	9.69	.000	.017
		Television	3.39	.001	.006
		Other Electronic Media	15.72	.000	.027
		Printed Media	9.21	.000	.016
		Face-to-Face	9.15	.000	.016
	<b>Gender</b>		Mobile Phones	25.86	.000
		Social Networks	21.93	.000	.005
		Television	7.35	.007	.002
		Other Electronic Media	1.79	.181	.000
		Printed Media	.38	.538	.000
		Face-to-Face	9.62	.002	.002
<b>Country * Gender</b>			Mobile Phones	.88	.524
		Social Networks	2.19	.032	.004
		Television	1.41	.198	.002
		Other Electronic Media	1.05	.394	.002
		Printed Media	3	.004	.005
		Face-to-Face	1.28	.257	.002

The results show that significant differences between genders were found regarding mobile phones ( $F(1, 4012)=25.861, p=.000, \eta^2=.006$ ), social networks ( $F(1, 4012)=21.926, p=.00, \eta^2=.005$ ), television ( $F(1, 4012)=7.347, p=.007, \eta^2=.002$ ) and face to face communication ( $F(1, 4012)=9.623, p=.000, \eta^2=.002$ ), but not regarding other electronic media ( $F(1, 4012)=1.793, p=.181, \eta^2=0$ ) and printed communication ( $F(1, 4012)=.379, p=.538, \eta^2=0$ ). Women preferred all four information sources, more than men: mobile phones (Men:  $M=3.86, SD=1.13$ ; Women:  $M=4.03, SD=1.01$ ), social networks (Men:  $M=3.1, SD=1.29$ ; Women:  $M=3.32, SD=1.27$ ), television (Men:  $M=3.48, SD=1.17$ ; Women:  $M=3.54, SD=1.21$ ) and face to face (Men:  $M=3.56, SD=1.02$ ; Women:  $M=3.63, SD=1.01$ ).

Interaction effects between gender and nationality were found only in social networks ( $F(7, 4012)=2.188, p=.032, \eta^2=.004$ ) and printed communication ( $F(7, 4012)=3, p=.004, \eta^2=.005$ ). In Israel, women tended more to prefer printed communication ( $M=2.68, SD=1.17$ ) more than men ( $M=2.5, SD=1.12$ ), while in Norway, men ( $M=3.06, SD=1.2$ ) tended to prefer printed communication more than women ( $M=2.7, SD=1.21$ ) and also in France a similar image of men

( $M=2.95$ ,  $SD=1.09$ ) over women ( $M=2.76$ ,  $SD=1.05$ ) were found. Regarding social networks, women in Israel ( $M=3.69$ ,  $SD=1.32$ ), Norway ( $M=3.26$ ,  $SD=1.25$ ), and Sweden ( $M=3.22$ ,  $SD=1.29$ ), tended to prefer them more than men in those countries ( $M=3.19$ ,  $SD=1.41$ ;  $M=3.04$ ,  $SD=1.37$ ;  $M=2.88$ ,  $SD=1.25$  accordingly).

#### 4.2.3 OTHER SOCIODEMOGRAPHIC VARIABLES

Full table 10, the MANCOVA table presented in the appendices, also shows the effect of various sociodemographic characteristics on the respondents' preference of information sources in the eight countries. It shows that age affected social networks, television, other electronic media, and face to face communication; marital status on mobile phones, social networks, television, other electronic media, printed communication, and face to face communication; the number of children under 18 on mobile phones and television; religion on social networks, television, other electronic media, and printed communication; religiosity on television, other electronic media, printed communication and face to face communication; education on mobile phones, social networks, television and other electronic media; and income on social networks, television, other electronic media, printed communication and face to face communication.

#### 4.2.4 DIGITAL LITERACY

Table 11 shows that digital literacy was positively correlated, using Spearman's R, with all information sources but one: mobile phones ( $r=.45$ ,  $p=.000$ ), social networks ( $r=.28$ ,  $p=.000$ ), television ( $r=.23$ ,  $p=.000$ ), other electronic media ( $r=.2$ ,  $p=.000$ ) and face to face communication ( $r=.28$ ,  $p=.000$ ). Digital literacy was not correlated with printed communication ( $r=.02$ ,  $p=.123$ ). Table 10 presents the total correlations across the eight countries. The entire table in the appendices presents that data from each country.

**Table 11.** Correlation table of digital literacy and sources of information (N=4,013).

Country	Source of information	Spearman's R	p-value
<b>Total</b>	Mobile Phones	.45	.000
	Social Networks	.27	.000
	Television	.23	.000
	Other Electronic Media	.2	.000
	Printed Communication	.02	.123
	Face to Face Communication	.28	.000

However, as shown in the whole table 8 in the appendices, digital literacy and printed communication preference were correlated in three countries. In Israel, they were negatively correlated ( $r=-.02$ ,  $p=.000$ ). In Sweden ( $r=.08$ ,  $p=.041$ ) and Japan ( $r=.17$ ,  $p=.000$ ), they were positively correlated, suggesting that higher digital literacy was correlated with a stronger preference for printed communication. The last two correlation are counter intuitive. This could be explained by the more complex assumption that stronger digital literacy enhances more information acquisition in digital sources, which in turn, also facilitates the need for information also from other sources. However, this assumption demands an empirical investigation which was not examined in this report.

Finally, to predict the citizens' preference towards specific information sources, a multivariate linear regression analysis was conducted. All variables found to be correlated with the preference of information sources were included in the regression analysis. The analysis was done in Enter mode:

- The regression model of mobile phones is statistically significant ( $F=73.77$ ,  $p=.000$ ) and accounts for 25% of the dependent variable's total variance.
- The regression model of social networks is statistically significant ( $F=26.38$ ,  $p=.000$ ) and accounts for 10.7% of the dependent variable's total variance.

- The regression model of television is statistically significant ( $F=21.96$ ,  $p=.000$ ) and accounts for 9% of the dependent variable's total variance.
- Other electronic media's regression model is statistically significant ( $F=20.47$ ,  $p=.000$ ) and accounts for 8.5% of the dependent variable's total variance.
- The regression model of printed communication is statistically significant ( $F=13.94$ ,  $p=.000$ ) and accounts for 5.9% of the dependent variable's total variance.
- The regression model of face-to-face communication is statistically significant ( $F=25.17$ ,  $p=.000$ ) and accounts for 10.2% of the dependent variable's total variance.

**Table 12.** Results of linear regression analysis to predict preferred information sources (N=4,013).

Communication Needs	Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
<b>Mobile Phones</b>	(Constant)	1.92	.11		17.09	.000
	Country=Israel	.5	.19	.15	2.66	.008
	Country=France	-.34	.06	-.1	-5.25	.000
	Gender	.15	.03	.07	5.02	.000
	Digital Literacy	.5	.02	.45	30.55	.000
<b>Social Networks</b>	(Constant)	1.88	.15		12.92	.000
	Country=Italy	-.39	.09	-.1	-4.45	.000
	Country=Norway	-.3	.08	-.08	-3.36	.000
	Country=Romania	-.21	.09	-.05	-2.34	.019
	Country=France	-.53	.08	-.14	-6.35	.000
	Country=Sweden	-.41	.08	-.11	-4.93	.000
	Gender	.21	.04	.08	5.51	.000
	Digital Literacy	.39	.02	.29	18.38	.000
	Religion=Muslim	.35	.16	.04	2.26	.024
Religion=No Religion	-.19	.09	-.07	-2.07	.039	
<b>Television</b>	(Constant)	1.81	.14		13.27	.000
	Country=Italy	-.3	.08	-.09	-3.17	.000
	Country=Romania	-.58	.08	-.16	-6.59	.000
	Country=France	-.34	.08	-.1	-4.39	.000
	Country=Spain	-.39	.08	-.11	-4.87	.000
	Country=Sweden	-.31	.08	-.09	-4.01	.000
	Digital Literacy	.29	.02	.24	14.72	.000
	Religion=Christian	.31	.09	.13	3.53	.000
	Religion=Muslim	.47	.15	.06	3.22	.001
	Marital Status	.19	.04	.08	4.7	.000
	Religiosity	.2	.03	.11	5.87	.000
	Number of kids under 18	-.06	.02	-.06	-3.95	.000
<b>Other Electronic Media</b>	(Constant)	2.57	.13		19.9	.000
	Country=Italy	-.4	.08	-.12	-5.11	.000
	Country=Norway	-.15	.07	-.05	-2.06	.04
	Country=Romania	-.39	.08	-.12	-4.96	.000

	Country=France	-.54	.07	-.17	-7.34	.000
	Country=Spain	-.46	.08	-.14	-6.03	.000
	Country=Sweden	-.31	.07	-.09	-4.17	.000
	Gender	-.08	.03	-.03	-2.23	.026
	Digital Literacy	.25	.02	.22	13.36	.000
	Marital Status	.08	.04	.03	2.14	.033
	Education	.05	.01	.05	3.39	.001
	Religiosity	-.08	.03	-.05	-2.58	.010
	(Constant)	3	.13		22.31	.000
	Country=Israel	-.61	.23	-.17	-2.69	.007
	Country=Romania	-.34	.08	-.1	-4.14	.000
	Country=Spain	-.28	.08	-.08	-3.58	.000
<b>Printed Media</b>	Digital Literacy	.08	.02	.07	4.01	.000
	Religion=Christian	.19	.09	.08	2.19	.029
	Religion=Muslim	.29	.14	.04	2.01	.044
	Marital Status	.14	.04	.06	3.63	.000
	Religiosity	-.23	.03	-.13	-7	.000
	(Constant)	2.6	.12		22.48	.000
	Country=Italy	.14	.07	.05	1.97	.049
	Country=Romania	.2	.07	.06	2.75	.006
	Country=Spain	.14	.07	.05	2.01	.045
<b>Face-to-Face</b>	Country=Sweden	.18	.07	.06	2.67	.008
	Gender	.08	.03	.04	2.46	.014
	Digital Literacy	.3	.02	.28	17.45	.000
	Marital Status	.1	.03	.05	2.95	.003
	Religiosity	-.13	.03	-.08	-4.39	.000

The regression analysis results, presented in table 12 (full table is in the appendices), suggest that the following variables are predictors for the preference of the following information sources. Also, as with communication needs, an increase of digital literacy was the strongest predictor of most communication channels, besides printed media: mobile phones ( $\beta=.45$ ,  $t=30.48$ ,  $p=.000$ ), social networks ( $\beta=.29$ ,  $t=18.38$ ,  $p=.000$ ), television ( $\beta=.24$ ,  $t=14.72$ ,  $p=.000$ ), other electronic media ( $\beta=.22$ ,  $t=13.36$ ,  $p=.000$ ) and face-to-face communication ( $\beta=.28$ ,  $t=17.45$ ,  $p=.000$ ).

For printed media, living in Israel and religiosity levels were the strongest predictors. Living in Israel predicted a decrease in preferring printed media during disasters ( $\beta=-.17$ ,  $t=-2.69$ ,  $p=.007$ ). The more religious the respondents were, the less they preferred printed media ( $\beta=-.13$ ,  $t=-7$ ,  $p=.000$ ). Besides digital literacy, for mobile phones, living in Israel was also a strong predictor for increasing the preference score ( $\beta=.15$ ,  $t=2.66$ ,  $p=.008$ ). For social networks, living in France ( $\beta=-.14$ ,  $t=6.35$ ,  $p=.000$ ) and Sweden ( $\beta=-.11$ ,  $t=-4.93$ ,  $p=.000$ ) predicted a decrease in the preference score. For television, living in Romania and Christianity were also strong predictors of preference score. Romanian preferred television less ( $\beta=-.16$ ,  $t=-6.59$ ,  $p=.000$ ), and Christians tended to prefer more using the television during disasters ( $\beta=.13$ ,  $t=3.53$ ,  $p=.000$ ). For other electronic media, living in France ( $\beta=-.17$ ,  $t=-7.34$ ,  $p=.000$ ) and Spain ( $\beta=-.14$ ,  $t=-6.03$ ,  $p=.000$ ) also predicted a decrease in the preference score, as stronger predictors.

In general, besides digital literacy, only national variables predicted the preference scores. However, no single country predicted all preference scores. Gender, religion, and religiosity levels appeared in most models as predictors, but not in all.

### 4.3 CORRELATIONS OF INFORMATION SOURCES AND COMMUNICATION NEEDS

The fourth research question examined the relationship between communication needs and preferred information sources. Table 13 presents Spearman’s r correlations between the different communication needs and the various information sources’ preferences. The entire table, with the different correlations in all the countries, is in the appendices.

**Table 13.** Correlations of information sources and communication needs.

Country	Cognitive	Affective	Integrative (Micro)	Integrative (Macro)	Escapist	Unidirectional Flow	Multidirectional Flow
Mobile	<b>.42</b> (.000)	.24 (.000)	<b>.38</b> (.000)	.31 (.000)	.15 (.000)	<b>.42</b> (.000)	.3 (.000)
SNS	.13 (.000)	.25 (.000)	.26 (.000)	.25 (.000)	.23 (.000)	.15 (.000)	.2 (.000)
TV	.26 (.000)	.22 (.000)	.29 (.000)	.28 (.000)	.21 (.000)	.27 (.000)	.24 (.000)
Other	.16 (.000)	.23 (.000)	.25 (.000)	.25 (.000)	.22 (.000)	.2 (.000)	.24 (.000)
Printed	0 (.499)	.22 (.000)	.19 (.000)	.23 (.000)	<b>.26</b> (.000)	.05 (.001)	.18 (.000)
F2F	.31 (.000)	<b>.27</b> (.000)	<b>.38</b> (.000)	<b>.34</b> (.000)	.19 (.000)	.3 (.000)	<b>.32</b> (.000)

The table shows that for cognitive, micro integrative (with face-to-face), and unidirectional flow needs, the preference for receiving information through mobile phones was the most positively correlated. Face-to-face communication was correlated with affective, micro (with mobile phones), macro integrative, and multidirectional needs. For escapist needs, it was printed communication. Printed communication was not correlated at all with cognitive needs. It was also the lowest correlation with affective needs (along with television), micro integrative, macro integrative, unidirectional, and multidirectional communication flow. Face-to-face communication was the lowest correlation with escapist needs.

Similar data was found even when the sample was divided into the different countries with slight differences, as shown in the entire table in the appendices:

- In Israel, printed media was mainly correlated with supporting affective needs and other electronic media with macro integrative needs.
- In Italy, social networks and television were the highest correlations with affective needs. Mobile phones were the highest correlation with micro integrative needs, television with macro integrative needs, social networks with escapist needs, and mobile phones with the multidirectional communication flow.
- In Norway, both micro and macro integrative needs’ highest correlation was with mobile phones, while escapist needs were correlated with face-to-face communication.
- In Romania, both micro and macro integrative needs’ highest correlation was with mobile phones, while escapist needs were correlated with printed communication and multidirectional flow with mobile phones and face-to-face communication.
- In France, television had the highest correlation with affective and macro integrative needs, mobile phones with micro integrative needs, printed communication with escapist needs and mobile phones, and face-to-face communication with multidirectional communication flow.
- In Spain, printed communication was the highest correlation with affective and escapist needs and other electronic media with macro integrative needs.
- In Sweden, printed communication had the highest correlation with affective and escapist needs and mobile phones with micro and macro integrative needs. Surprisingly, social networks were not correlated at all with cognitive needs.

- In Japan, face-to-face communication had the highest correlation with multidirectional communication flow, although mobile phones were second and very close behind, making it very similar to the general results.

#### 4.4 EXAMPLES OF EFFECTIVE COMMUNICATION WITH IMPACTED SOCIETIES

The fifth research question examined the characteristics of effective communications with the public, focusing on impacted societies. This question involves two secondary questions: (a) what is effective communication? Moreover, (b) how can effective communication be measured?

For the first question, several possible answers are found in the literature and various multidisciplinary approaches. Some focus on reach – how many people were exposed to the communication? How many know about it? Others add to or replace the question of reach with effect and reactions – did the public remember they were exposed to the communication? Did they like it? Did it convince or help them? A third approach focuses on the purpose – did the message achieve its desired result (e.g., people changed their behavior, know what to do during a crisis, they feel that they have whom to ask questions). Last, at the macro level, there is the approach of aims and outcomes – given the fact that the communication between authorities and first responders and the public is not for the communication process per se, but one of the means for achieving societal resilience, did it succeed? For example, can we see a statistically significant increase in the public’s preparedness? Risk Awareness? Resilience? Following these approaches, measuring success can be done by several methods, from measuring the popularity of communications (e.g., numbers of views, interactions), surveying the public for the awareness of the messages, attitudes, and how they understand it and measuring the purposes and outcomes.

Illustrations for effective communications are examples of meeting society's communication needs and expectations on the cognitive, affective, integrative (micro and macro), and escapist levels. A communication process that meets the needs and expectations both on the unidirectional flow and the multidirectional communication flow. Therefore, we examined all social media content produced by the selected authorities and first responders to identify communications that facilitate those communication needs and expectations.

Quantitative measures, as would be illustrated below, are sometimes confounders for the actual effectiveness. Communications can achieve large numbers of engagement and reactions but not be effective. For example, on May 15<sup>th</sup>, 2020, the Israeli home front command shared a funny video created by an Israeli journalist and comedian from an Israeli news website called “Mako”. The video illustrates a prank call to the information call center of home front command, with awkward questions on the coronavirus and infection measures. The post said: “Mako decided to troll our call center during the lockdown. We are happy and proud of our representatives that knew precisely which answers to give! Furthermore, No, Mako, it is not recommended that you wear nylon bags on your face instead of a mask...”. Both the website Facebook page and the comedian journalist were tagged in the post, which also referred to the website of home front command, call center, and other information sources. The post was reacted 846 times (out of the 295 reactions of “HaHa”), had 296 comments, and was shared 157 times.

**Figure 22.** An example for multiplex needs in Israel’s home-front command Facebook post.

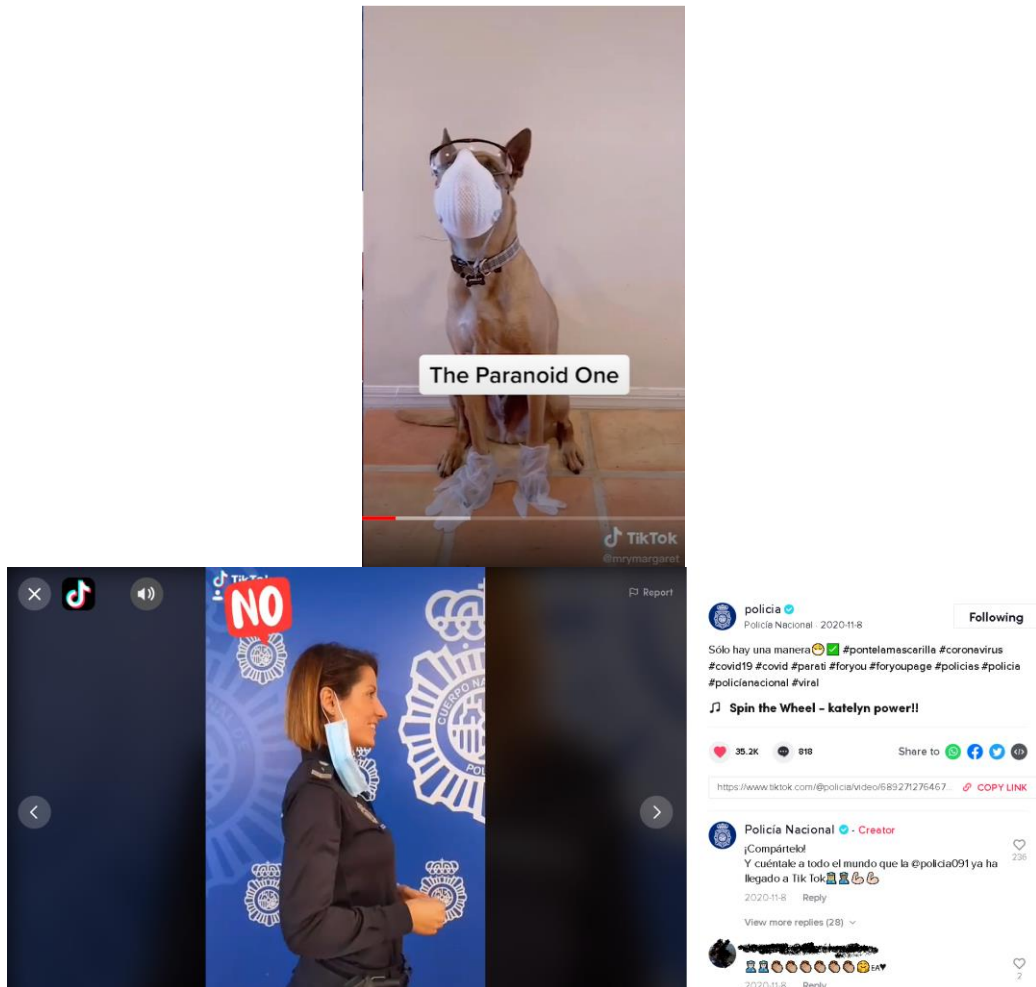


While the posts' metrics were high, a close examination of the comments and shares show mixed results. Most of the comments were of amusement and joy as outcomes of fulfilling the need for escapism during a crisis (pandemic). Users tagged their friends, shared the video showing amusement, and laughed about the content. However, aside from the escapist comments, dozens of comments and shares were negative – criticizing the type of humor, accusing its creators of stereotypes (with no differentiation between the original creator of the content and the one who shared it), and even blaming the authority for not providing “real information” (referring to open questions that the users had regarding the situation).

Moreover, its content and design focused on escapism – providing entertainment regarding the situation, even if not created by the home front command. This, however, did not prevent the responders from asking other questions, trying to fulfill their need for knowledge (cognitive). For example, one commenter asked: “Hello Home Front Command, I just talked to one of your representatives about returning the gas mask that I have at home [...] I do not understand the answer”. While the post was not about Q&A and provided information, the organization still provided answers to such questions, fulfilling the cognitive needs.

Similar situations also appeared in the social media accounts of other organizations. Escapist content was published mainly in the “younger” platforms, Instagram and TikTok. There, alongside escapist and affective comments, information was provided, and integrative needs were met. For example, In November 2020, shortly after policia nacional from Spain joined TikTok, they published a video following a TikTok trend on “how to wear a mask”. The video was humorous, focused on how to wear and how not to wear a mask, addressing the public's escapist needs. It received 35,200 likes, commented 818 times, and shared 1106 times.

**Figure 23.** Examples of the trend of “how to wear a mask” and its implication by “policia nacional”.



However, besides entertainment, the TikTok video also answers other communication needs of the audience. Several users asked questions – which were answered by the police. Others complained about a lack of information or unclear information. Many affective comments were commented, such as “I love you! Thank you! ♡ ♡ ♡ ♡” and “Bravo!!! 🙌 🙌 🙌 🙌 🙌 🙌”. Users conversed with one another in the comments, sharing the police's video and imitating fulfilling micro and macro integrative needs. Moreover, above all, the engagement and interaction between the organization and the public served as a multidirectional communication flow.

The survey highlighted the essential categories of communication needs and expectations the public has in emergencies and disasters. While some differences were found (e.g., cognitive needs being on top across all countries and escapist needs at the bottom), all groups of need received relatively high scores. The qualitative analysis elaborated on these needs, broadening the categories into different examples (e.g., gaining knowledge, becoming a credible source, and passing information – as part of the cognitive needs). Contrary to the survey, the qualitative analysis showed that some needs were more dominant than reported on the survey. Raising the assumption that in some instances, the public has more needs than they are aware of. This assumption could be further investigated in future parts of the project, if needed, using semi-structured interviews and/or focus groups with the public, focusing on these issues.

Based on that, table 14 suggests a list of criteria, with examples of questions, to examine the content in all three phases of emergencies and disasters.

**Table 14.** The examination of social media content in light of society's communication needs.

Needs (Level)	Before	During	After
<b>Cognitive</b>	Are we providing the necessary information for the public?	Are we providing the necessary information for the public?	Are we providing the necessary information for the public?
	Are we ready to give more information if and when needed?	Are we ready to give more information if and when needed?	Are we ready to give more information if and when needed?
	Can the information support the communication process inside the community and help in its preparedness?	Can the information help community members help other citizens during the crisis?	Can the information help community members help other citizens to recover from the crisis?
<b>Affective</b>	Can the content make the public feel better?	Can the content make the public feel better?	Can the content make the public feel better?
	Can it make the public feel what it wants to feel?	Can it make the public feel what it wants to feel?	Can it make the public feel what it wants to feel?
<b>Integrative (Micro)</b>	Does the content help us connect with the public to build and maintain the relationship?	Is the content based on the type of relationship we developed with the public before the crisis?	If necessary, can the content restore the relationship with the public?
	Does it facilitate relationships among the public?	Does it connect different members of the public?	Does it connect different members of the public?
<b>Integrative (Macro)</b>	Does the content create a sense of belongingness?	Does the content create a sense of belongingness?	Does the content create a sense of belongingness?
<b>Escapist</b>	Is the content entertaining?	Is the entertainment level of the content suitable for the type of crisis?	Can the content increase the morale after the crises?
	How does the content portray the organization? Can it support other needs?	Can this type of content help the public in other needs?	Is it suitable for the outcomes of the disaster?
<b>Unidirectional Flow</b>	Is the timing of the information ideal (enough	Was the information published fast enough to	Is the time of the information ideal (enough

	time to prepare but not premature)?	help the public to cope with the crisis?	time after the crisis but not too late)?
	Is the information considered credible?	Is the information considered credible?	Is the information considered credible?
	Are we giving enough place for the public to provide relevant content?	Are we giving enough place for the public to provide relevant content?	Are we giving enough place for the public to provide relevant content?
<b>Multidirectional Flow</b>	Do we leave a place for interaction with the public to make them feel that the content they provide and the questions they ask receive attention (i.e., that they have someone to talk to)?	Do we leave a place for interaction with the public to make them feel that the content they provide and the questions they ask receive attention (i.e., that they have someone to talk to)?	Do we leave a place for interaction with the public to make them feel that the content they provide and the questions they ask receive attention (i.e., that they have someone to talk to)?

The table gives some examples of questions that should be asked when creating content in all three phases of emergencies and disasters to facilitate the public's communication needs and expectations, both among the community and in the communication process between the public and authorities and first responders. They are not focused on specific cultures, genders, or social groups and allow thinking about diversity.

Effective communication, as shown before, is multiplex. It is not aiming just for one level of needs but for multiple levels. As in the example of the home-front command, the entertaining content was not just addressing the escapist level of needs – it aimed for integration, cognitive, affective, and maybe even more.

Another example for effective communication with impacted societies comes from Italy, one of the countries affected mainly by the Covid-19 pandemic. In December 2020, the Instagram account of ASL1 Roma published the following post:

**Figure 24.** An example of multiplex needs in Italy's ASL1 Roma Instagram post.



The post, containing several photos of Italians getting their coronavirus vaccines, did not receive many metrics. 174 likes and dozens of comments. However, its effectiveness relies on its ability to address multiple levels of needs. The post said: "We started with the #vaccinations #AntiCovid19 at the Santo Spirito hospital. Today our operators, with great enthusiasm and a sense of responsibility, have voluntarily joined the campaign. Getting vaccinated is important. We know it. We get vaccinated".

On the cognitive level, the post gave information about the vaccination plan and its initiation. The information which is relevant for the public, waiting for vaccination. It also provided moral support, as the vaccines signify for the public the near end of the pandemic, fulfilling an affective role. This was seen by some supportive and excited responses, sending hearts, kisses and wishing “may it be a year of rebirth”.

The post also initiated some general questions – all receiving answers from the organizations, showing the multidirectional communication flow. Such as a question of someone whose father should have gotten its vaccine – but did not get it in the end. Finally, the post even evoked integrative needs, for example, by this comment: “Thanks to the Holy Spirit hospital, my hospital of reference. 🤝... My son was born there. Continue to lead by example!” – signaling for a sense of integration, being part of something bigger than the individual itself.

#### 4.5 THE RELATIONSHIP BETWEEN CITIZENS-CITIZENS COMMUNICATION AND AUTHORITIES-CITIZENS-AUTHORITIES COMMUNICATION

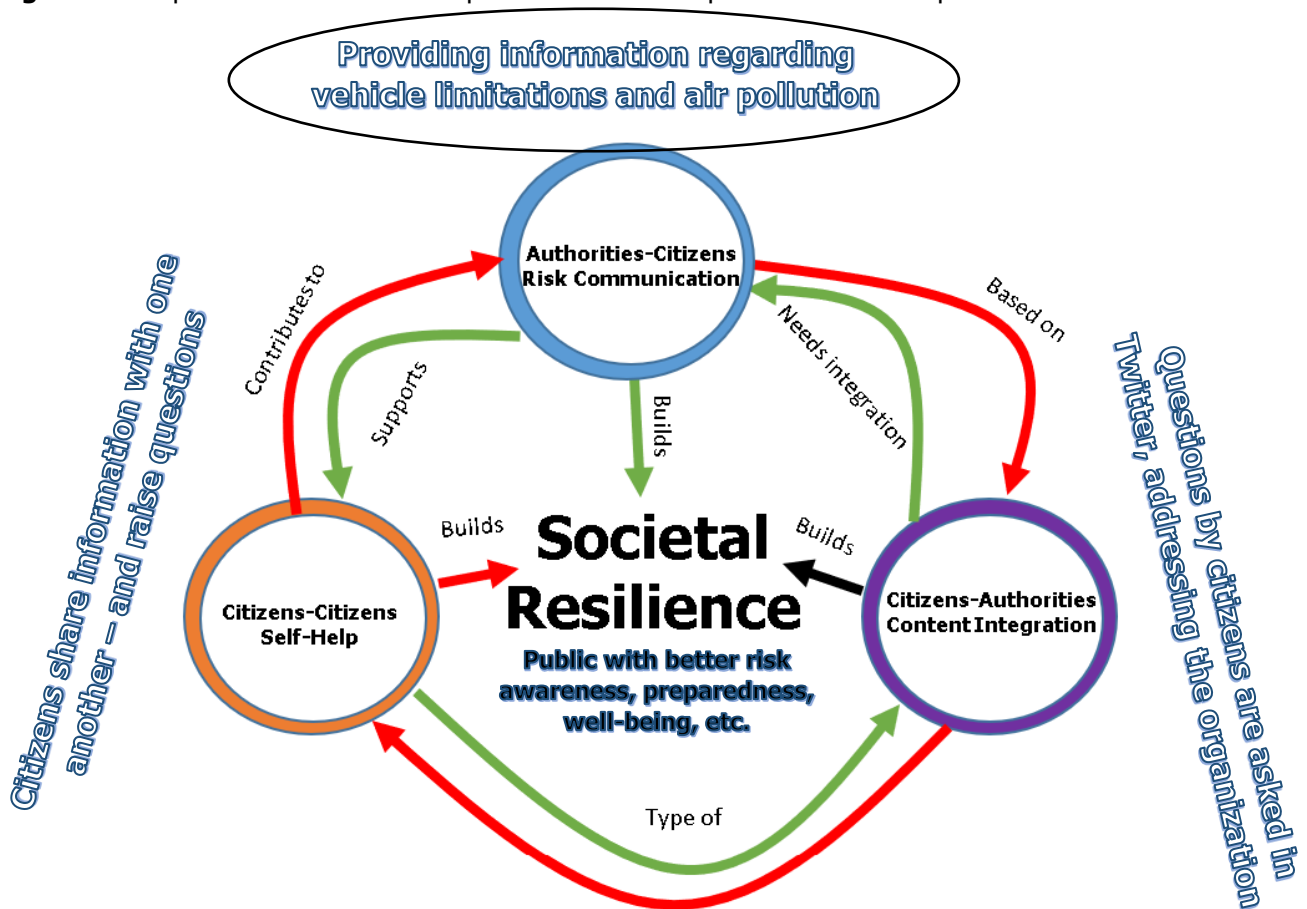
The sixth and last research question focused on the relationship between communication needs and expectations among community members, authorities, and first responders. This research question is based on the previous findings of the empirical research and the scientific review.

In the scientific review, we presented the crisis communication matrix, focusing on authorities-authorities, authorities-citizens, citizens-authorities, and citizens-citizens communication processes (Reuter, Mark & Pipek, 2012). The matrix describes the information which flows in each of the relationships.

Based on this matrix, we suggested a model that explains the relationship between the levels of communication among community members and between them and authorities and first responders. In addition, the model shows how disseminating information between these levels conduces societal resilience. The empirical research findings in this deliverable explain how the relationship between the different levels contributes to societal resilience. Figure 25 shows two examples for this relationship, one from the side of authorities and first responders to the public and one from the public to authorities and first responders.

In figure 26, we used one example for fulfilling the public's cognitive needs and expectations in the communication process between authorities and first responders to citizens. In one example, we described information provided by an emergency agency in Spain regarding pollution protocol, activated and imposed restrictions on vehicles.

**Figure 25.** Implementation of an example of the relationship between the two processes of communication.

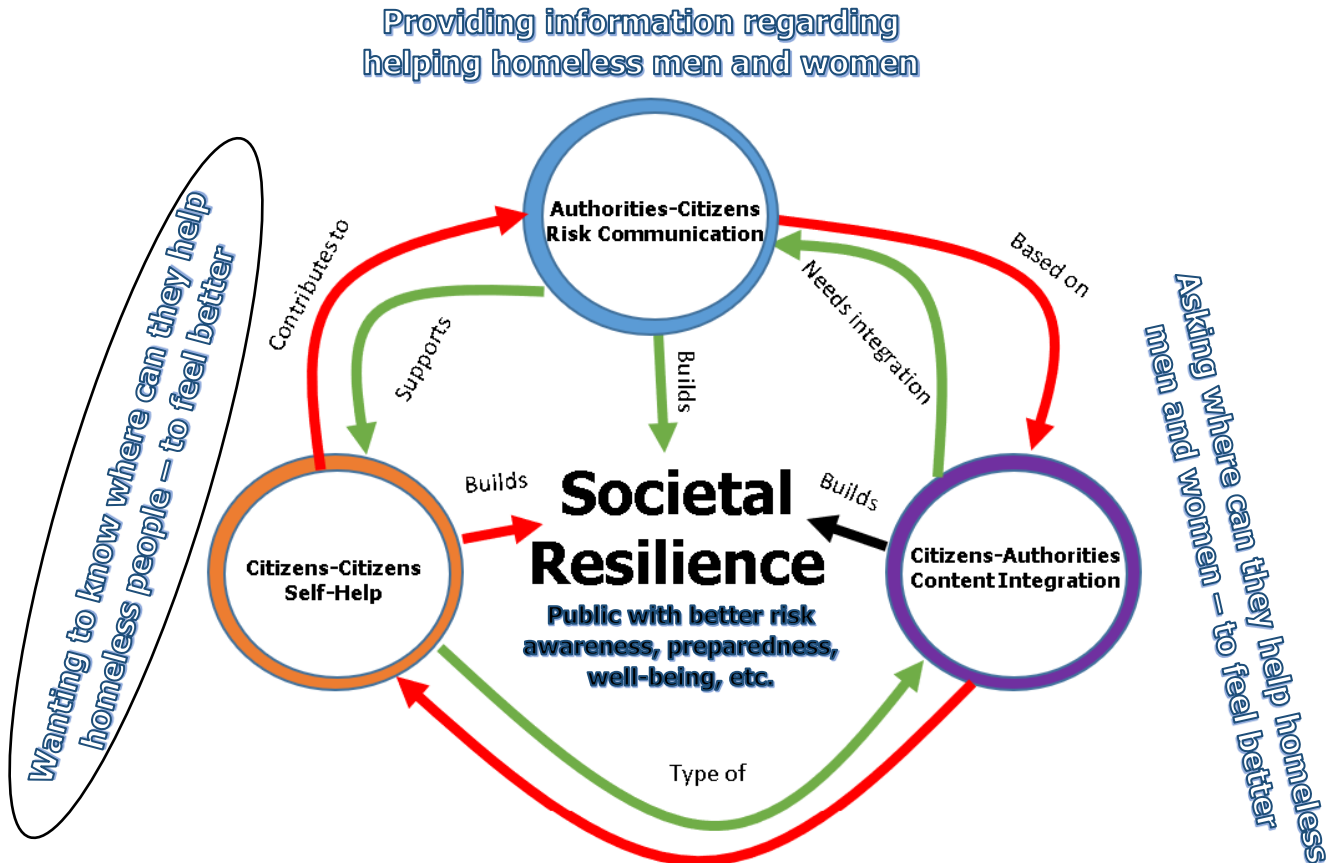


The information provided in the tweet, and other tweets related to it, had several goals. One of the goals was to provide crucial information for the public, help them know what is supposed to happen, and raise their risk awareness regarding air pollution. Therefore, trying to build or directly increase societal resilience. Another possible goal was to support citizens' self-help citizens (i.e., provide the information they can share and help one another). In the process of sharing the content – new questions arose. These questions were asked on Twitter and considered the type of content produced by citizens that authorities and the first organizations integrated. Later on, this type of content was integrated into future posts about the situation. In every stage, the circulation of the information between the levels contributes to societal resilience.

In Figure 26, the starting point is different – the citizens-citizens self-help. In this case, we use the example of users tagging Fédération des acteurs de la solidarité in France to find information on how they can help homeless people. In this case, the need was inside the community. To fulfill it, they addressed the Twitter account of Fédération des acteurs de la solidarité, who integrated this content, both for trying to provide answers and to create future tweets with relevant information,

again, contributed to the citizens-citizens self-help. Here, again, every step in the process can also contribute independently to societal resilience.

**Figure 26.** Implementation of an example of the relationship between the two processes of communication.



Therefore, the following examples and models show the relationship between communication among community members and authorities and first responders. Fulfilling the public's communication needs and expectations on one level can significantly contribute to the other level. If the public's communication needs are met at the community level, it affects the communication process with the authorities, first responders, and vice-versa. Same, failing to fulfill the communication needs and expectations in the authorities and first responders to citizens level can also negatively impact the communication process among community members.

## 5 DISCUSSION

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The study carried on deliverable 1.3 aimed at understanding the society's communication needs and expectations during all three phases of emergencies and disasters. Both in the communication process among community members and between society and authorities and first responders. The study also aimed at understanding the preferred sources for information and how the means for receiving public warnings are related to communication needs and expectations. The last two aims were to illustrate effective communication with impacted societies and clarifying the relationship between the internal (among community members) and external (with authorities and first responders) communication processes. Questions of culture, nationality, gender, and digital literacy were asked, and the differences were examined.

Regarding the first two research questions, focusing on communication needs and expectations among community members and between them and authorities and first responders, the findings revealed important information. First, it showed the hierarchy of communication needs, with cognitive and unidirectional on top and affective and escapist on the bottom. These findings partly support the literature, highlighting the public's need for information (Boyle et al., 2004; Stiegler, Tiley & Parveen, 2011; Hughes et al., 2008; Skinner, 2013).

However, while studies from the last year called for greater focus on the multidirectional flow of communication (Gesser-Edelsburg et al., 2014), the survey results, which were also supported by the qualitative analysis, highlight the still critical unidirectional need of the public for quality top-down communication. Second, the qualitative findings highlight how the public's communication needs and expectations were expressed online, revealing that some less rated needs in the survey were more dominant in practice. Especially affective and escapist needs.

The third research question examined the information sources preferred by the public. Here, the findings supported the need, expressed in the literature, for diverse communication channels (Gutiérrez, Luque, Manigilo, Casado & García-Guerrero, 2020; Pratten, 2011).

While mobile phones (including all ranges of uses, from text messages to using emergency apps) topped the list of preferred communication channels, social media was among the last places in most countries. While in general the respondents in the survey had a high digital literacy score in average, one explanation for these findings could be the levels of trust the public express towards social media. Another explanation for these findings could be the less organized information in social media and the difficulty of finding information.

Television, aligned with the world values survey (WVS, 2014), still plays an essential role as an information source. Also, as part of the fourth research question, it was shown that different communication channels correlate with various communication needs.

While mobile phones, for example, were more correlated with cognitive and unidirectional needs, printed media, while those were less popular, were correlated with affective and escapist needs – which were also less prevalent in the survey.

Hypotheses H1, H2, H3 regarding the effect of gender, socioeconomic status, and nationality (culture) were partly accepted, while H4 regarding digital literacy was entirely accepted. The finding

showed differences regarding the needs and information sources between men and women and across countries – but not in all cases. Socioeconomic status did not explain the communication needs and expectations, but only some preferred specific information sources.

These findings call for more focus on gender and nationality. The findings showed that women rated all communication needs with greater importance than men, emphasizing the need for focusing on channels and content for women.

Digital literacy, on the other hand, was a strong predictor in all cases. Even the strongest predictor of all. In some cases, digital literacy predicted more use of a communication channel in a counter-intuitive way – such as television. In most cases, it predicted more preference to digital communication channels and a higher ranking of the importance of the various communication needs. Communications needs and preferred information sources were also subjected to religiosity levels, different religions, and educational levels.

The fifth research question examined the characteristics that contribute to effective communication with impacted societies. This question's results were based on previous findings, highlighting the communication needs and expectations, and the preferred information sources, as the criteria for effective communication.

We suggested that a multiplex approach, integrating more than one or two groups of needs into the messages' design process, would contribute to the process's effectiveness. This was illustrated and exemplified by several results.

Last, the sixth research question examined the relationship between the communication process among community members and authorities, and first responders. If the survey examined the general needs, the qualitative analysis showed that the two processes are connected without differentiating between the internal and external processes.

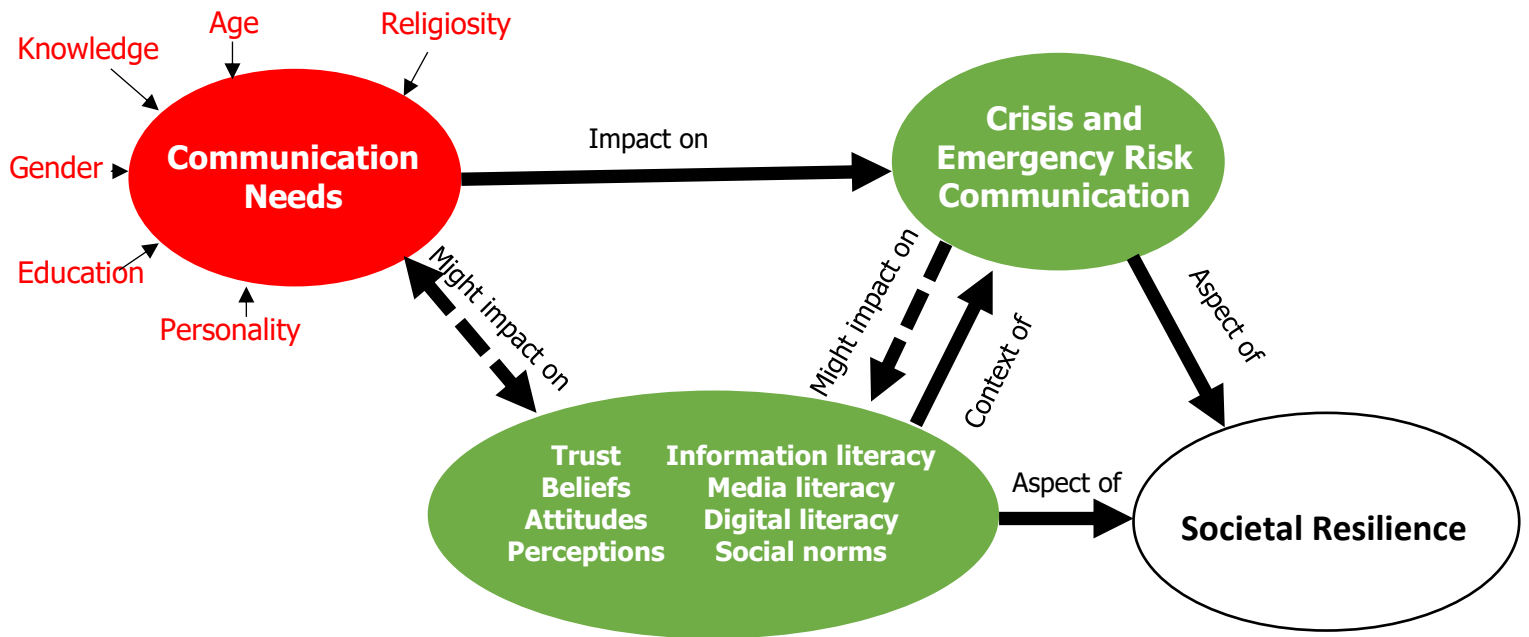
We showed that the communication process between society and authorities and first responders supports the communication process among community members – and vice-versa. We illustrated the relationship between these two communication processes in all three phases of emergencies and disasters.

## 5.1 COMMUNICATION NEEDS AND SOCIETAL RESILIENCE

One of the current deliverable focus areas is the relationship between communication needs, risk communication, and societal resilience. In the survey presented in deliverable 1.2, the role of communication needs in predicting societal resilience was discussed. Based on these findings, deliverable 1.3 elaborated on what are precisely the communication needs of the public. We suggest that effective risk communication considers these communication needs and expectations, facilitating the communication process that contributes to building societal resilience.

Previously, we illustrated the model which defines the relationship between all of the components of communication needs, risk communication, contextual and target factors, and societal resilience. The mixed-methods findings, combining the quantitative data about the correlations of communication needs, contextual factors, and some target factors and the in-depth qualitative analysis, elaborated on this relationship.

**Figure 4.** The relationship between communication needs and risk communication, contextual factors (in red), and target factors (in green).



As the figure shows, meeting the public's communication needs, both in the internal communication process inside the community and in the external communication process with authorities and first responders, can enhance trust, beliefs, attitudes, and perceptions. We showed that in accordance with Reuter & Spielhofer (2017) claims, the public expected authorities and first responders to answer questions, give accurate information, and do it on time. Nevertheless, as the qualitative analysis showed, the public had more expectations, which they were not always aware of – to be happy, feel better, distract their thoughts, and receive entertainment, and more.

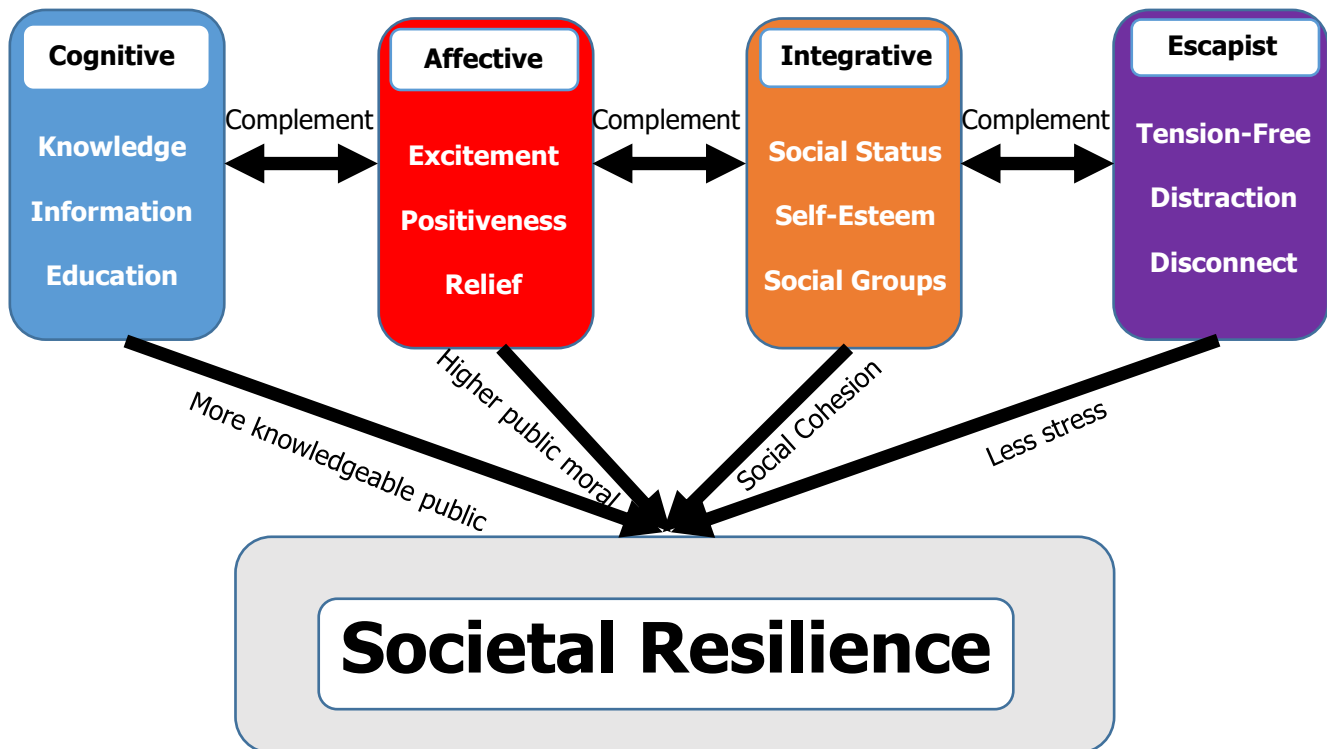
On the one hand, succeeding in this mission led to positive responses that demonstrated more trust and more positive attitudes towards the organization and the situation and the sense of preparedness and risk awareness. On the other hand, failing to do it evoked negative responses and sometimes even verbal attacks – all signs of lowering trust and negative attitudes.

Therefore, it is recommended that authorities and first responders act to fulfill and answer these communication needs and meet the expectations, when possible – or clarify what is possible, what is not and why. We provided a list of questions related to the published content to help understand the possibilities and advantages of the communication process to support the public's communication needs, on the one hand, and to identify possible disadvantages that might arise during a crisis – decreasing societal resilience.

The empirical work focused on the public's attitudes and perceptions of communication needs and expectations during crises, in general (the survey), and in the communication process between authorities and first responders (the qualitative analysis). However, it revealed a lot about the desired communication process among community members, shining a light on their needs and how they expect authorities and first responders to facilitate this communication process. While the content in the analysis focused on the communication process between the emergency and disaster organizations and the public – organizations should focus more on facilitating the internal communication process in the community: to provide information that can be discussed in the community, to connect between people that want to help and others that need help, to provide community members with content that can facilitate the need for escapism and more.

Last, this deliverable's significant contribution to understanding the relationship between communication needs, risk communication, and societal resilience is the multiplexity of the needs, as shown in the model, illustrated at the beginning of the deliverable.

**Figure 1.** Relationship between communication needs and societal resilience.



We showed that while cognitive and unidirectional needs are the most dominant, the public simultaneously fulfils other needs. Therefore, the recommendation is to work in more than one dimension. Not to create one-level content, but content that enables approaching the public's multiplex needs, as illustrated by several examples.

The understanding of the relationship between communication needs, risk communication, and societal resilience, and also of the relationship between the communication process among community members and the between them and authorities and first responders, contributes to current and future work in the project:

- **D2.4 Communication guidelines of authorities and first responders:** deliverable 2.4 is the mirror image of 1.3. While 1.3 focused on the public's communication needs and expectations, 2.4 focuses on authorities and first responders' communication strategy and guidelines. This deliverable highlights some essential communication needs and expectations and elaborated on how the public communicates with authorities and first responders and the need to communicate inside the community. The main ideas found here are the rank of communication needs and their multiplexity, the crucial effect of variables such as gender and digital literacy, and the facilitation of the community's communication process by authorities and first responders in depth.
- **D3.1 Selection of promising solutions and D3.2 Innovative use of communication and social media technologies:** for selecting promising solutions, including social media technologies and AI, we suggest setting the criteria of facilitating the various and multiplex communication needs as grading the solution from the public's perspective. We suggest examining how the solutions, designed to meet specific needs, can meet and facilitate more than one need at a time, refer to different genders (in particular women) and digital literacy levels and take into consideration also the role of the emergency and disaster organizations in facilitating the in-community communication process, and not just between the organizations and the public.

## 5.2 THE RELATIONSHIP BETWEEN NEEDS AND CHANNELS

RQ3 and RQ4 focused, as mentioned before, on the preferred sources for information and warnings and their correlation with the different communication needs. As noted in other studies before (Lev-On & Uziel, 2018; Neville, Peres & Moon, 2020), we showed that different communication channels are more associated with several communication needs with emergencies and disasters.

These findings highlight the importance of matching messages with suitable media. In the scientific review, we explained the idea of transmedia (Kalogeras, 2014; Pratten, 2011), telling a story through various platforms while each platform completes the other. While this deliverable did not focus on these findings, some of the content published by authorities and first responders was copied from one platform to another. The exact text appeared on Facebook, Twitter, and Instagram (with TikTok as an exception), without using each platform's advantages and uniqueness.

However, it is recommended to think about each platform's uniqueness and how it can contribute to fulfilling the various communication needs. The empirical work in the deliverable focused on social media and not on other communication channels. However, even inside the field of social media – there are various platforms and channels, each can facilitate different needs, and together they can address the multiplexity of needs and tell the whole “story”.

The recommendation which derives from here is to think in a more transmedia way. Not about platforms as distributors of information, but as different “pages” in a book. The communication strategy should look at all the platforms as a whole, to think how they can tell the whole “story” of the crisis (e.g., give the information, making the public feel good, integrating them, distracting their thoughts, and more) – while people who consume only one or part of these platforms, will still be able to fulfill the vital communication needs they expect to get.

For example, to use “younger” platforms, such as TikTok and Instagram, to address the younger public with more escapist and entertaining content that can also provide information and integration, while the more in-depth information is available on the website, Facebook is used for collecting comments from the more general public and twitter for rapid short updates, with links to the website or other platforms for the complete information.

## 5.3 DIVERSITY, COMMUNICATION, AND SOCIETAL RESILIENCE

This deliverable's empirical work also focused on diverse populations: men and women, people from eight countries (in the survey, seven in the qualitative analysis), and less privileged populations, digital literacy, and income. The result showed that gender and digital literacy created more difference. Women rated the various needs as more important, suggesting that it is more complex to address their needs. Digital literacy, in general, increased the preference of information sources, even counter intuitive such as printed media, in several countries. On the other hand, country and income had a more negligible effect.

Several factors could explain these differences. Previous studies already highlighted differences between men's and women's communication preferences (Altenburger, De, Fraizer & Avteniev, 2017; Perrin, Thaller & Anderson, 2019). The findings of the survey support these findings. Second, in a digitally-rich environment of mobile phones and social media, digital literacy plays an essential role in everything. Compared to that, the communication needs discussed in the survey were

general. They did not refer to specific characteristics of cultures, and therefore, probably, differences, both in the quantitative and qualitative, were less emphasized.

The differences which were found highlight the importance of diverse communication strategies to diverse populations. Future WP's and deliverables should examine the existence of elements that address these populations. For example, guidelines for communicating with different cultures, genders, and less privileged populations in 2.4 and the same with the solutions analyzed in 3.1 and 3.2.

## 5.4 THE GAPS BETWEEN AUTHORITIES, FIRST RESPONDERS, AND SOCIETY

As mentioned before, deliverable 1.3 lays the groundwork for deliverable 2.4, which will be the mirror image of 1.3. the initial analysis conducted in 1.3 identified some possible gaps between the authorities and first responders, and the public regarding communication needs and expectations. The negative comments, in some cases unanswered requests and questions and criticism, indicate that the content produced by authorities and first responders leaves some communication needs unfulfilled. Therefore, future work in 2.4 should locate whether and how authorities and first responders think about these needs and design their strategy to fulfill them.

## 5.5 MAIN FINDINGS AND SUGGESTED STRATEGIES TO INVESTIGATE AND VALIDATE

**Table 15.** List of main findings and suggested strategies to investigate and validate.

Findings	Suggested strategies to investigate and validate
<p>Cognitive and unidirectional needs received the highest score. However, the qualitative analysis revealed that other, less rated needs, are very dominant.</p>	<p>Addressing communication needs in a multiplex way. Rather than differentiating between needs, refer to them as a set of needs, interacting with one another, allowing users to respond to multiple needs simultaneously.</p>
<p>The literature calls for more focus on multidirectional flow of communication. However, the findings showed that unidirectional flow of communication is still crucial.</p>	<p>While multidirectional flow of communication is very important, it should not replace effective top-down information. Authorities and first responders should still foster quality top-down messages aligned with bottom-up communication.</p>

Mobile phones were the highest preferred source of information, while social media were rated among the lowest.

One of the reasons for the low ranking of social media could be related to the organization of information. Social media does not allow efficient ways for organizing the information, and therefore, when looking for information, the public might prefer more organized media (even television, which is more structured). Authorities and first responders should pay more attention to organizing the information in social media. For example, by using tabs and sections, pinned posts and searchable content. However, some of these features are not possible through some social media channels and therefore require distribution of information through other, non-social media channels.

Varied information sources are correlated with different communication needs (e.g., mobile phones with cognitive unidirectional needs and printed media with affective and escapist needs).

Authorities and first responders should consider the different information channels not just by their affordances (e.g., what type of information could be shared and in which way), but also as facilitators of different needs. For example, which is the suitable channel for providing comfort, giving information, satisfying the audience and more.

Differences were found between countries, with small variations in the ranking of needs and preferred information sources.

Based on the findings from the countries investigated in the study, there is no necessity to focus on specific needs in the varied countries or to prioritize some information sources over others. However, changes in how to use these channels in different countries might still apply – a hypothesis which was not examined in this study.

Women tended to rank the importance of all communication needs higher than men.

Since women tend to attribute more importance to their communication needs, it is crucial to create channels and content that specifically focus on women.

Differences were found in the preferred information sources of men and women, with variance between countries.

In each country, specific information sources should be used with reference to gender.

The communication process among community members and between them, authorities and first responders are intercorrelated.

Designing messages that facilitate the communication process between authorities and first responders should not disregard the internal communication process, within the community – and vice-versa. The two processes facilitate one each other and cannot be disengaged.

Digital literacy was the strongest predictor of both communication needs and preferred information sources – even in counter intuitive ways (e.g., with printed media).

Improving the digital literacy of the public can contribute, in general, to societal resilience and to the consumption of various communication channels.

The public used various communication channels and showed different preferences towards them.

The general communication strategy should focus more on the transmedia storytelling approach. Instead of simply distributing the same information through different channels, it is vital to take into account how these pieces of information, in different channels, can complement one another to create one “full narrative”.

## 6 STRENGTHS & LIMITATIONS

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### 6.1 STUDY LIMITATIONS

The study has several limitations. First, the study used quantitative data from D1.2 but did not employ an independent survey. Therefore, we could not provide quantitative answers to all questions, and some were based on the qualitative analysis, which cannot be generalized.

Second, since this study used the survey conducted by 1.2, all limitations mentioned in deliverable 1.2 are also relevant to 1.3. Among them, the sample's technical constraints, accessing the participants through online channels, and social desirability bias.

Third, the study was conducted during the COVID-19 pandemic. It cannot be ruled out that the responses in the survey were heavily affected by the pandemic. Also, in the content analysis of the social media accounts, the posts of 2020 mentioned many times the pandemic. Therefore, it might be arguable that some of the findings, despite some of the analysis relying on 2018-2019, represent not emergencies and disasters in general, but COVID-19.

Fourth, the empirical study focused on electronic communications in social media between authorities, first responders, and the public. Therefore, the findings about communication processes among community members might be affected by this type of conversation analysis.

### 6.2 STUDY STRENGTHS

The current study in this deliverable also has the following strengths. First, the mixed-methods approach allows the qualitative elaboration on the quantitative findings. The results from the survey questions are illustrated and exemplified using the posts and comments. The use of data mining tools allows a systematic examination of the content.

Second, the study can show how the strength and recommended strategies for effective communication are presented in social media accounts of emergency and disaster organizations. It allows future solutions to rely on rough data and examples of how these recommendations look in reality, what types of responses they receive, and their effect.

Third, the study covers communication processes and needs in several countries, thus identifying differences and similarities.

## 7 CONCLUSIONS

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The study had five objectives. The first objective was to identify the communication process's needs and expectations among community members and between them and authorities and first responders. The study results, both quantitative and qualitative, showed the public's various communication needs and expectations, ranked their importance in the public's eyes, and revealed other, unaware communication needs to be expressed in social media discussion. The conclusion that derives from these findings is that authorities and first responders must address the variety of needs. Even those who are not perceived as very important by the public but were expressed as dominant needs in the electronic communications in the social media accounts of authorities and first responders.

The second objective was to identify the preferred sources for receiving information and warnings about emergencies and disasters. Here, as in the case of communication needs and expectations, there was a hierarchy of preference. Social media, which was the platform in this deliverable focus, was ranked second from last. Before printed media, but after television and face-to-face communication. On the other hand, with mobile phones as the most preferred source for information, these findings emphasize that the variety of communication channels is essential, with many traditional channels that are still preferred more than new media. This is important because many authorities and first responders started publishing more content on social media at the expense of traditional media. This study's findings suggest reconsidering such decisions, uncommonly since the different communication channels were correlated with other communication needs.

The third objective was to understand effective communication characteristics with impacted societies and identify prominent illustrations of such communications. Here, the analysis, predominantly qualitative, addressed the multiplexity of communication needs. As mentioned before, since on the one hand, communication needs were ranked in a specific order by the public, but on the other hand, the dominance of these needs in actual comments was different – we identified effective communication as addressing the communication needs in a multiplex way: allowing the public to fulfill a comprehensive set of needs, by interacting and engaging with the content.

The fourth objective was to define the relationship between the communication process among community members and between them and authorities and first responders and its impact on societal resilience. This was done in an illustration connecting the internal, community members, communication process, and the external, with the authorities and first responders, communication process. The conclusions here are that one type of communication process facilitates the other, and it will be considered an error to focus only on one.

Last, the fifth objective was to identify the role of gender, socioeconomic status, culture, digital literacy, and other demographic variables on the abovementioned objectives. Digital literacy and gender played the most crucial role, while nationality (country) and socioeconomic status were less dominant. The conclusion here is the need to focus more on gender and digital literacy questions over traditional factors, such as nationality and income.

The discussion section described in details the necessary recommendations for future WP's and deliverables, among them, in short:

- For D2.4: the necessary comparison between the disaster and emergency agencies' communication approach and guidelines and the public's experience.
- For D3.1 and D3.2: the effective, less effective, and not effective characteristics of communication processes will define the criteria for promising solutions and serve as guidelines for innovative channels, including AI chatbots.
- For D4.1: the identified criteria of effective communication processes that can serve the initial validation process of solutions.

- For D5.1: use the results of this study is shaping ENGAGE’s communication and dissemination strategy.
- Last, for D5.4 and D5.5: the results contribute to the website and knowledge platform of ENGAGE.



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## **Deliverables of EmerGent Project**

- Junge, K., Spielhofer, T., Gieve, M., Cullen, J., & Drabble, D. (2014). Deliverable 2.2: Impact of social media on emergency services and citizens.
- Spielhofer, T., Junge, K., Cullen, J., Drabble, D., Hahne, A.S., Bizjan, G., Akerkar, R., Reuter, C., Kaufhold, M.A., Plasota, T., Wenarski, G., & Gizkis, A. (2016). Deliverable 2.3: Impact of Social Media for EMS and citizens using EmerGent concepts – Version 1.
- Spielhofer, T., Junge, K., Cullen, J., Drabble, D., Hahne, A.S., Bizjan, G., Akerkar, R., Reuter, C., Kaufhold, M.A., Plasota, T., Wenarski, G., & Gizkis, A. (2017). Deliverable 2.4: Impact of Social Media for EMS and citizens using EmerGent concepts – Version 2.
- Reuter, C., Kaufhold, M.A., & Spielhofer, T. (2017). Deliverable 2.5: Continuous citizens and EMS Involvement by Social Media.
- Reuter, C., Ludwig, T., Habig, T., Habdank, M., Akerkar, R., Pratzler-Wanczura, S., Gizkis, A., & O'Brien, T. (2014). Deliverable 3.1: Usage patterns of social media in emergencies.



Reuter, C., & Amelunxen, C. (2016). Deliverable 3.7: Potentials of social media usage by EMS and citizens' involvement in the EMC enabled by EmerGent.



## 9 APPENDICES

### 9.1 APPENDIX A: THE SURVEY QUESTIONS USED FOR THE SECONDARY QUANTITATIVE ANALYSIS OF T1.2 RESULTS.

#### Communication needs

	<b>In case of a disaster (e.g., flood, earthquake, pandemic), how important are each of the following information needs to you?</b>	Not important at all	Not Important	Somewhat important	Important	Very important
1.	To receive information that can help me talk about the situation with others.	1	2	3	4	5
2.	To receive information that can help me feel as part of the community/nation.	1	2	3	4	5
3.	To receive information that can distract my thoughts from the situation.	1	2	3	4	5
4.	To receive credible information.	1	2	3	4	5
5.	To be able to actively share information with the authorities/relevant organizations acting on the situation.	1	2	3	4	5
6.	To receive information that can make me feel positive emotions (e.g., happiness, amusement, joy).	1	2	3	4	5
7.	To receive information as fast as possible.	1	2	3	4	5

#### Communication Channels

	<b>What is the likelihood that you will use the following media sources for information during a disaster?</b>	Not at all	A little	Somewhat	Much	Very much
1.	Mobile phones (e.g., text, calls, instant messaging)	1	2	3	4	5
2.	Social media (e.g., Facebook, Twitter, Instagram)	1	2	3	4	5
3.	Television					
4.	Other electronic communications	1	2	3	4	5

	(email, discussion boards, websites)					
5.	Printed communications (newsletter, leaflets, letters)	1	2	3	4	5
6.	Face-to-face or personal communication	1	2	3	4	5

### Digital Literacy

	To what extent do you agree or disagree with the following statements:	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
8.	Learning to use new mobile apps or websites is easy for me	1	2	3	4	5
9.	Using mobile apps or websites to find information is easy for me	1	2	3	4	5

### Demographics

A few questions for statistical analysis purposes only. All information is completely anonymous.

10. Gender: Male / Female / Other
11. Year of birth: \_\_\_\_\_
12. Country \_\_\_\_\_
13. Place of residence: \_\_\_\_\_
14. Familial status:
  - Coupled with children
  - Coupled without children
  - Single with children
  - Single without children
15. Number of children under 18: \_\_\_\_\_
16. Affiliation to religion:
  - Christian - Protestant
  - Christian - Catholic
  - Christian - Other
  - Muslim
  - Jewish
  - Other religion
  - Atheist
17. Level of religiosity
  - Highly religious
  - Religious
  - Not religious
18. Education
  - Less than full high school education (K-12)



- Full high school education (K-12)
- Vocational education
- Bachelor's degree
- Master's degree or higher

19. Income

- Much below average
- A little below average
- Average
- A little above average
- Much above average

20. Have you been personally exposed in the past five years to a significant disaster risk?

- Yes
- No
- Don't know / not sure

21. To which community do you feel you belong to? (you may mark more than one)

- local neighborhood
- ethnic minority
- cultural community

other, please specify: \_\_\_\_\_

## 9.2 APPENDIX B. THE FULL TABLES THAT ARE USED IN THE REPORT.

### 9.2.1 TABLE 3 (FULL TABLE). THE DISTRIBUTION OF ANSWERS OF COMMUNICATION NEEDS CONSTRUCT. AGGREGATED RESULTS OF 4,013 PARTICIPANTS FROM ISRAEL, ITALY, NORWAY, ROMANIA, FRANCE, SPAIN, SWEDEN, AND JAPAN.

<b>Total</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	69 (1.7%)	119 (3%)	547 (13.6%)	1086 (27.1%)	2192 (54.6%)	4.3 (.93)
<b>Affective</b> (Feel better)	161 (4%)	447 (11.1%)	1345 (33.5%)	1364 (34%)	696 (17.3%)	3.5 (1.03)
<b>Integrative – Micro</b> (Talk with others)	153 (3.8%)	308 (7.7%)	1134 (28.3%)	1587 (39.5%)	831 (20.7%)	3.66 (1.01)
<b>Integrative – Macro</b> (Part of society)	139 (3.5%)	385 (9.6%)	1179 (29.4%)	1562 (38.9%)	748 (18.6%)	3.6 (1.01)
<b>Escapist</b> (Distract thoughts)	290 (7.2%)	688 (17.1%)	1400 (34.9%)	1133 (28.2%)	502 (12.5%)	3.22 (1.09)
<b>Flow – Unidirectional</b> (Fast)	78 (1.9%)	130 (3.2%)	690 (17.2%)	1243 (31%)	1872 (46.6%)	4.17 (.96)
<b>Flow - Multidirectional</b> (Active)	105 (2.6%)	263 (6.6%)	1118 (27.9%)	1570 (39.1%)	957 (23.8%)	3.75 (.98)
<b>Israel (N=504)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	2 (0.4%)	6 (1.2%)	34 (6.7%)	112 (22.2%)	350 (69.4%)	4.59 (.71)
<b>Affective</b> (Feel better)	19 (3.8%)	40 (7.9%)	152 (30.2%)	151 (30%)	142 (28.2%)	3.71 (1.08)
<b>Integrative – Micro</b> (Talk with others)	18 (3.6%)	67 (13.3%)	144 (28.6%)	176 (34.9%)	99 (19.6%)	3.54 (1.06)
<b>Integrative – Macro</b> (Part of society)	24 (4.8%)	75 (14.9%)	178 (35.3%)	152 (30.2%)	75 (14.9%)	3.36 (1.06)
<b>Escapist</b> (Distract thoughts)	50 (9.9%)	102 (20.2%)	171 (33.9%)	112 (22.2%)	69 (13.7%)	3.1 (1.17)
<b>Flow – Unidirectional</b> (Fast)	3 (0.6%)	11 (2.2%)	47 (9.3%)	133 (26.4%)	310 (61.5%)	4.46 (.8)
<b>Flow - Multidirectional</b> (Active)	15 (3%)	43 (8.5%)	148 (29.4%)	165 (32.7%)	133 (26.4%)	3.71 (1.04)
<b>Italy (N=500)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	4 (0.8%)	3 (0.6%)	47 (9.4%)	154 (30.8%)	292 (58.4%)	4.45 (.76)
<b>Affective</b> (Feel better)	11 (2.2%)	41 (8.2%)	139 (27.8%)	227 (45.4%)	82 (16.4%)	3.66 (.92)
<b>Integrative – Micro</b> (Talk with others)	6 (1.2%)	19 (3.8%)	77 (15.4%)	279 (55.8%)	119 (23.8%)	3.97 (.81)
<b>Integrative – Macro</b> (Part of society)	9 (1.8%)	16 (3.2%)	74 (14.8%)	294 (58.8%)	107 (21.4%)	3.95 (.81)
<b>Escapist</b> (Distract thoughts)	22 (4.4%)	41 (8.2%)	155 (31%)	198 (39.6%)	84 (16.8%)	3.56 (1.01)
<b>Flow – Unidirectional</b> (Fast)	2 (0.4%)	9 (1.8%)	61 (12.2%)	176 (35.2%)	252 (50.4%)	4.33 (.79)
<b>Flow - Multidirectional</b> (Active)	3 (0.6%)	8 (1.6%)	86 (17.2%)	254 (50.8%)	149 (29.8%)	4.08 (.76)
<b>Norway (N=500)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	14 (2.8%)	16 (3.2%)	71 (14.2%)	112 (22.4%)	287 (57.4%)	4.28 (1.01)



<b>Total</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Affective</b> (Feel better)	26 (5.2%)	84 (16.8%)	177 (35.4%)	145 (29%)	68 (13.6%)	3.29 (1.06)
<b>Integrative – Micro</b> (Talk with others)	35 (7%)	50 (10%)	160 (32%)	150 (30%)	105 (21%)	3.48 (1.14)
<b>Integrative – Macro</b> (Part of society)	20 (4%)	58 (11.6%)	158 (31.6%)	172 (34.4%)	92 (18.4%)	3.52 (1.05)
<b>Escapist</b> (Distract thoughts)	29 (5.8%)	112 (22.4%)	168 (33.6%)	131 (26.2%)	60 (12%)	3.16 (1.08)
<b>Flow – Unidirectional</b> (Fast)	17 (3.4%)	16 (3.2%)	71 (14.2%)	125 (25%)	271 (54.2%)	4.23 (1.03)
<b>Flow - Multidirectional</b> (Active)	21 (4.2%)	33 (6.6%)	151 (30.2%)	175 (35%)	120 (24%)	3.68 (1.04)

<b>Romania (N=500)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	10 (2%)	14 (2.8%)	63 (12.6%)	146 (29.2%)	267 (53.4%)	4.29 (.93)
<b>Affective</b> (Feel better)	18 (3.6%)	49 (9.8%)	150 (30%)	181 (36.2%)	102 (20.4%)	3.6 (1.03)
<b>Integrative – Micro</b> (Talk with others)	17 (3.4%)	26 (5.2%)	102 (20.4%)	226 (45.2%)	129 (25.8%)	3.85 (.98)
<b>Integrative – Macro</b> (Part of society)	12 (2.4%)	24 (4.8%)	100 (20%)	226 (45.2%)	138 (27.6%)	3.91 (.94)
<b>Escapist</b> (Distract thoughts)	48 (9.6%)	119 (23.8%)	161 (32.2%)	124 (24.8%)	48 (9.6%)	3.01 (1.12)
<b>Flow – Unidirectional</b> (Fast)	15 (3%)	16 (3.2%)	82 (16.4%)	172 (34.4%)	215 (43%)	4.11 (.99)
<b>Flow - Multidirectional</b> (Active)	7 (1.4%)	20 (4%)	124 (24.8%)	205 (41%)	144 (28.8%)	3.92 (.9)

<b>France (N=503)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	10 (2%)	19 (3.8%)	75 (14.9%)	181 (36%)	218 (43.3%)	4.15 (.94)
<b>Affective</b> (Feel better)	25 (5%)	42 (8.3%)	175 (34.8%)	188 (37.4%)	73 (14.5%)	3.48 (1)
<b>Integrative – Micro</b> (Talk with others)	30 (6%)	30 (6%)	142 (28.2%)	219 (43.5%)	82 (16.3%)	3.58 (1.02)
<b>Integrative – Macro</b> (Part of society)	29 (5.8%)	51 (10.1%)	163 (32.4%)	195 (38.8%)	65 (12.9%)	3.43 (1.03)
<b>Escapist</b> (Distract thoughts)	44 (8.7%)	80 (15.9%)	170 (33.8%)	162 (32.2%)	47 (9.3%)	3.17 (1.09)
<b>Flow – Unidirectional</b> (Fast)	12 (2.4%)	15 (3%)	100 (19.9%)	181 (36%)	195 (38.8%)	4.06 (.96)
<b>Flow - Multidirectional</b> (Active)	15 (3%)	41 (8.2%)	132 (26.2%)	222 (44.1%)	93 (18.5%)	3.67 (.97)

<b>Spain (N=502)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive</b> (Credible)	3 (0.6%)	15 (3%)	59 (11.8%)	118 (23.5%)	307 (61.2%)	4.42 (.86)
<b>Affective</b> (Feel better)	16 (3.2%)	61 (12.2%)	154 (30.7%)	164 (32.7%)	107 (21.3%)	3.57 (1.05)
<b>Integrative – Micro</b> (Talk with others)	11 (2.2%)	61 (12.2%)	154 (30.7%)	164 (32.7%)	107 (21.3%)	3.76 (.96)
<b>Integrative – Macro</b> (Part of society)	14 (2.8%)	60 (12%)	132 (26.3%)	186 (37.1%)	110 (21.9%)	3.63 (1.04)
<b>Escapist</b> (Distract thoughts)	30 (6%)	88 (17.5%)	157 (31.3%)	144 (28.7%)	83 (16.5%)	3.32 (1.12)
<b>Flow – Unidirectional</b> (Fast)	4 (0.8%)	9 (1.8%)	94 (18.7%)	170 (33.9%)	225 (44.8%)	4.2 (.86)



<b>Total</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Flow - Multidirectional (Active)</b>	9 (1.8%)	39 (7.8%)	137 (27.3%)	186 (37.1%)	131 (26.1%)	3.78 (.98)
<b>Sweden (N=504)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive (Credible)</b>	14 (2.8%)	19 (3.8%)	57 (11.3%)	117 (23.2%)	297 (58.9%)	4.32 (1)
<b>Affective (Feel better)</b>	28 (5.6%)	79 (15.7%)	166 (32.9%)	158 (31.3%)	73 (14.5%)	3.34 (1.08)
<b>Integrative – Micro (Talk with others)</b>	20 (4%)	45 (8.9%)	143 (28.4%)	182 (36.1%)	114 (22.6%)	3.64 (1.05)
<b>Integrative – Macro (Part of society)</b>	16 (3.4%)	50 (9.9%)	144 (28.6%)	191 (37.9%)	102 (20.2%)	3.62 (1.02)
<b>Escapist (Distract thoughts)</b>	43 (8.5%)	75 (14.9%)	178 (35.3%)	140 (27.8%)	68 (13.5%)	3.23 (1.12)
<b>Flow – Unidirectional (Fast)</b>	9 (1.8%)	22 (4.4%)	71 (14.1%)	138 (27.4%)	264 (52.4%)	4.24 (.97)
<b>Flow - Multidirectional (Active)</b>	17 (3.4%)	42 (8.3%)	148 (29.4%)	196 (38.9%)	101 (20%)	3.64 (1)
<b>Japan (N=500)</b>						
<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Cognitive (Credible)</b>	12 (2.4%)	27 (5.4%)	141 (28.2%)	146 (29.2%)	174 (34.8%)	3.89 (1.03)
<b>Affective (Feel better)</b>	18 (3.6%)	51 (10.2%)	232 (46.4%)	150 (30%)	49 (9.8%)	3.32 (.91)
<b>Integrative – Micro (Talk with others)</b>	16 (3.2%)	38 (7.6%)	227 (45.4%)	154 (30.8%)	65 (13%)	3.43 (.92)
<b>Integrative – Macro (Part of society)</b>	14 (2.8%)	51 (10.2%)	230 (46%)	146 (29.4%)	59 (11.8%)	3.37 (.92)
<b>Escapist (Distract thoughts)</b>	24 (2.8%)	71 (14.2%)	240 (48%)	122 (24.4%)	43 (8.6%)	3.18 (.95)
<b>Flow – Unidirectional (Fast)</b>	16 (3.2%)	32 (6.4%)	164 (32.8%)	148 (29.6%)	140 (28%)	3.73 (1.04)
<b>Flow - Multidirectional (Active)</b>	18 (3.6%)	37 (7.4%)	192 (38.4%)	167 (33.4%)	86 (17.2%)	3.53 (.98)

**9.2.2 TABLE 5 (FULL TABLE). MANCOVA FOR NATIONALITY AND GENDER EFFECTS ON COMMUNICATION NEEDS, WITH SOCIODEMOGRAPHIC VARIABLES AS COVARIATES.**

Source	Communication Need	F	Sig	Partial Eta Squared
<b>Country</b>	Cognitive	33.45	.000	.056
	Affective	9.19	.000	.016
	Integrative – Micro	13.42	.000	.023
	Integrative – Macro	17.56	.000	.03
	Escapist	12.21	.000	.021
	Unidirectional Flow	29.24	.000	.049
	Multidirectional Flow	11.26	.000	.019
<b>Gender</b>	Cognitive	18.28	.000	.005
	Affective	42.22	.000	.011
	Integrative – Micro	32.9	.000	.008
	Integrative – Macro	44.01	.000	.011
	Escapist	27.96	.000	.007
	Unidirectional Flow	25.12	.000	.006
	Multidirectional Flow	7.32	.007	.002
	Cognitive	1	.429	.002



<b>Country * Gender</b>	Affective	.96	.462	.002
	Integrative – Micro	1.37	.214	.002
	Integrative – Macro	1.14	.333	.002
	Escapist	2.19	.032	.004
	Unidirectional Flow	.7	.675	.001
	Multidirectional Flow	.6	.758	.001
<b>Age</b>	Cognitive	133.52	.000	.033
	Affective	1.96	.162	.000
	Integrative – Micro	53.89	.000	.013
	Integrative – Macro	46.85	.000	.012
	Escapist	17.09	.000	.004
	Unidirectional Flow	125.66	.000	.031
	Multidirectional Flow	33.28	.000	.008
<b>Marital</b>	Cognitive	.42	.519	.000
	Affective	13.81	.000	.003
	Integrative – Micro	7.25	.007	.002
	Integrative – Macro	10.5	.001	.003
	Escapist	27.35	.000	.007
	Unidirectional Flow	6.42	.011	.002
	Multidirectional Flow	4.47	.035	.001
<b># kids under 18</b>	Cognitive	26.54	.000	.007
	Affective	6.78	.009	.002
	Integrative – Micro	3.62	.057	.001
	Integrative – Macro	3.29	.07	.001
	Escapist	4.64	.031	.001
	Unidirectional Flow	10.45	.001	.003
	Multidirectional Flow	3.95	.047	.001
<b>Religion</b>	Cognitive	6.32	.012	.002
	Affective	7.64	.006	.002
	Integrative – Micro	.96	.327	.000
	Integrative – Macro	6.02	.014	.002
	Escapist	3.91	.048	.001
	Unidirectional Flow	.48	.489	.000
	Multidirectional Flow	2.43	.119	.001
<b>Religiosity</b>	Cognitive	2.86	.091	.001
	Affective	14.98	.000	.004
	Integrative – Micro	2.26	.133	.001
	Integrative – Macro	17.48	.000	.004
	Escapist	10.62	.001	.003
	Unidirectional Flow	4.04	.044	.001
	Multidirectional Flow	.44	.509	.000
<b>Education</b>	Cognitive	15.56	.000	.004
	Affective	.000	.996	.000
	Integrative – Micro	6.43	.011	.002
	Integrative – Macro	2.84	.092	.001
	Escapist	.07	.796	.000
	Unidirectional Flow	6.82	.009	.002
	Multidirectional Flow	12.31	.000	.003
<b>Income</b>	Cognitive	.97	.325	.000
	Affective	.4	.528	.000
	Integrative – Micro	.21	.648	.000
	Integrative – Macro	1.23	.268	.000
	Escapist	.8	.371	.000
	Unidirectional Flow	1.07	.3	.000
	Multidirectional Flow	.51	.477	.000

### 9.2.3 TABLE 6 (FULL TABLES). CORRELATION TABLE OF DIGITAL LITERACY AND COMMUNICATION NEEDS (N=4,013).

Country	Communication Need	Spearman's R	p-value
<b>Israel</b>	Cognitive	.27	.000
	Affective	-.01	.84
	Integrative – Micro	.06	.21
	Integrative – Macro	.01	.9
	Escapist	-.01	.87
	Unidirectional Flow	.22	.000
	Multidirectional Flow	.13	.004
<b>Italy</b>	Cognitive	.41	.000
	Affective	.21	.000
	Integrative – Micro	.33	.000
	Integrative – Macro	.33	.000
	Escapist	.22	.000
	Unidirectional Flow	.4	.000
	Multidirectional Flow	.33	.000
<b>Norway</b>	Cognitive	.49	.000
	Affective	.18	.000
	Integrative – Micro	.33	.000
	Integrative – Macro	.36	.000
	Escapist	.14	.000
	Unidirectional Flow	.49	.000
	Multidirectional Flow	.29	.000
<b>Romania</b>	Cognitive	.42	.000
	Affective/	.26	.000
	Integrative – Micro	.39	.000
	Integrative – Macro	.41	.000
	Escapist	.06	.21
	Unidirectional Flow	.44	.000
	Multidirectional Flow	.38	.000
<b>France</b>	Cognitive	.44	.000
	Affective	.2	.000
	Integrative – Micro	.29	.000
	Integrative – Macro	.23	.000
	Escapist	.08	.095
	Unidirectional Flow	.43	.000
	Multidirectional Flow	.31	.000
<b>Spain</b>	Cognitive	.45	.000
	Affective	.17	.000
	Integrative – Micro	.35	.000
	Integrative – Macro	.28	.000
	Escapist	.09	.039
	Unidirectional Flow	.43	.000
	Multidirectional Flow	.3	.000
<b>Sweden</b>	Cognitive	.47	.000
	Affective	.1	.023
	Integrative – Micro	.32	.000
	Integrative – Macro	.29	.000
	Escapist	.08	.071
	Unidirectional Flow	.44	.000
	Multidirectional Flow	.29	.000
<b>Japan</b>	Cognitive	.34	.000
	Affective	.32	.000
	Integrative – Micro	.36	.000
	Integrative – Macro	.32	.000
	Escapist	.26	.000



	Unidirectional Flow	.35	.000
	Multidirectional Flow	.32	.000
<b>Total</b>	Cognitive	.45	.000
	Affective	.2	.000
	Integrative – Micro	.32	.000
	Integrative – Macro	.29	.000
	Escapist	.11	.000
	Unidirectional Flow	.44	.000
	Multidirectional Flow	.31	.000

#### 9.2.4 TABLE 7 (FULL TABLE). RESULT OF LINEAR REGRESSION ANALYSIS TO PREDICT COMMUNICATION NEEDS (N=4,013).

Communication Needs	Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
<b>Cognitive</b>	(Constant)	2.395	.097		24.612	.000
	Country=Israel	.515	.163	.184	3.17	.002
	Country=Italy	.231	.058	.082	3.947	.000
	Country=Norway	.203	.056	.072	3.646	.000
	Country=Romania	.105	.06	.037	1.763	.078
	Country=France	.046	.056	.016	.828	.408
	Country=Spain	.186	.057	.066	3.248	.001
	Country=Sweden	.225	.056	.08	4.039	.000
	Gender (Female)	.084	.026	.045	3.26	.001
	Digital Literacy	.417	.014	.431	39.317	.000
	Religion=Christian	-.055	.063	-.029	-.869	.385
	Religion=Muslim	-.342	.103	-.057	-3.306	.001
	Religion=Jewish	-.203	.167	-.073	-1.213	.225
	Religion=No Religion	.012	.061	.006	.192	.848
	Marital Status	.084	.028	.044	3.002	.003
	Education	.014	.011	.018	1.291	.197
	Religiosity	.002	.024	.001	.08	.936
Number of kids under 18	-.063	.01	-.09	-6.045	.000	
<b>Affective</b>	(Constant)	2.95	.12		24.84	.000
	Country=Israel	-.03	.2	-.01	-.16	.871
	Country=Italy	-.01	.07	0	-.17	.866
	Country=Norway	-.25	.07	-.08	-3.64	.000
	Country=Romania	-.08	.07	-.03	-1.11	.267
	Country=France	-.06	.07	-.02	-.92	.36
	Country=Spain	-.06	.07	-.02	-.79	.432
	Country=Sweden	-.24	.07	-.08	-3.47	.001
	Gender	.21	.03	.1	6.71	.000
	Digital Literacy	.22	.02	.21	12.69	.000
	Religion=Christian	.07	.08	.04	.94	.35
	Religion=Muslim	.12	.13	.02	.92	.36



	Religion=Jewish	.12	.2	.04	.56	.575
	Religion=No Religion	-.06	.08	-.03	-.75	.452
	Marital Status	.09	.03	0.4	2.7	.007
	Education	-.02	.01	-.02	-1.46	.145
	Religiosity	-.14	.03	-.09	-4.85	.000
	Number of kids under 18	-.02	.01	-.03	-1.7	.089
<b>Integrative-Micro</b>	(Constant)	2.32	.11		20.76	.000
	Country=Israel	-.13	.19	-.04	-.72	.472
	Country=Italy	.12	.07	.04	1.84	.066
	Country=Norway	-.2	.06	-.07	-3.14	.002
	Country=Romania	.01	.07	0	.09	.931
	Country=France	-.12	.06	-.04	-1.94	.052
	Country=Spain	-.07	.07	-.02	-1.01	.313
	Country=Sweden	.06	.06	-.02	-1.02	.31
	Gender	.15	.03	.07	5.02	.000
	Digital Literacy	.366	.02	.35	22.41	.000
	Religion=Christian	.025	.07	.01	.35	.726
	Religion=Muslim	-.17	.12	-.03	-1.45	.147
	Religion=Jewish	-.2	.19	-.07	-1.04	.297
	Religion=No Religion	.05	.07	-.02	-.65	.516
	Marital Status	.13	.03	.06	3.97	.000
	Education	.01	.01	.01	.68	.498
	Religiosity	-.08	.03	-.05	-2.93	.003
Number of kids under 18	-.02	.01	-.02	-1.56	.119	
<b>Integrative-Macro</b>	(Constant)	2.49	.11		22.39	.000
	Country=Israel	-.44	.19	-.14	-2.35	.019
	Country=Italy	.1	.07	.03	1.44	.149
	Country=Norway	-.16	.06	-.05	-2.5	.013
	Country=Romania	.05	.07	.02	.7	.485
	Country=France	-.26	.06	-.09	-4.17	.000
	Country=Spain	-.18	.07	-.06	-2.69	.007
	Country=Sweden	-.09	.06	-.03	-1.47	.14
	Gender	.18	.03	.09	5.96	.000
	Digital Literacy	.33	.02	.31	20.17	.000
	Religion=Christian	.18	.07	.09	2.48	.013
	Religion=Muslim	.09	.12	.01	.79	.432
	Religion=Jewish	.06	.19	.02	.33	.743
	Religion=No Religion	.04	.07	.02	.62	.536
	Marital Status	.15	.03	.07	4.69	.000
	Education	0	.01	0	.18	.854
	Religiosity	-.14	.03	-.09	-5.18	.000
Number of kids under 18	-.02	.01	-.03	-1.6	.11	
<b>Escapist</b>	(Constant)	2.9	.13		22.75	.000
	Country=Israel	-.27	.21	-.08	-1.29	.199

	Country=Italy	.11	.08	.03	1.38	.166
	Country=Norway	-.2	.07	-.06	-2.73	.006
	Country=Romania	-.46	.08	-.14	-5.82	.000
	Country=France	-.2	.07	-.06	-2.71	.007
	Country=Spain	-.09	.08	-.03	-1.25	.211
	Country=Sweden	-.17	.07	-.05	-2.27	.023
	Gender	.2	.03	.09	5.79	.000
	Digital Literacy	.16	.02	.14	8.74	.000
	Religion=Christian	.08	.08	.04	.92	.357
	Religion=Muslim	.36	.14	.05	2.68	.007
	Religion=Jewish	-.04	.22	-.01	-.18	.857
	Religion=No Religion	-.02	.08	-.01	-.18	.856
	Marital Status	.12	.04	.05	3.17	.002
	Education	-.02	.01	-.02	-1.33	.184
	Religiosity	-.12	.03	-.07	-3.92	.000
	Number of kids under 18	-.01	.01	-.02	-1.01	.315
	(Constant)	2.18	.1		21.6	.000
	Country=Israel	.5	.17	.17	2.97	.003
	Country=Italy	.2	.06	.07	3.35	.001
	Country=Norway	.26	.06	.09	4.54	.000
	Country=Romania	.01	.06	0	.16	.873
	Country=France	.05	.06	.02	.91	.362
	Country=Spain	.06	.06	.02	1.08	.279
	Country=Sweden	.25	.06	.09	4.35	.000
	Gender	.11	.03	.06	4.16	.000
<b>Unidirectional Flow</b>	Digital Literacy	.43	.02	.43	29.04	.000
	Religion=Christian	-.01	.07	0	-.12	.903
	Religion=Muslim	-.26	.11	-.04	-2.39	.017
	Religion=Jewish	-.23	.17	-.08	-1.31	.191
	Religion=No Religion	-.03	.06	-.02	-.53	.598
	Marital Status	.14	.03	.07	4.81	.000
	Education	0	.01	0	-.07	.945
	Religiosity	.02	.03	.02	.87	.386
	Number of kids under 18	-.04	.01	-.05	-3.48	.001
	(Constant)	2.53	.11		22.99	.000
	Country=Israel	.28	.18	.1	1.52	.129
	Country=Italy	.18	.07	.06	2.77	.006
	Country=Norway	-.08	.06	-.03	-1.3	.193
	Country=Romania	.02	.07	.01	.32	.747
	Country=France	-.11	.06	-.04	-1.71	.087
	Country=Spain	-.11	.07	-.04	-1.65	.099
	Country=Sweden	-.13	.06	-.05	-2.12	.034
	Gender	.06	.03	.03	1.96	.05
<b>Multidirectional Flow</b>	Digital Literacy	.31	.02	.31	19.4	.000



Religion=Christian	.02	.07	.01	.34	.735
Religion=Muslim	.02	.12	0	.18	.856
Religion=Jewish	-.49	.19	-.17	-2.62	.009
Religion=No Religion	-.08	.07	-.04	-1.09	.277
Marital Status	.1	.03	.05	3.11	.002
Education	.02	.01	.03	1.92	.055
Religiosity	-.04	.03	-.03	-1.54	.125
Number of kids under 18	-.02	.01	-.03	-1.89	.06

For country, the reference is Japan.

For Religion, reference is another religion.

### 9.2.5 TABLE 8 (FULL TABLE). THE DISTRIBUTION OF ANSWERS OF PREFERRED MEANS FOR INFORMATION. AGGREGATED RESULTS OF 4,013 PARTICIPANTS FROM ISRAEL, ITALY, NORWAY, ROMANIA, FRANCE, SPAIN, SWEDEN, AND JAPAN.

<b>Total</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	122 (3%)	399 (9.9%)	1289 (32.1%)	1390 (34.6%)	813 (20.3%)	3.59 (1.01)
<b>Printed Communication</b>	622 (15.5%)	987 (24.6%)	1319 (32.9%)	774 (19.3%)	311 (7.7%)	2.79 (1.15)
<b>Television</b>	339 (8.4%)	417 (10.4%)	1027 (25.6%)	1324 (33%)	906 (22.6%)	3.51 (1.19)
<b>Mobile Phone</b>	154 (3.8%)	274 (6.8%)	725 (18.1%)	1360 (33.9%)	1500 (37.4%)	3.94 (1.08)
<b>Social Networks</b>	529 (13.2%)	640 (15.9%)	1047 (26.1%)	1064 (26.5%)	733 (18.3%)	3.21 (1.28)
<b>Other Electronic Media</b>	310 (7.7%)	629 (15.7%)	1359 (33.9%)	1142 (28.5%)	573 (14.3%)	3.26 (1.12)
<b>Israel (N=504)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	13 (2.6%)	55 (10.9%)	143 (28.4%)	168 (33.3%)	125 (24.8%)	3.67 (1.05)
<b>Printed Communication</b>	95 (18.8%)	159 (31.5%)	139 (27.6%)	78 (15.5%)	33 (6.5%)	2.59 (1.15)
<b>Television</b>	88 (17.5%)	32 (6.3%)	75 (14.9%)	158 (31.3%)	151 (30%)	3.5 (1.42)
<b>Mobile Phone</b>	6 (1.2%)	7 (1.4%)	39 (7.7%)	155 (30.8%)	297 (58.9%)	4.45 (.79)
<b>Social Networks</b>	73 (14.5%)	57 (11.3%)	93 (18.5%)	134 (26.6%)	147 (29.2%)	3.45 (1.39)
<b>Other Electronic Media</b>	18 (3.6%)	67 (13.3%)	137 (27.2%)	147 (29.2%)	135 (26.8%)	3.62 (1.12)
<b>Italy (N=500)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	12 (2.4%)	26 (5.2%)	159 (31.8%)	200 (40%)	103 (20.6%)	3.71 (.93)
<b>Printed Communication</b>	60 (12%)	96 (19.2%)	166 (33.2%)	126 (25.2%)	52 (10.4%)	3.03 (1.16)
<b>Television</b>	22 (4.4%)	46 (9.2%)	134 (26.8%)	202 (40.4%)	96 (19.2%)	3.61 (1.04)
<b>Mobile Phone</b>	6 (1.2%)	29 (5.8%)	101 (20.2%)	196 (39.2%)	168 (33.6%)	3.98



<b>Total</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
						(.94)
<b>Social Networks</b>	60 (12%)	82 (16.4%)	135 (27%)	158 (31.6%)	65 (13%)	3.17 (1.21)
<b>Other Electronic Media</b>	34 (6.8%)	79 (15.8%)	187 (37.4%)	135 (27%)	65 (13%)	3.24 (1.08)
<b>Norway (N=500)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	24 (4.8%)	59 (11.8%)	147 (29.4%)	164 (32.8%)	106 (21.2%)	3.54 (1.1)
<b>Printed Communication</b>	78 (15.6%)	110 (22%)	153 (30.6%)	105 (21%)	54 (10.8%)	2.89 (1.22)
<b>Television</b>	42 (8.4%)	43 (8.6%)	111 (22.2%)	142 (28.4%)	162 (32.4%)	3.68 (1.24)
<b>Mobile Phone</b>	27 (5.4%)	40 (8%)	83 (16.6%)	154 (30.8%)	196 (39.2%)	3.9 (1.17)
<b>Social Networks</b>	76 (15.2%)	86 (17.2%)	119 (23.8%)	129 (25.8%)	90 (18%)	3.14 (1.32)
<b>Other Electronic Media</b>	31 (6.2%)	73 (14.6%)	157 (31.4%)	166 (33.2%)	73 (14.6%)	3.35 (1.09)
<b>Romania (N=500)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	9 (1.8%)	41 (8.2%)	144 (28.8%)	175 (35%)	131 (26.2%)	3.76 (.99)
<b>Printed Communication</b>	95 (19%)	130 (26%)	143 (28.6%)	93 (18.6%)	39 (7.8%)	2.7 (1.2)
<b>Television</b>	42 (8.4%)	75 (15%)	136 (27.2%)	149 (29.8%)	98 (19.6%)	3.37 (1.2)
<b>Mobile Phone</b>	13 (2.6%)	36 (7.2%)	66 (13.2%)	182 (36.4%)	203 (40.6%)	4.05 (1.03)
<b>Social Networks</b>	45 (9%)	84 (16.8%)	128 (25.6%)	133 (26.6%)	110 (22%)	3.36 (1.25)
<b>Other Electronic Media</b>	36 (7.2%)	87 (17.4%)	158 (31.6%)	144 (28.8%)	75 (15%)	3.27 (1.13)
<b>France (N=503)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	17 (3.4%)	50 (9.9%)	177 (35.2%)	194 (38.6%)	65 (12.9%)	3.48 (.96)
<b>Printed Communication</b>	64 (12.7%)	112 (22.3%)	188 (37.4%)	111 (22.1%)	28 (5.6%)	2.85 (1.08)
<b>Television</b>	36 (7.2%)	39 (7.8%)	160 (31.8%)	191 (38%)	77 (15.3%)	3.47 (1.07)
<b>Mobile Phone</b>	36 (7.2%)	43 (8.5%)	120 (23.9%)	200 (39.8%)	104 (20.7%)	3.58 (1.12)
<b>Social Networks</b>	87 (17.3%)	95 (18.9%)	143 (28.4%)	129 (25.6%)	49 (9.7%)	2.92 (1.23)
<b>Other Electronic Media</b>	66 (13.1%)	84 (16.7%)	184 (36.6%)	137 (27.2%)	32 (6.4%)	2.97 (1.11)
<b>Spain (N=502)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	10 (2%)	47 (9.4%)	143 (28.5%)	194 (38.6%)	108 (21.5%)	3.68 (.98)
<b>Printed Communication</b>	109 (21.7%)	116 (23.1%)	143 (28.5%)	105 (20.9%)	29 (5.8%)	2.66 (1.19)
<b>Television</b>	34 (6.8%)	59 (11.8%)	122 (24.3%)	178 (35.5%)	109 (21.7%)	3.54 (1.15)
<b>Mobile Phone</b>	14 (2.8%)	27 (5.4%)	65 (12.9%)	168 (33.5%)	228 (45.4%)	4.13 (1.02)
<b>Social Networks</b>	55 (11%)	66 (13.1%)	118 (23.5%)	144 (28.7%)	119 (23.7%)	3.41



<b>Total</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Other Electronic Media</b>	53 (10.6%)	87 (17.3%)	150 (29.9%)	151 (30.1%)	61 (12.2%)	3.16 (1.17)
<b>Sweden (N=504)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	18 (3.6%)	43 (8.5%)	141 (28%)	195 (38.7%)	107 (21.2%)	3.65 (1.02)
<b>Printed Communication</b>	70 (13.9%)	98 (19.4%)	180 (35.7%)	108 (21.4%)	48 (9.5%)	2.93 (1.16)
<b>Television</b>	47 (9.3%)	59 (11.7%)	130 (25.8%)	155 (30.8%)	113 (22.4%)	3.45 (1.22)
<b>Mobile Phone</b>	28 (5.6%)	34 (6.7%)	95 (18.8%)	174 (34.5%)	173 (34.3%)	3.85 (1.13)
<b>Social Networks</b>	83 (16.5%)	79 (15.7%)	147 (29.2%)	121 (24%)	74 (14.7%)	3.05 (1.28)
<b>Other Electronic Media</b>	48 (9.5%)	75 (14.9%)	172 (34.1%)	144 (28.6%)	65 (12.9%)	3.2 (1.14)
<b>Japan (N=500)</b>						
<b>Communication Channel</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>M (SD)</b>
<b>Face to Face</b>	19 (3.8%)	78 (15.6%)	235 (47%)	100 (20%)	68 (13.6%)	3.24 (1)
<b>Printed Communication</b>	51 (10.2%)	166 (33.2%)	207 (41.4%)	48 (9.6%)	28 (5.6%)	2.67 (.98)
<b>Television</b>	28 (5.6%)	64 (12.8%)	159 (31.8%)	149 (29.8%)	100 (20%)	3.46 (1.12)
<b>Mobile Phone</b>	24 (4.8%)	58 (11.6%)	156 (31.2%)	131 (26.2%)	131 (26.2%)	3.57 (1.14)
<b>Social Networks</b>	50 (10%)	91 (18.2%)	164 (32.8%)	116 (23.2%)	79 (15.8%)	3.17 (1.19)
<b>Other Electronic Media</b>	24 (4.8%)	77 (15.4%)	214 (42.8%)	118 (23.6%)	67 (13.4%)	3.25 (1.03)

**9.2.6 TABLE 10 (FULL TABLE). MANCOVA OF NATIONALITY AND GENDER ON PREFERRED INFORMATION SOURCES WITH SOCIODEMOGRAPHIC VARIABLES AS COVARIATES.**

Source	Communication Need	F	Sig	Partial Eta Squared
<b>Country</b>	Mobile Phones	35.92	.000	.06
	Social Networks	9.69	.000	.017
	Television	3.39	.001	.006
	Other Electronic Media	15.72	.000	.027
	Printed Media	9.21	.000	.016
	Face-to-Face	9.15	.000	.016
	<b>Gender</b>	Mobile Phones	25.86	.000
Social Networks		21.93	.000	.005
Television		7.35	.007	.002
Other Electronic Media		1.79	.181	.000
Printed Media		.38	.538	.000
Face-to-Face		9.62	.002	.002
<b>Country * Gender</b>		Mobile Phones	.88	.524
	Social Networks	2.19	.032	.004
	Television	1.41	.198	.002
	Other Electronic Media	1.05	.394	.002
	Printed Media	3	.004	.005



	Face-to-Face	1.28	.257	.002
<b>Age</b>	Mobile Phones	.94	.333	.000
	Social Networks	117.7	.000	.029
	Television	41.84	.000	.01
	Other Electronic Media	8.69	.003	.002
	Printed Media	1.6	.206	.000
	Face-to-Face	10.2	.001	.003
	<b>Marital</b>	Mobile Phones	4.28	.039
Social Networks		3.86	.05	.001
Television		8.62	.003	.002
Other Electronic Media		4.6	.032	.001
Printed Media		12.04	.001	.003
Face-to-Face		5.34	.021	.001
<b># kids under 18</b>		Mobile Phones	6.46	.011
	Social Networks	1.2	.274	.000
	Television	12.75	.000	.003
	Other Electronic Media	0	.953	.000
	Printed Media	1.12	.29	.000
	Face-to-Face	1.07	.3	.000
	<b>Religion</b>	Mobile Phones	.76	.382
Social Networks		9.6	.002	.002
Television		45.44	.000	.011
Other Electronic Media		10.65	.001	.003
Printed Media		14.08	.000	.004
Face-to-Face		.01	.939	.000
<b>Religiosity</b>		Mobile Phones	.98	.321
	Social Networks	2.89	.09	.001
	Television	28.49	.000	.007
	Other Electronic Media	6.73	.01	.002
	Printed Media	57.98	.000	.014
	Face-to-Face	11.56	.001	.003
	<b>Education</b>	Mobile Phones	8.81	.003
Social Networks		6.3	.012	.002
Television		4.46	.035	.001
Other Electronic Media		13.44	.000	.003
Printed Media		.21	.649	.000
Face-to-Face		.08	.782	.000
<b>Income</b>		Mobile Phones	2.06	.151
	Social Networks	3.92	.048	.001
	Television	16.16	.000	.004
	Other Electronic Media	12.96	.000	.003
	Printed Media	5.16	.023	.001
	Face-to-Face	6.37	.012	.002

### 9.2.7 TABLE 11 (FULL TABLE): CORRELATION TABLE OF DIGITAL LITERACY AND INFORMATION SOURCES (N=4,013).

Country	Source of information	Spearman's R	p-value
<b>Israel</b>	Mobile Phones	.25	.000
	Social Networks	.31	.000
	Television	.24	.000
	Other Electronic Media	.15	.001
	Printed Communication	-.16	.000
	Face to Face Communication	.12	.003



<b>Italy</b>	Mobile Phones	.43	.000
	Social Networks	.2	.000
	Television	.17	.000
	Other Electronic Media	.14	.001
	Printed Communication	.06	.103
	Face to Face Communication	.24	.000
<b>Norway</b>	Mobile Phones	.49	.000
	Social Networks	.3	.000
	Television	.31	.000
	Other Electronic Media	.2	.000
	Printed Communication	.02	.353
	Face to Face Communication	.25	.000
<b>Romania</b>	Mobile Phones	.42	.000
	Social Networks	.2	.000
	Television	.14	.001
	Other Electronic Media	.1	.013
	Printed Communication	.028	.267
	Face to Face Communication	.22	.000
<b>France</b>	Mobile Phones	.37	.000
	Social Networks	.15	.000
	Television	.23	.000
	Other Electronic Media	.16	.000
	Printed Communication	.03	.267
	Face to Face Communication	.24	.000
<b>Spain</b>	Mobile Phones	.45	.000
	Social Networks	.23	.000
	Television	.2	.000
	Other Electronic Media	.2	.000
	Printed Communication	-.03	.245
	Face to Face Communication	.22	.000
<b>Sweden</b>	Mobile Phones	.49	.000
	Social Networks	.24	.000
	Television	.25	.000
	Other Electronic Media	.29	.000
	Printed Communication	.08	.041
	Face to Face Communication	.34	.000
<b>Japan</b>	Mobile Phones	.4	.000
	Social Networks	.47	.000
	Television	.24	.000
	Other Electronic Media	.33	.000
	Printed Communication	.17	.000
	Face to Face Communication	.36	.000
<b>Total</b>	Mobile Phones	.45	.000
	Social Networks	.27	.000
	Television	.23	.000
	Other Electronic Media	.2	.000
	Printed Communication	.02	.123
	Face to Face Communication	.28	.000

### 9.2.8 TABLE 12 (FULL TABLE). RESULTS OF LINEAR REGRESSION ANALYSIS TO PREDICT PREFERRED INFORMATION SOURCES (N=4,013).

Communication Needs	Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		



<b>Mobile Phones</b>	(Constant)	1.92	.11		17.09	.000
	Country=Israel	.5	.19	.15	2.66	.008
	Country=Italy	-.09	.07	-.03	-1.39	.165
	Country=Norway	.01	.06	0	.15	.885
	Country=Romania	0	.07	0	-.02	.984
	Country=France	-.34	.06	-.1	-5.25	.000
	Country=Spain	.07	.07	.02	1.05	.294
	Country=Sweden	-.07	.06	-.02	-1.12	.262
	Gender	.15	.03	.07	5.02	.000
	Digital Literacy	.5	.02	.45	30.55	.000
	Religion=Christian	.02	.07	.01	.29	.776
	Religion=Muslim	.04	.12	.01	.31	.756
	Religion=Jewish	-.16	.19	-.05	-.83	.408
	Religion=No Religion	-.03	.07	-.01	-.43	.672
	Marital Status	.05	.03	.02	1.57	.116
	Education	.01	.01	.01	.44	.662
	Religiosity	-.04	.03	-.02	-1.28	.199
Number of kids under 18	-.02	.01	-.02	-1.55	.121	
<b>Social Networks</b>	(Constant)	1.88	.15		12.92	.000
	Country=Israel	-.14	.24	-.04	-.59	.553
	Country=Italy	-.39	.09	-.1	-4.45	.000
	Country=Norway	-.3	.08	-.08	-3.36	.000
	Country=Romania	-.21	.09	-.05	-2.34	.019
	Country=France	-.53	.08	-.14	-6.35	.000
	Country=Spain	-.14	.09	-.04	-1.65	.1
	Country=Sweden	-.41	.08	-.11	-4.93	.000
	Gender	.21	.04	.08	5.51	.000
	Digital Literacy	.39	.02	.29	18.38	.000
	Religion=Christian	-.05	.09	-.02	-.48	.632
	Religion=Muslim	.35	.16	.04	2.26	.024
	Religion=Jewish	-.09	.25	-.02	-.36	.717
	Religion=No Religion	-.19	.09	-.07	-2.07	.039
	Marital Status	-.06	.04	-.02	-1.46	.145
	Education	.02	.02	.01	.95	.343
	Religiosity	-.01	.04	0	-.16	.875
Number of kids under 18	.02	.02	.02	.99	.323	
<b>Television</b>	(Constant)	1.81	.14		13.27	.000
	Country=Israel	-.34	.23	-.1	-1.49	.136
	Country=Italy	-.3	.08	-.09	-3.17	.000
	Country=Norway	-.12	.08	-.03	-1.58	.114
	Country=Romania	-.58	.08	-.16	-6.59	.000
	Country=France	-.34	.08	-.1	-4.39	.000
	Country=Spain	-.39	.08	-.11	-4.87	.000
	Country=Sweden	-.31	.08	-.09	-4.01	.000
	Gender	.06	.04	.02	1.52	.128



	Digital Literacy	.29	.02	.24	14.72	.000
	Religion=Christian	.31	.09	.13	3.53	.000
	Religion=Muslim	.47	.15	.06	3.22	.001
	Religion=Jewish	.09	.24	.03	.38	.706
	Religion=No Religion	-.11	.09	-.04	-1.22	.221
	Marital Status	.19	.04	.08	4.7	.000
	Education	.03	.02	.03	1.78	.075
	Religiosity	.2	.03	.11	5.87	.000
	Number of kids under 18	-.06	.02	-.06	-3.95	.000
	(Constant)	2.57	.13		19.9	.000
	Country=Israel	.27	.22	.08	1.24	.214
	Country=Italy	-.4	.08	-.12	-5.11	.000
	Country=Norway	-.15	.07	-.05	-2.06	.040
	Country=Romania	-.39	.08	-.12	-4.96	.000
	Country=France	-.54	.07	-.17	-7.34	.000
	Country=Spain	-.46	.08	-.14	-6.03	.000
	Country=Sweden	-.31	.07	-.09	-4.17	.000
	Gender	-.08	.03	-.03	-2.23	.026
<b>Other Electronic Media</b>	Digital Literacy	.25	.02	.22	13.36	.000
	Religion=Christian	.07	.08	.03	.85	.394
	Religion=Muslim	.171	.14	.02	1.25	.212
	Religion=Jewish	-.28	.22	-.08	-1.28	.202
	Religion=No Religion	-.13	.08	-.05	-1.57	.116
	Marital Status	.08	.04	.03	2.14	.033
	Education	.05	.01	.05	3.39	.001
	Religiosity	-.08	.03	-.05	-2.58	.010
	Number of kids under 18	.01	.01	.01	.74	.462
	(Constant)	3	.13		22.31	.000
	Country=Israel	-.61	.23	-.17	-2.69	.007
	Country=Italy	.02	.08	.01	.3	.766
	Country=Norway	.01	.08	0	.08	.939
	Country=Romania	-.34	.08	-.1	-4.14	.000
	Country=France	-.03	.08	-.01	-.44	.66
	Country=Spain	-.28	.08	-.08	-3.58	.000
	Country=Sweden	.01	.08	0	.13	.895
	Gender	-.04	.04	-.02	-1	.316
<b>Printed Media</b>	Digital Literacy	.08	.02	.07	4.01	.000
	Religion=Christian	.19	.09	.08	2.19	.029
	Religion=Muslim	.29	.14	.04	2.01	.044
	Religion=Jewish	.34	.23	.1	1.48	.138
	Religion=No Religion	-.01	.09	0	-.12	.908
	Marital Status	.14	.04	.06	3.63	.000
	Education	0	.02	0	-.1	.921
	Religiosity	-.23	.03	-.13	-7	.000

	Number of kids under 18	.02	.01	.02	1.44	.151
	(Constant)	2.6	.12		22.48	.000
	Country=Israel	-.17	.19	-.06	-.86	.388
	Country=Italy	.14	.07	.05	1.97	.049
	Country=Norway	.1	.07	.03	1.51	.13
	Country=Romania	.2	.07	.06	2.75	.006
	Country=France	.02	.07	.01	.29	.771
	Country=Spain	.14	.07	.05	2.01	.045
	Country=Sweden	.18	.07	.06	2.67	.008
	Gender	.08	.03	.04	2.46	.014
<b>Face-to-Face</b>	Digital Literacy	.3	.02	.28	17.45	.000
	Religion=Christian	-.03	.08	-.01	-.38	.704
	Religion=Muslim	-.11	.12	-.02	-.9	.366
	Religion=Jewish	.22	.2	.07	1.11	.265
	Religion=No Religion	-.03	.07	-.02	-.46	.644
	Marital Status	.1	.03	.05	2.95	.003
	Education	-.01	.01	-.02	-.97	.331
	Religiosity	-.13	.03	-.08	-4.39	.000
	Number of kids under 18	0	.01	-.01	-.32	.747

9.2.9 TABLE 13 (FULL TABLE). CORRELATIONS OF INFORMATION SOURCES AND COMMUNICATION NEEDS.

	Cognitive	Affective	Integrative (Micro)	Integrative (Macro)	Escapist	Unidirectional Flow	Multidirectional Flow
<b>Israel</b>							
Mobile	<b>.3</b> (.000)	.11 (.005)	.17 (.000)	.12 (.004)	.11 (.006)	<b>.3</b> (.000)	.08 (.031)
SNS	.061 (.000)	.11 (.006)	.16 (.000)	.13 (.002)	.14 (.001)	.11 (.008)	.05 (.133)
TV	.12 (.003)	.1 (.013)	.18 (.000)	.1 (.01)	.17 (.000)	.18 (.000)	.11 (.007)
Other	.05 (.128)	.13 (.001)	.17 (.000)	.22 (.000)	.15 (.000)	.17 (.000)	.11 (.006)
Printed	-.05 (.14)	<b>.17</b> (.000)	.11 (.008)	.16 (.000)	<b>.22</b> (.000)	-.05 (.133)	-.015 (.37)
F2F	.12 (.003)	.14 (.001)	<b>.24</b> (.000)	<b>.2</b> (.000)	.1 (.014)	.08 (.041)	<b>.12</b> (.004)
<b>Italy</b>							
Mobile	<b>.31</b> (.000)	.2 (.000)	<b>.4</b> (.000)	.27 (.000)	.21 (.000)	<b>.32</b> (.000)	<b>.29</b> (.000)
SNS	-.09 (.023)	<b>.24</b> (.000)	.24 (.000)	.22 (.000)	<b>.32</b> (.000)	-.03 (.261)	.12 (.003)
TV	.2 (.000)	<b>.24</b> (.000)	.3 (.000)	<b>.28</b> (.000)	.21 (.000)	.2 (.000)	.27 (.000)
Other	-.021 (.323)	.22 (.000)	.21 (.000)	.2 (.000)	.3 (.000)	.057 (.102)	.14 (.001)
Printed	-.1 (.01)	.23 (.000)	.17 (.000)	.17 (.000)	.27 (.000)	-.063 (.08)	.09 (.028)
F2F	.2 (.000)	.16 (.000)	.3 (.000)	.3 (.000)	.12 (.003)	.27 (.000)	.24 (.000)
<b>Norway</b>							



Mobile	<b>.52</b> (.000)	.26 (.000)	<b>.45</b> (.000)	<b>.45</b> (.000)	.15 (.000)	<b>.49</b> (.000)	<b>.41</b> (.000)
SNS	.2 (.000)	.31 (.000)	.33 (.000)	.36 (.000)	.26 (.000)	.22 (.000)	.25 (.000)
TV	.37 (.000)	.21 (.000)	.34 (.000)	.36 (.000)	.1 (.014)	.33 (.000)	.29 (.000)
Other	.18 (.000)	.24 (.000)	.31 (.000)	.31 (.000)	.26 (.000)	.22 (.000)	.32 (.000)
Printed	-.001 (.488)	.24 (.000)	.28 (.000)	.27 (.000)	.23 (.000)	.028 (.267)	.32 (.000)
F2F	.34 (.000)	<b>.33</b> (.000)	.43 (.000)	.4 (.000)	<b>.28</b> (.000)	.29 (.000)	.32 (.000)
<b>Romania</b>							
Mobile	<b>.4</b> (.000)	.25 (.000)	<b>.42</b> (.000)	<b>.4</b> (.000)	.08 (.04)	<b>.36</b> (.000)	<b>.28</b> (.000)
SNS	.16 (.000)	.17 (.000)	.26 (.000)	.2 (.000)	.12 (.004)	.14 (.000)	.15 (.001)
TV	.25 (.000)	.19 (.000)	.27 (.000)	.32 (.000)	.23 (.000)	.28 (.000)	.21 (.000)
Other	.18 (.000)	.24 (.000)	.22 (.000)	.23 (.000)	.22 (.000)	.14 (.000)	.24 (.000)
Printed	.053 (.123)	.22 (.000)	.1 (.011)	.13 (.000)	<b>.27</b> (.000)	.1 (.000)	.17 (.000)
F2F	.28 (.000)	<b>.27</b> (.000)	.35 (.000)	.3 (.000)	.16 (.000)	.28 (.000)	<b>.28</b> (.000)
<b>France</b>							
Mobile	<b>.33</b> (.000)	.26 (.000)	<b>.43</b> (.000)	.3 (.000)	.22 (.000)	<b>.36</b> (.000)	<b>.33</b> (.000)
SNS	.09 (.025)	.26 (.000)	.25 (.000)	.28 (.000)	<b>.35</b> (.000)	.1 (.015)	.25 (.000)
TV	.28 (.000)	<b>.29</b> (.000)	.35 (.000)	<b>.36</b> (.000)	.3 (.000)	.28 (.000)	.3 (.000)
Other	.13 (.002)	.22 (.000)	.29 (.000)	.31 (.000)	.26 (.000)	.17 (.000)	.26 (.000)
Printed	.017 (.356)	.21 (.000)	.22 (.000)	.28 (.000)	.24 (.000)	.096 (.015)	.21 (.000)
F2F	.28 (.000)	.27 (.000)	.33 (.000)	.25 (.000)	.16 (.000)	.31 (.000)	<b>.33</b> (.000)
<b>Spain</b>							
Mobile	<b>.32</b> (.000)	.13 (.001)	.28 (.000)	.21 (.000)	.09 (.023)	<b>.39</b> (.000)	.27 (.000)
SNS	.11 (.006)	.22 (.000)	.23 (.000)	.27 (.000)	.23 (.000)	.2 (.000)	.23 (.000)
TV	.17 (.000)	.21 (.000)	.22 (.000)	.24 (.000)	.23 (.000)	.21 (.000)	.19 (.000)
Other	.11 (.006)	.21 (.000)	.25 (.000)	<b>.29</b> (.000)	.2 (.000)	.19 (.000)	.24 (.000)
Printed	-.08 (.035)	<b>.24</b> (.000)	.13 (.001)	.25 (.000)	<b>.24</b> (.000)	-.031 (.241)	.22 (.000)
F2F	.22 (.000)	.22 (.000)	<b>.36</b> (.000)	.28 (.000)	.19 (.000)	.25 (.000)	<b>.35</b> (.000)
<b>Sweden</b>							
Mobile	<b>.44</b> (.000)	.19 (.000)	<b>.45</b> (.000)	<b>.38</b> (.000)	.16 (.000)	<b>.42</b> (.000)	.27 (.000)
SNS	.06 (.109)	.28 (.000)	.26 (.000)	.28 (.000)	.26 (.000)	.12 (.003)	.23 (.000)
TV	.31 (.000)	.24 (.000)	.31 (.000)	.33 (.000)	.21 (.000)	.27 (.000)	.26 (.000)
Other	.16 (.000)	.25 (.000)	.28 (.000)	.27 (.000)	.23 (.000)	.2 (.000)	.27 (.000)
Printed	.09 (.018)	<b>.29</b> (.000)	.22 (.000)	.28 (.000)	<b>.3</b> (.000)	.15 (.000)	.31 (.000)
F2F	.39 (.000)	.24 (.000)	.43 (.000)	.37 (.000)	.2 (.000)	.37 (.000)	<b>.47</b> (.000)
<b>Japan</b>							

Mobile	<b>.47</b> <b>(.000)</b>	.37 (.000)	.48 (.000)	.44 (.000)	.27 (.000)	<b>.48</b> <b>(.000)</b>	.47 (.000)
SNS	.3 (.000)	.35 (.000)	.41 (.000)	.38 (.000)	.28 (.000)	.29 (.000)	.34 (.000)
TV	.37 (.000)	.37 (.000)	.42 (.000)	.39 (.000)	.24 (.000)	.39 (.000)	.39 (.000)
Other	.35 (.000)	.36 (.000)	.38 (.000)	.38 (.000)	.23 (.000)	.36 (.000)	.41 (.000)
Printed	.06 (.078)	.25 (.000)	.24 (.000)	.28 (.000)	.23 (.000)	.12 (.005)	.17 (.000)
F2F	.42 (.000)	<b>.46</b> <b>(.000)</b>	<b>.49</b> <b>(.000)</b>	<b>.49</b> <b>(.000)</b>	<b>.33</b> <b>(.000)</b>	.42 (.000)	<b>.48</b> <b>(.000)</b>
<b>Total</b>							
Mobile	<b>.42</b> <b>(.000)</b>	.24 (.000)	<b>.38</b> <b>(.000)</b>	.31 (.000)	.15 (.000)	<b>.42</b> <b>(.000)</b>	.3 (.000)
SNS	.13 (.000)	.25 (.000)	.26 (.000)	.25 (.000)	.23 (.000)	.15 (.000)	.2 (.000)
TV	.26 (.000)	.22 (.000)	.29 (.000)	.28 (.000)	.21 (.000)	.27 (.000)	.24 (.000)
Other	.16 (.000)	.23 (.000)	.25 (.000)	.25 (.000)	.22 (.000)	.2 (.000)	.24 (.000)
Printed	0 (.499)	.22 (.000)	.19 (.000)	.23 (.000)	<b>.26</b> <b>(.000)</b>	.05 (.001)	.18 (.000)
F2F	.31 (.000)	<b>.27</b> <b>(.000)</b>	<b>.38</b> <b>(.000)</b>	<b>.34</b> <b>(.000)</b>	.19 (.000)	.3 (.000)	<b>.32</b> <b>(.000)</b>