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CLIMATE CHANGE COMMUNICATION

AN HISTORICAL ANALYSIS OVER EVOLUTION OF THE COMMUNICATION REGARDING THE CHANGE OF THE CLIMATE AND ENVIRONMENT IN THE LAST DECADES

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INTRODUCTION

The opening of the 21st century and the new millennium has seen the emergence, in a global manner, of the most pressing problem that human history has ever had to face. Climate change is taking place today. The term climate change means any change in the state of the climate, identifiable by analysis of changes in average values or measures of climate variability over time, usually over decades or centuries. These changes can be attributed to human activities and their impact on the biosphere, either directly or indirectly, or to natural climate variability and its diachronic evolution[1].

Climate change is a global phenomenon that directly and indirectly affects all the populations of the world. Although at first glance, in a few cases, it may appear that some phenomena are positive for the economy of some countries[2],

[1] IPCC, 2007: "Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change" [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

[2] In the last century, the melting of the Arctic cap due to global warming (Global Warming, GW) and climate change (CG)1 has profoundly changed the strategic importance of the Arctic region. In fact, according to the estimates of various international scientific organizations, starting from 2020 we could see a progressive extension of the periods conventionally defined as ice free, until even when, in a period between 2030 and 2050, the Arctic summers will be characterized by the total absence of ice. The retreat of glaciers once believed to be perennial has expanded the possibility of exploiting the many resources of the far north of the world, both economically and commercially. From the first point of view, it is believed that the Arctic possesses 30% of the natural gas reserves and 15% of the global oil reserves not yet discovered, that it hosts more than 15% of the global fish resources and, finally, that it has huge stocks of minerals, including significant quantities of the so-called rare earth elements (REE), which have become accessible and exploitable thanks to the improvement of mining techniques and technologies (...). In the same way, from a commercial point of view, the thinning or disappearance of the ice sheet has considerably increased the periods and the quality of the navigability of the Arctic Ocean and of the seas adjacent to it, making the Passage to the North West (PNO), the Passage to the North East (PNE) and the Transpolar Route highly practicable. These three routes have in common the reduced number of kilometers and the possibility of being travelled by any type of vessel compared to the current commercial maritime routes connecting Europe and Asia, which must pass through the Panama Canal, the Suez Canal or even round Cape Horn or Cape of Good Hope. In fact, while any type of commercial ship can cross Suez, Panama continues to have structural limitations that require the passage of vessels whose technical characteristics must not exceed 294 meters in length, 32.3 meters in width, 12.04 meters in draft and 52,500 tons in deadweight. http://www.parlamento.it/application/xmanager/projects/parlamento/file/repository/affariinternazionali/osservatorio/approfondimenti/PI0124App.pdf.

climate change has and will have negative effects on a large scale for the whole humanity.

> "It is therefore clear that climate change is today a great moral and ethical issue, a problem of justice, of equity: those who are and will be hardest hit, future generations, the poorest people on the planet, non-human species, are the least responsible. The removal, or at least the major underestimation on a global scale of the problem of climate change is due to the fact that the "uncomfortable truth" of climate change shows from a particular point of view the injustice on which the current economic system is based, which allows the misappropriation of scarce resources by a relatively small number of individuals. And a scarce resource is the ability of the atmosphere to absorb climate-changing gases. The climate crisis poses a new question about the sense of the continuous pursuit of the growth of production and consumption in our society; it involves a deep level of our lives, as it is a matter of redefining the limits of human expectations"[3].

Climate change, as we often read and listen to through media all over the world, is defined as a challenge, a sort of competition against time to allow a purely resilient path between a first in which the planet could live its own life organically balanced and a then in which it must be saved from the continuous attacks due, mainly by the evolution of human societies. In this sense, the extent of the phenomenon also defines the geological era in which we are now fully integrated, the Anthropocene.

Climate change is a challenge in every sense, but it is even more so because it must be communicated to people all over the world, given the complexity of the subject, as well as the differences between cultures, languages and traditions.

[3] Caserini, S., *I cambiamenti climatici: la sfida del XXI secolo*, Politecnico di Milano, DICA Se. Ambientale, 2014, https://www.e3s-conferences.org/articles/e3sconf/pdf/2014/01/e3sconf_sf2013_02005.pdf (accessed May 22, 2019).

> "As several decades of awareness-raising and initiatives to engage the public have shown, climate change doesn't communicate itself. A burgeoning evidence base on the social science of climate change communication now provides many explanations for why engaging on climate change can be challenging. Climate science is filled with uncertainties, a notorious obstacle for communicating with non-scientists. For some, the topic can seem abstract and intangible. For others, the abstract statistics that define the climate discourse can feel distant from their day-to-day experiences. In some nations, the issue is politically polarized; in others, the absence of a public and political discourse is the problem. However, the same social science literature that documents the challenges posed by engaging the public with climate change also provides some robust guidance for how to communicate more effectively. That our worldviews, values and social norms dictate how we receive information and apply it to our own lives is well understood. It has also long been recognized that the messenger is at least as important, if not more so, than the message itself. [...] What those social science insights tell us is that it is possible to communicate climate science in a way that makes that message easier for non-scientific audiences to understand and makes it more relevant to their lives and experiences. Connecting with your audience based on shared values builds trust between the communicator and the audience. There may be no 'magic words' that will resonate universally, but there are better and worse ways to start a conversation about climate change; more and less effective ways to use language and narratives. There is guidance available on talking about the link between weather and climate, and the uncertainty inherent in climate science"[4].

Communicating climate change has become more challenging than climate change itself. This (ironic) paradox hides the complexity of human relations, and therefore, of mass communication. Communicating climate change is a challenge of difficult approach, therefore, for different reasons:

- It is a purely scientific subject, dealt with in technical and specialist language;
- It is one of the first global topics in the age of the acceleration of communication through digital and internet;

[4] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.

- It is a topic that involves everyone without distinction, without distinction of any kind (race, religion, social class, nationality, etc.);
- It is an issue that concerns our "common home" as defined by Pope Francis in his encyclical on climate change. It is the first time in centuries that we consider publicly and unanimously (in agreement with the United Nations) the planet as a living being, and therefore, in some way, as a subject of law[5];
- It is one of the most falsified subjects in general, and on which there is a distorted mass production of its contents;
- It is a global argument that is used locally at the political level for the acquisition of consensus;
- It is an impalpable argument that cannot be seen or touched here and now at any time, but that has its own evolution, not always visible to the naked eye;
- It is a subject that is reduced, especially in modern societies, to pure entertainment for conversation, which serves to pass the time.

These are the reasons that most characterize the complexity of the topic and make the communication of climate change a complex system that needs an integrated approach.

In this research, I will try to demonstrate, in the first place, the difficulty of approaching the topic, and secondly, it is highlighted how this difficulty is due:

- to its non-linear historical evolution;
- to the fact that it is also a vehicle for obtaining consensus;

[5] FRANCESCO, Encyclical Letter *Laudato Sì* (May 24th 2015).

- to being part of a communicational process in continuous movement that has the Internet as its first engine and global diffusion;
- to the variation of public sentiment on the concept of truth and the shift of communication from information to entertainment.

In the first chapter, therefore, the context of the communication infrastructure in which climate change takes place will be defined. The Internet and digital communication have created a hybridization of reality, moving from a process of social inclusion to a path of digital inclusion. The hybridization of reality is the union between the real and the digital, where the instruments of the digital world become prosthesis of the human body, allowing an amplification, an extension of the body itself. The senses and perceptions are, therefore, increased, offering a cognitive and evolutionary potential to the human being. In this context, the complexity of climate change makes it difficult to meet the challenges facing it[6]. The complexity of the communication infrastructure, therefore, is the first point of reference.

In the second chapter, the focus is on the historical evolution of climate change, from being a mere subject of scientific analysis, through the journalistic debate, and arriving at its position as a lever of political action to obtain consensus. In this sense, the history of scientific analysis, the history of the evolution of communication and a deepening of denialism complete the meaning of climate change. Climate change is defined, therefore, through multiple perspectives and with paths of historical, journalistic and denials significance, which outline the connotations of mass.

[6] Khanna, P., and Khanna, A., *Hybrid Reality: Thriving in the Emerging Human-Technology Civilization*, TED Books, 2012, Book 15, Part 1, Kindle version.

The third chapter is dedicated to explaining the communicational environment, an environment in which overexposure to information creates a stratified thickening which, in order to decode it, requires multiple and synergistic approaches. Particular attention is also given to the change of paradigm of truth and the aspect of using information as a form of entertainment. In the last part, communication on risks and emergencies, as a process of the communicational environment inherent in climate change, was analyzed.

The fourth chapter is dedicated to the analysis of the climate change campaigns implemented so far, with particular attention to the central elements of each: the purpose, the message, the images, and the media used. The character of Greta Thunberg and the Friday for Future movement, finally, have been used as a case study, on a global scale, of the massification of the topic of climate change.

In the conclusion, the difficulties of approaching climate change are combined with the difficulties of communicating climate change itself. The thesis is defined with the need for an integrated, multiplatform and multi-channel approach, which takes into account the evolution of the network and digital communication. The topic needs complex analysis, taking into account different factors, different actors, different media and the evolution of the problem. Climate change affects all of us and every aspect of our lives. It affects ecosystems, our infrastructure, our health, our economic system and global security. It is changing the planet as it is known and it is doing so at a faster rate than ever before. This real problem needs to be addressed.

In order to react to change, it is of fundamental importance to understand and identify its real causes and consequences and to be able to communicate complexity through simplicity, overcoming crisis and risk communication, to move on to a constructive process that allows a substantial and integrated paradigm shift of all sectors of human society.

Climate change is a controversial subject, which uses a technical language. It is also subject to various interpretations and is the subject of negative rhetoric aimed at forming political consensus. The history of the evolution of climate change and the violence, with which it is too often treated, makes communication far from strategic, serving as a basis for attacks and criticism.

1. CONTEXTUALIZATION

1.1 FROM SOCIAL INCLUSION TO DIGITAL INCLUSION

This research aims to clarify the effectiveness of communication in large scale, especially in certain fields as social and mass issues. One of the preliminary assets we need to consider is the fast and large-scale transformation we are living in today. The last two centuries have established the systematic growing of usage of communication within the society. This represent in first instance the peculiar necessity of human being in communicating each other's. Secondly, perhaps, this essential imperative of humanity has been led from simple one-to-one correlation, to a more sophisticated one to many relations. The movement of communication towards a fundamental necessity of one-many mass communication, to be understood, requires a brief excursus on what we define today as social inclusion.

When we speak about social inclusion, we intend "the active participation on the society by a single person". This idea identifies three dimensions of inclusion – "starting with individual (biographical) level continues with level of neighborhood, which is group or network that is called "social" or "life" world and finally the societal or structural level"[7]. At the same time, social inclusion

[7] Stasova, L., Khynova, J., *Internet social networks as important agents of social inclusion for contemporary children and youth*, in "SHS Web of Conferences", Volume 2, EDP Sciences, 2012, p. 2.

as it is experienced today is an effect of the destruction of paradigms on which society has been based for decades and centuries.

> "We live in an age in which the social order of the national state, class, ethnicity and the traditional family is in decline. The ethic of individual self-fulfillment and achievement is the most powerful current in modern society. The choosing, deciding, shaping human being who aspires to be the author of his or her own life, the creator of an individual identity, is the central character of our time. It is the fundamental cause behind changes in the family and the global gender revolution in relation to work and politics. Any attempt to create a new sense of social cohesion has to start from the recognition that individualism, diversity and skepticism are written into Western culture"[8].

Loader explains in his study how the social inequality is reproduced in the same way in the cyberspace as in the real society. He demonstrates that

> "for the vast majority of the world's population, the possibility of constructing virtual identities is entirely dependent upon their material situation. Clearly most people are not free to choose but instead are subject to a variety of social and economic conditions which act to structure and articulate their opportunities for action"[9].

What we called social inclusion in the today world necessary sees an increasing relevance of digital inclusion as a phenomenal asset for an wide comprehension of the society. The ubiquity of the Internet poses challenges and opportunities for individuals and communities alike. These challenges and opportunities have not been evenly distributed. Digital technology has opened new domains of exclusion and privilege for some, leaving some populations isolated from the vast digital realm. Even equitable access, however, is no

[8] Beck, U., and Beck-Gernsheim, E., *Individualization: Institutionalized Individualism and its Social and Political Consequences*, SAGE Publications Ltd, Thousand Oaks, 2001, Kindle Version, pos. 1119.
[9] Loader, B.D., *Cyberspace Divide. Equality, Agency and Policy in the Information Society,* Routledge, London, 1998.

longer enough - increasingly, digital life requires that users be more than users. Users are now content creators as much as they are content consumers.

> "The amount of Internet users worldwide has raised since the beginning of the World Wide Web. On the 20 December 1990, the world's first website and server went live at CERN, the European Organization for Nuclear Research. It is at least singular that the fast progress of the world was made from the nuclear fission and the legacy of that, the World Wide Web, started in a research center as the one in Geneva. The first ever website was realized and published by the Internet's creator, Sir Tim Berners-Lee, on 6 August 1991 and in 1993 CERN made the World Wide Web available on a royalty free basis to the public domain. By 1993, there were 14 million Internet users' worldwide and 130 websites"[10].

Success in the increasingly digitized social and economic realms requires a comprehensive approach to fostering inclusion.

> "Digital inclusion brings together high-speed internet access, information technologies, and digital literacy in ways that promote success for communities and individuals trying to navigate and participate in the digital realm"[11].

In other words, digital inclusion is a structure for evaluating and considering the smartness of collectivity to provide access to opportunities in a digital age.

Digital inclusion can be defined with three main characteristics: access, adoption, and application. These aspects underline the last aim of performing digitally inclusive communities[12]:

- Access: Availability, affordability, design for inclusion, and public access;
- Adoption: Relevance, digital literacy, and consumer safety;

[10] Murphy, J, and Roser, M., *Internet*, 2018, https://ourworldindata.org/internet (accessed March 4, 2019).
[11] Digital Inclusion Survey, *What is Digital Inclusion*, https://digitalinclusion.umd.edu/content/what-digital-inclusion (accessed March 5, 2019).
[12] Ibid.

- Application: Economic and workforce development, education, health care, public safety and emergency services, civic engagement, and social connections.

The movement of the digital inclusion around the world in the last decades is growing at an exponential rate and today reached more than 60% of the world (fig 1),

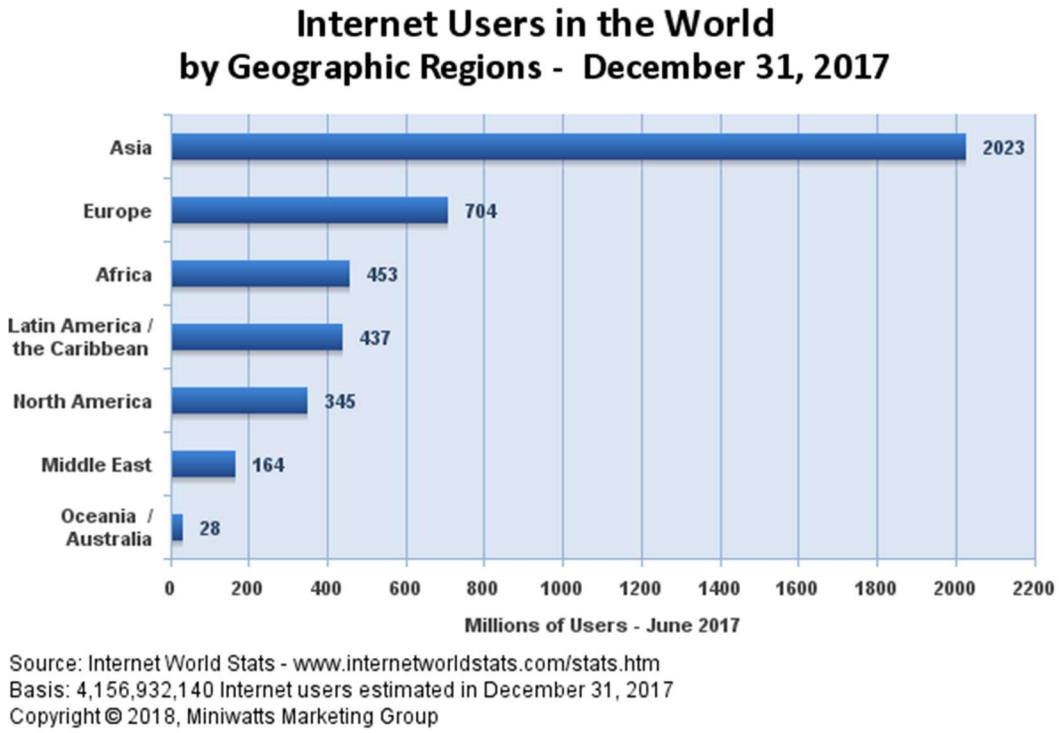

FIGURE 1

with a balance between the various regions of the world, that reflects the world social inclusion (fig 2).

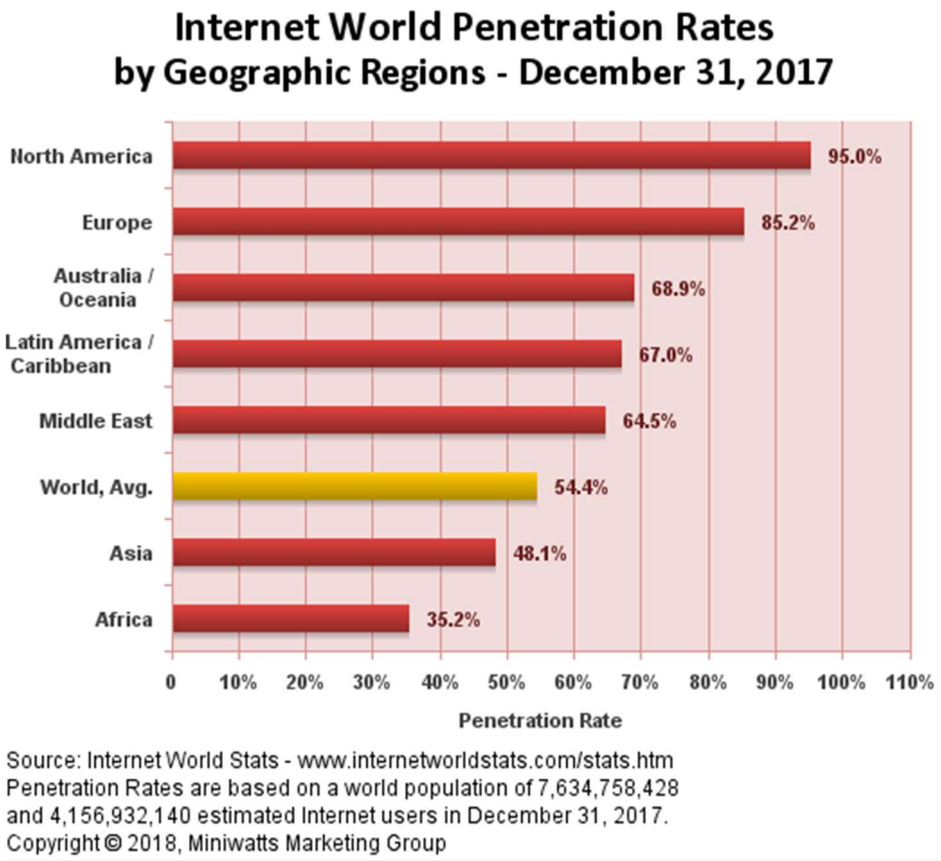

FIGURE 2

In a matter of very few years, the Internet consolidated itself as a very powerful - second - reality that has changed forever the way we communicate. The Net, as no other communication medium, has given a globalized dimension to the world. Internet has become the universal source of information for millions of people, at home, at school, and at work.

We should consider that the interest of experts on Internet has focused on the relevance of the interaction between humans because after the early stage of development, the net rushed ahead in the last decade with two main features: the social web and mobile technology. These two evolution marks have

changed the way people use the Internet[13]. In the social web, people have found a new way to communicate. Facebook since 2004 has grown into a global interactive network of over 1 billion subscribers. Mobile technology, on the other hand, has made possible a much greater reach of the Internet, increasing the number of Internet users around the world.

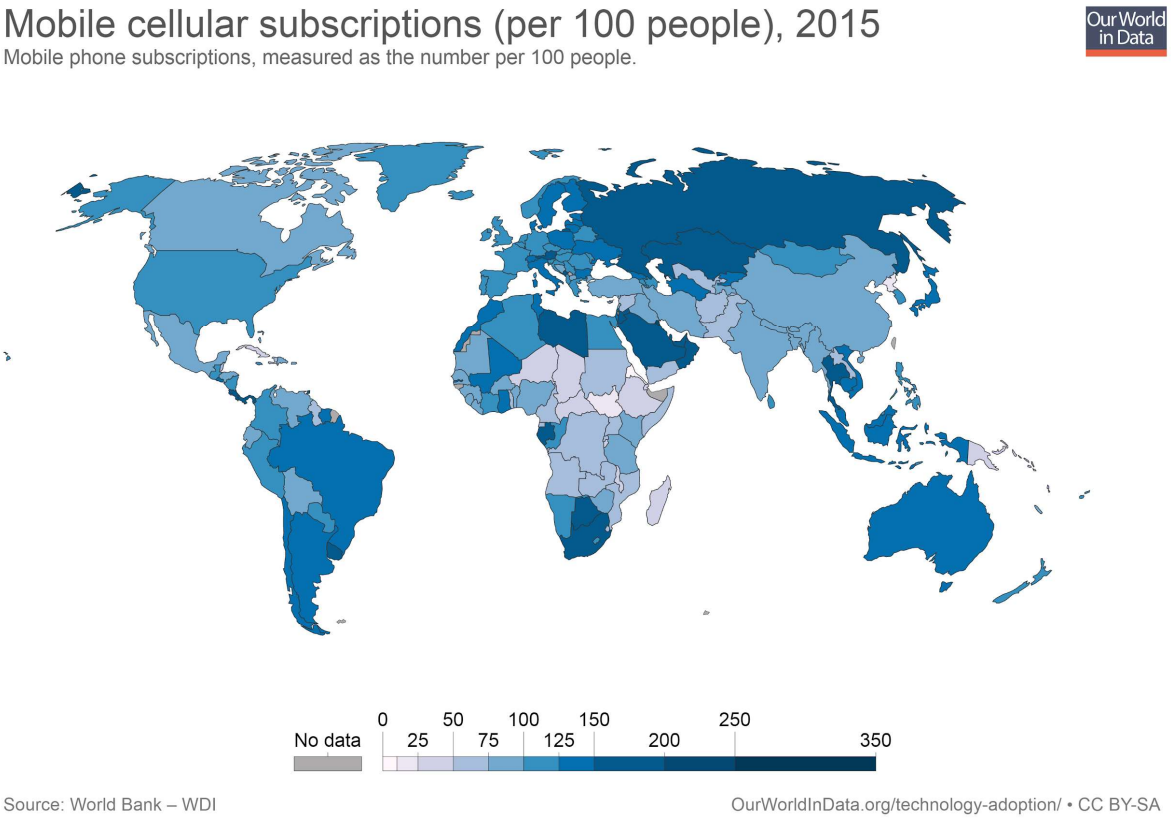

FIGURE 3

The explicit and sensible change of society is represented well by the progressive change of internet, as the first manifestation of what has been

[13] Anderson, J., and Rainie, L., *The future of social relations*, Pew Research Center, 2010, http://www.pewinternet.org/2010/07/02/the-future-of-social-relations-2/ (accessed June 13, 2019).

called the Global Village. Marshall McLuhan developed the concept of a global village and once and for all changed the shared thought about media, technology, and communications. McLuhan chose the oxymoron "global village", to underline his finding made on an electronic nervous system (the media) that was suddenly integrating the planet.

1.2 HYBRID AGE

While McLuhan diffused this idea, he was not the first to think about the consolidating effects of communication technology. One of the forerunner thinkers was Nicolas Tesla who stated

> "When wireless is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole. We shall be able to communicate with one another instantly, irrespective of distance. Not only this, but through television and telephony we shall see and hear one another as perfectly as though we were face to face, despite intervening distances of thousands of miles; and the instruments through which we shall be able to do his will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket"[14].

The other well-known definition of McLuhan is well summarized in the expression "the medium is the message", which means that the attributes of a medium have as much effect as the information it transmits.

> "McLuhan's concepts have imbued the manner we are thinking about technology and media to such an extent we are generally no longer aware of the revolutionary effect his concepts had when first introduced. McLuhan create the concept of an integrated planetary nervous system a part of our popular culture, so that when the Internet finally arrived in the global village it seemed no less amazing, but still somehow in the natural order of things"[15].

This also manifests itself in the progress and differentiation of devices that have arisen during the period, changing capacities and versatility of operators

[14] Kennedy, J. B., *When Woman is Boss. An interview with Nikola Tesla*, Colliers, 1926, http://www.tfcbooks.com/tesla/1926-01-30.htm (consulted April 18, 2019).
[15] Mc Luhan, M., *Understanding Media*, Mit Press, Boston, 1964.

of communication. “For tribal man, space was the uncontrollable mystery. For technological man it is time that occupies the same role”[16]. Marshall McLuhan understood the paradigm shift, what we called a quantum leap as sort of provocation but, in parallel, a challenge for the ages, including a radical perspective on social change and in the human progress.

> “The ordinary person senses the greatness of the odds against him even without thought or analysis, and he adapts his attitudes unconsciously. A huge passivity has settled on industrial society. For people carried about in mechanical vehicles, earning their living by waiting on machines, listening much of the waking day to canned music, watching packaged movie entertainment and capsulated news, for such people it would require an exceptional degree of awareness and an especial heroism of effort to be anything but supine consumers of processed goods”[17].

In this passage, McLuhan suspends all judgments about the ongoing process, but exemplifies what our challenge is, to tell the tale of the scope of communication nowadays and to steer the attention on the real potentials of the communication itself. We will discuss about systems and complexity in today global village.

Communication today is reaching its boiling point, a concrete point of no return. The growing of digital communication brought attention from the analogue mass media to a global digital media. We define this historical phase in this historical phase (more so than in the past) communication on the edge of a point of no return, because of what we define digital media became global and interactive at the same time, shaping the temper of communication giving the message a potential portability:

[16] Mc Luhan, M., *The Mechanical Bride: Folklore of Industrial Man*, Duckworth Overlook, 2011, p. 85.
[17] Ibid., p. 21.

> "Digital media connects people in ways never before possible, enabling users to maintain friendships across time and distance. It enables those who are socially isolated or somehow set apart from their immediate physical community to connect with like-minded or like-situated people. Digital media also facilitates interaction across social, economic, cultural, political, religious and ideological boundaries, allowing for enhanced understanding"[18].

A Pew Research Center survey on social media and social engagement highlights how "that 57% of teens state they have made a new friend online, and 83% state that social media makes them feel more connected and informed about their friends' lives"[19], which means that one of the feature of social media, or interactive digital communication is to establish a new level of contact and relation among humans, producing effects that in a large scale and long-term are completely unexplored. In this sense, these matters have purely social reasons. Mass extension of the interactive internet (social media based internet) and possibility of social inclusion are closely linked as well as affecting each other. Since nowadays, the majority of young people are users of the social networks we can say that essentially every moment or activity is schedule there, every issue is discussed there because the possibility of providing information to the largest quantity of people results much easier than contacting them personally. "That is why people who are not members of the social networks can be easily "forgotten". They do not know about planned events, they cannot participate in discussions over actual problems. That leads to their slow separation from the group of friends and peers. In this age, friendships are

[18] World Economic Forum, "Digital Media and Society - Section 3: Impact of Digital Media on Individuals, Organizations and Society. Benefits and Opportunities", in World Economic Forum, Geneva 2016, http://reports.weforum.org/human-implications-of-digital-media-2016/benefits-and-opportunities/?doing_wp_cron=1519835063.2826030254364013671875#view/fn-59 (accessed Jun 13, 2019).

[19] Lenhart, A., "Teens, Technology and Friendships", Pew Research Center, 2015, http://www.pewinternet.org/2015/08/06/teens-technology-and-friendships/ (accessed May 22, 2019).

supported by common experiences and mutual communication which is something social network can help with"[20]. Internet and the infinite repository of knowledge, of information and data about us and our forms of interaction, related to devices that allow us to access to the cyberspace and the internet world, are a proper extent of human body and human mind, in a metamorphosis toward hybridization of our faculties, "it is another liberating extension of them, as significant as books, the abacus, the pocket calculator or the Sinclair Z80"[21]. What we assume today is a different kind of interaction than before. Indeed, until the advent of the interactive use of internet "the adult mind was a product of a dialogue between environment and self, and this dialogue allowed for pauses, self-reflection and the slow but sure development of a robust internal narrative"[22], when today the social networking environment present a completely different scenario "that displace a robust inner sense of identity in favor of one that is externally constructed and driven"[23].

In this scenario, we are participating in a historical transformation, a course of things taken only foreseen but never realized until now:

> "Today we stand at the Information Age's frontier: The Hybrid Age. The Hybrid Age is a new sociotechnical era that is unfolding as technologies merge with each other and humans merge with technology — both at the same time. Information technology's exponentially increasing power is propelling other fields forward at

[20] Stasova, L. and Khynova, J., "Internet social networks as important agents of social inclusion for contemporary children and youth", University of Hradec Králové, Czech Republic, 2012, https://www.shs-conferences.org/articles/shsconf/pdf/2012/02/shsconf_shw2010_00032.pdf (accessed Jun 13, 2019).
[21] Naughton, J, "The internet: is it changing the way we think?", The Guardian, August 15, 2010, https://www.theguardian.com/technology/2010/aug/15/internet-brain-neuroscience-debate (accessed Apr 30, 2019).
[22] Greenfield, S., *Mind Change: How digital technologies are leaving their mark on our brains*, Random House Inc., 2015, p. 38.
[23] Ibid.

accelerating rates, allowing them to transcend their individual limitations in scale and speed"[24].

The mind changes of humanity, through the interactivity with technology and digital communication devices and the social world of the net, nurtures a complexity of issues and raise questions that are partially unanswered and partially under the beam of light of academic and no academic research. In view of the social development process, the overall relevance of this subject affect social changes and young generations development, because Social Networking Sites (and human interaction internet more in general) "intersect with key tasks of adolescent psychosocial development, specifically peer affiliation and friendship quality, as well as identity development"[25].

[24] Khanna, P., and Khanna, A., *Hybrid Reality: Thriving in the Emerging Human-Technology Civilization*, TED Books Book 15, Kindle version, pos. 12.
[25] Spies Shapiro, L., and Margolin, G., *Growing Up Wired: Social Networking Sites and Adolescent Psychosocial Development*, US National Library of Medicine National Institutes of Health, 2014, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3795955/ (accessed May 22, 2019).

1.3 DATA COMMUNICATION

Whether the social digital technological transformation is leading us to new frontiers of interactivity and human development, at the same level we should consider the progression of the ecosystem we live in. Today's world, in fact, is the safest and the healthier ever. This is not a propaganda statement, rather is a quantitative evidence built by a crossway of data. A quantitative evidence that causes ripples in a way we look at the world and we come up with technology and think of it. Life in general is not the best possible for every person on the surface of this planet.

There is a wide-ranging debate about the effective social security in which the world is today. One is not always sure that the social security that is offered by an optimistic reading of the data is at the same time an effective perception on the part of the population. One of the most widespread lines of the debate is that which evokes how much security is the result of surrounding oneself with different layers of protection. "Modern insecurity would not be the absence of protections, but rather their reverse: their shadow, projected into a social universe that has organized itself around an endless demand for protections around an overwhelming search for security. What it means to be protected under such conditions? Doesn't that mean taking root in the certainty of being able to perfectly control all the risks of existence; rather, it means living surrounded by systems security systems that are complex and fragile constructions and that carry within themselves the risk of failing in their task and of disappoint the expectations they produce. Insecurity would come so created precisely by the search for protections, for the good reason that the feeling of

insecurity is not a given immediate conscience. It, on the contrary, is connected to different historical configurations, since security and insecurity are reports of the types of protections that a company insures or does not insure adequately. Today, in in other words, being protected also means being threatened"[26].

The breadth of the debate on social security is, at the same time, an important corollary to understanding the process of the constant search for a better quality of life.

The society look at the quality of life as the target to aim to, and technology seems to be the litmus test through which it may defeated inequality.

The fast-moving technological world represents today the paradigm of progress and general process forward of the humanity. War, poverty, democracy, culture and food are the mainstream topics of today fast-moving world representing a cultural inversion of the general tendency until the '50.

These big issues represent part of the main folder of what we consider today quality of life. Quality of life is current term used to refer to something that, already in the ancient world, was strictly connected to happiness. Aristotle in his Nicomachean ethics[27] spoke about happiness as "a certain activity, and an activity is clearly something that comes into being and not something that belong to us"[28], and the term *eudaimonia*, the Greek word mostly translatable as "happiness" (in the cultural feeling that we have of the word today) suggests the condition to have a good *Daimon* on one's side. For this reason, the

[26] Castel, R., *L'insicurezza sociale*, Einaudi, Torino, 2015, p. 2. (English translation provided by the author)
[27] Aristotle, *Nicomachean Ethics*, University of Chicago Press, 2011, p. 24.
[28] Ibid, 28

eudaimonia own to the body of the person itself linked to the world life. In the history of human thought, the binomial quality and life has been treated under different perspectives.

Saint Augustine of Hippo search for God is ultimately a journey toward *beatitudo* or happiness. Nicholas Wolterstorff[29] maintains that this path was quite different from that of a eudaimonist. Although *eudaimonia* was frequently translated into Latin as *beatitudo*, Wolterstorff demonstrates that Augustine does not see it as the eudaimonist 'estimable life,' but a meaning that is closer to true joy.

Saint Thomas Aquinas connected two apparently different concepts: Aristotelian *eudaimonia* and Christian theology, underlining that happiness is bound to moral actions toward God. If happiness is defined for every human being as a consistent tension toward what we would realize in this life as an ultimate fulfillment, the life in itself worth living if its quality is morally oriented. He says that "everyone desires the fulfillment of their perfection, and it is precisely this fulfillment in which the last end consists"[30] and in this regard the ultimate goal (*telos*) is a "formal concept…of the complete and perfect good, that which completely satisfies desire"[31].

Baruch Spinoza in XVII century still associated the happiness in this life with the rectitude in this life. In this regard, happiness is exemplified by aligning personal intention and will with that of the universe. And this is strictly related

[29] Wolterstorff, N., *The Mighty and the Almighty: An Essay in Political Theology*, Cambridge University Press, Cambridge, 2014, p. 53.
[30] Aquinas, T., *Summa Theologiae*, I^{a}- II^{ae} 1.7.
[31] MacDonald, S., "Ultimate Ends and Practical Reasoning: Aquinas's Aristotelian Moral Psychology and Anscombe's Fallacy", The Philosophical Review, Vol. 100, No. 1, Jan 1991, pp. 31-66.

to the entire human community: “He who counts himself more blessed because he alone enjoys well-being not shared by others, or because he is more blessed or fortunate than others, knows not what is true happiness and blessedness”[32]. The universe – God – has its own projects and it is our task to understand rather than rail against these. A free person is the one who is conscious of the necessities that compel us all.

Our rapid excursus on the history of happiness and a potential arrival on what today is the concept of quality of life.

Dealing with the issue of quality of life means putting different perspectives on the subject. The quality of life has to do with the different living conditions proposed, with human development that takes into account different characteristics and includes aspects studied in various disciplines of human knowledge such as philosophy, economics, political science, urban planning, sociology, biology, agronomy, medicine, physics, chemistry, pedagogy, psychology, ecology, engineering, mathematics and computer science, just to name a few.

When it is considered an environment or a city with a good quality of life, it means that the majority of its population can enjoy a number of political, economic and social advantages that allow it to easily develop its human potential and lead a life that can be peaceful and fulfilled.

In what we consider the city environment today, the quality of life is classified through numerous economic and social indicators[33]. The indices are highly

[32] Spinoza, B., *Theological-Political Treatise*, Chapter 3, in Morgan, Spinoza, p. 416.
[33] Nussbaum, M. and Sen, A., *The Quality of Life*, Clarendon Press, Oxford, 1993.

measurable, while social indicators, such as security from crime, social inequality, political freedom, physical health, access to education, pollution, are more difficult to classify and measure. This fact has created an analysis that may be unbalanced and difficult to convey, with the result that standard quantification criteria have been developed for economic aspects, but with the difficulty of agreeing on how to measure others and establish their percentage of mutual importance.

> "By examining the arguments for and against a variety of different accounts of how to measure quality of life, it aims to generate a more complex understanding of alternative positions and their respective merits. The original motivation for this project lay in our perception that these issues were being debated in several different fields whose communication with one another was unfortunately slight. (…) Again, philosophers have for some time been debating the merits of measuring the quality of human life in terms of utility (whether understood as happiness or as the satisfaction of desires or preferences). Some philosophers continue to defend this general approach—though usually with considerable qualification, producing utilitarianisms with complex and subtle restrictions on the nature of the preferences that may be taken into account"[34].

In the context of our research we will use the term "quality of life" to indicate different meanings that can be divided into three categories:

- Quality of environment that refers to quality of the living environment;
- Quality of performance is used for life abilities, as physical and mental fitness. In this use of the term, inner ability to deal with the problems of life is equated with the good life itself;

[34] Ibid., p. 2.

- Quality of the result is used for the outcomes aspect, where the above-mentioned types of qualities are the pre-conditions for a good life. Outcomes are described by 'products' of life and as 'enjoyment' of life.

As we have rapidly seen before, over the centuries, the term 'happiness' has been used to bridge the gap for all above-mentioned meanings of 'quality-of-life'. With a substantial differentiation among centuries, during the history of philosophy the first two meanings mentioned predominated: in social philosophy the meaning of good living conditions (happiness as the good society) and in moral philosophy the meaning of good performance (happiness as virtue). In current social science the third meaning prevails; the word happiness is commonly used to denote subjective enjoyment of life. “Subjective enjoyment of life is not a one-dimensional matter. One can enjoy the thrills of life, but at the same time suffer under its tensions. Likewise, one can like life in one domain, such as marriage, but at the same time dislike life in another, such as work. In the literature on subjective quality-of-life, these appraisals are referred to as respectively aspect-satisfactions and domain-satisfactions”[35].

Data steer the world economy and speculation around various opportunities of development, dwell in what we call today quality of life. Our current reality declares that our world, as we said, is the best possible in term of living and quality. Thereabout. This would demand in fact a same degrowth (or growth) assessment about what we intend as quality of life. For this reason, we are going to explore life expectancy, health, war and peace, education, food and

[35] Veenhoven, R., *Quality-Of-Life And Happiness: Not Quite The Same*, p. 3 https://personal.eur.nl/veenhoven/Pub2000s/2001e-full.pdf (accessed Apr. 25, 2019).

environment. What we are to see is the inversely proportional tendency of the quality of environment compared to the other themes.

Life expectancy[36] has increased fast since the XVII century. Estimates suggested in a pre-modern, poor world, life expectancy in the early 19th century, life is expected to grow in the early-industrialized countries. This led to a very high inequality in how health was spread across the world. Good health in those countries that stayed poor. Over the last few years this global inequality decreased. In 1950 the life expectancy of all countries was higher than in 1800 and the richer countries in Europe and North America had life expectancies over 60 years – after the world war II the health of the population all over the world improved dramatically.

[36] Roser, M, "Life Expectancy", in *Our World in Data*, 2013, https://ourworldindata.org/life-expectancy (accessed May 2, 2019).

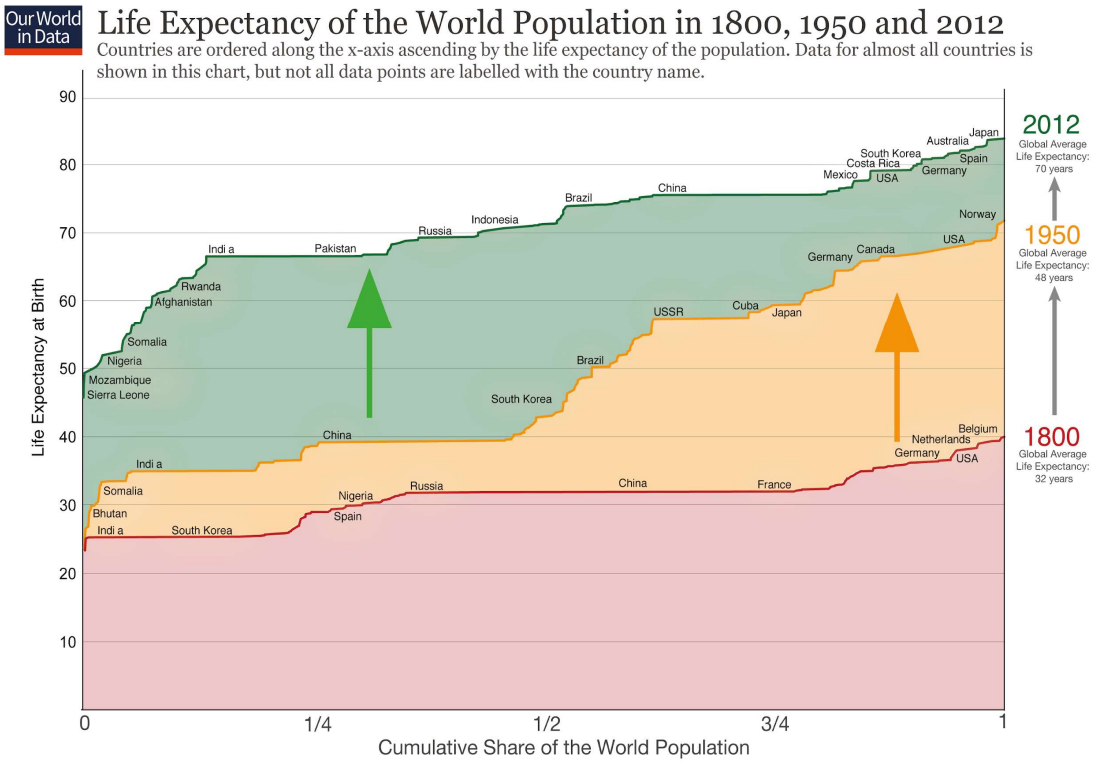
Our World in Data
Life Expectancy of the World Population in 1800, 1950 and 2012
Countries are ordered along the x-axis ascending by the life expectancy of the population. Data for almost all countries is shown in this chart, but not all data points are labelled with the country name.
Life Expectancy at Birth
90
80
70
60
50
40
30
20
10
0
1/4
1/2
3/4
1
Cumulative Share of the World Population
2012
Global Average Life Expectancy: 70 years
1950
Global Average Life Expectancy: 48 years
1800
Global Average Life Expectancy: 32 years
Japan
Australia
South Korea
Spain
Costa Rica
Germany
Mexico
USA
China
Brazil
Norway
Indonesia
USA
Russia
Canada
Indi a
Pakistan
Germany
Rwanda
Afghanistan
USSR
Cuba
Somalia
Japan
Nigeria
Brazil
Mozambique
Sierra Leone
South Korea
China
Belgium
Netherlands
Indi a
Germany
USA
Somalia
Nigeria
Russia
China
France
Bhutan
Spain
Indi a
South Korea
Data source: The data on life expectancy by country and population by country are taken from Gapminder.org.
The interactive data visualisation is available at OurWorldinData.org. There you find the raw data and more visualisations on this topic.
Licensed under CC-BY-SA by the author Max Roser.

FIGURE 4

In these terms, life expectancy is strictly connected with the increasing of GDP per capita, which denotes a close correlation between quality of life and economic wealth.

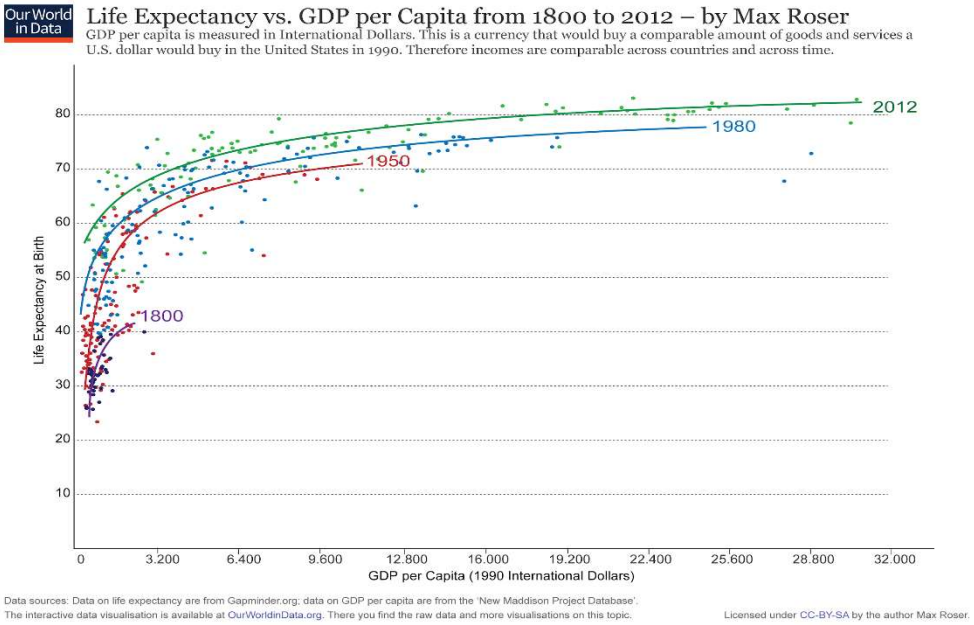

FIGURE 5

Moving to another term of reference, food and undernourishment are what we can most notably see how it has diminished during the last century.

Comparing the two maps below that represent a denotative condition of what was the reality after the first world struggle comparing to the world today[37], today's world reached a general sufficient condition, where the majority of the populations gained access to food and minimum nutrition.

[37] Roser, M., and Ritchie, H, "Hunger and Undernourishment", in *Our World in Data*, 2018, https://ourworldindata.org/hunger-and-undernourishmen (accessed April 24, 2019).

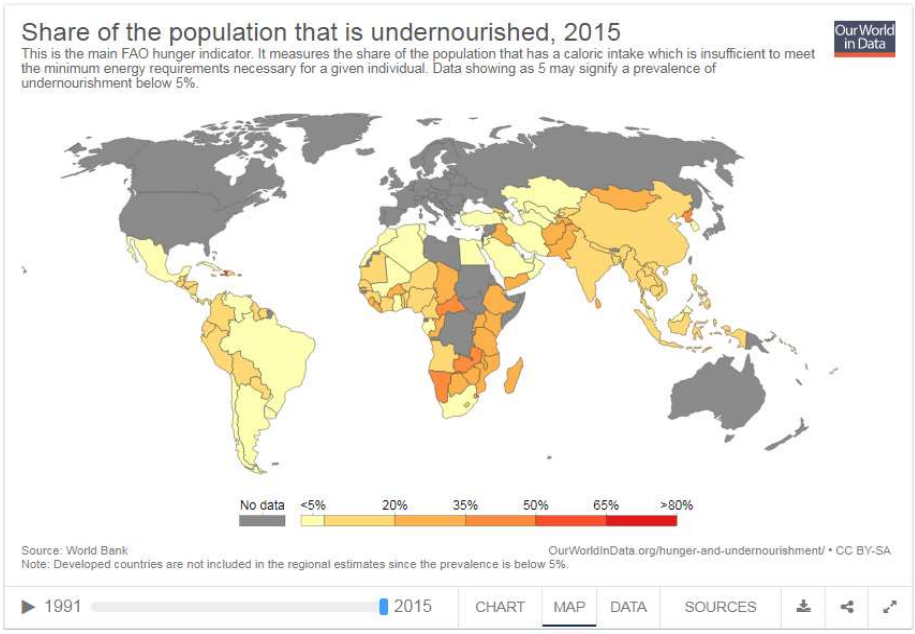

FIGURE 6

The past was not peaceful, and we have the atrocities decreased in the very long run.

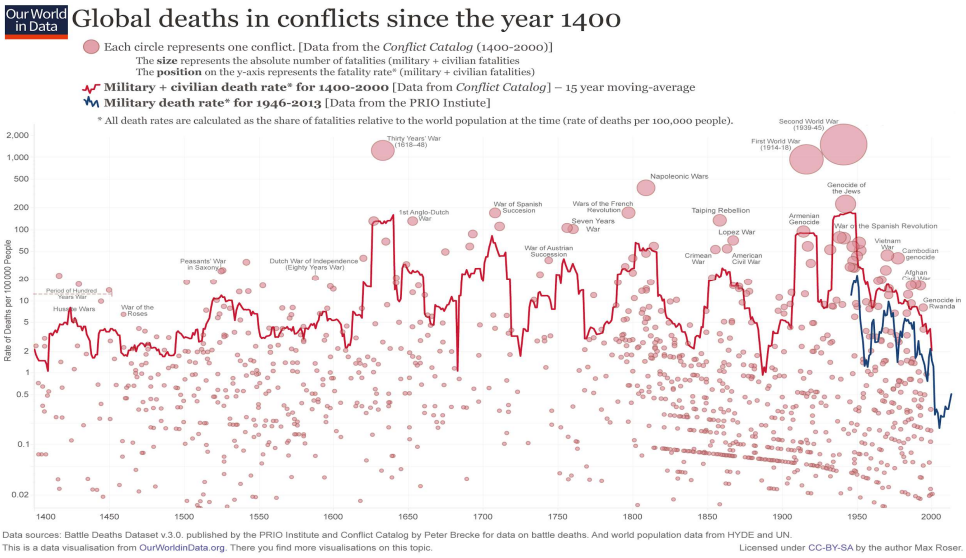

FIGURE 7

The absolute number of war deaths has been declining since 1946. In some years in the early post-war era, around half a million people died in wars[38]; in contrast, in 2007 (the last year for which I have data) the number of all war deaths was down to 22.139.

The decline of the absolute number of battle deaths is visualized in the following chart that shows global battle deaths per year by world region[39].

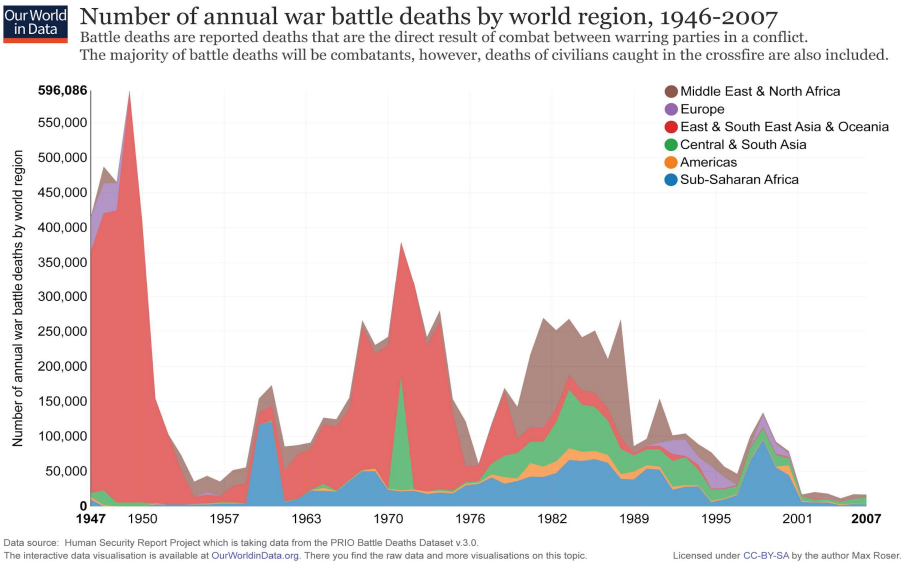

FIGURE 8

The world is healthier, safer and more nutritious than before. Considering education and level of alphabetization, the world pursued the same trend. Education is widely accepted to be a fundamental resource, both for individuals and societies. Indeed, in most countries basic education is nowadays perceived not only as a right, but also as a duty – governments are typically expected to

[38] Roser, M., "War and Peace", in *Our World in Data*, 2017, https://ourworldindata.org/war-and-peace (accessed Apr 24, 2019).
[39] Ibid.

ensure access to basic education, while citizens are often required by law to attain education up to a certain basic level. From a historical perspective[40], the world went through a great expansion in education over the past two centuries. This can be seen across all quantity measures. Global literacy rates have been ascending over the course of the last two centuries, mainly as increasing rates of enrollment in primary education. Secondary and tertiary education have also seen drastic growth, with global average years of education being much higher now than a hundred years ago.

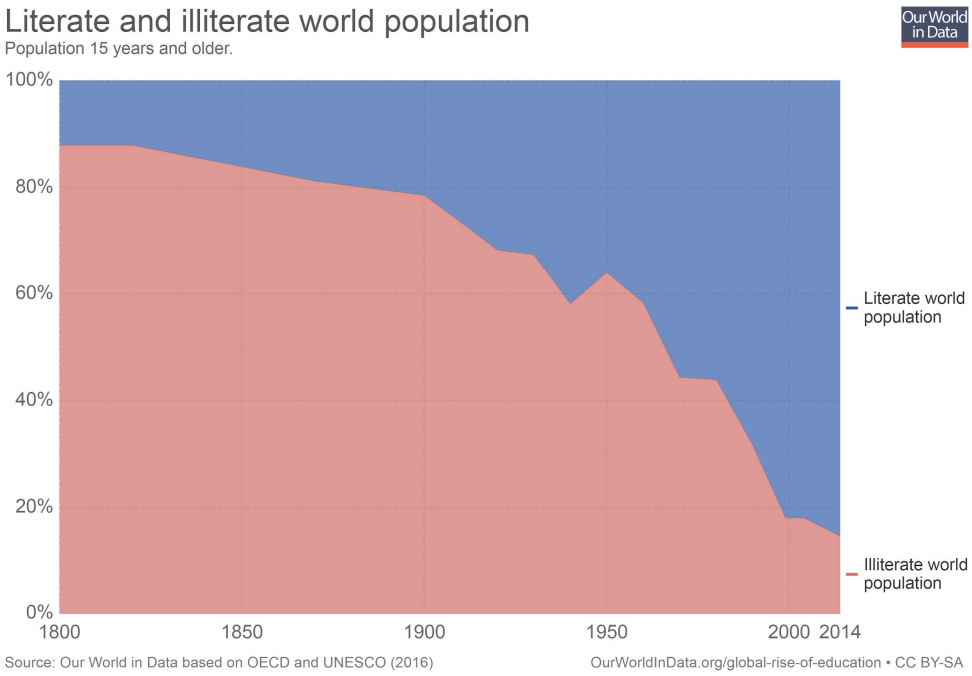

FIGURE 9

Primary school enrollment around the world increased dramatically in the last century, highlighting steady growth in the last twenty years.

[40] Roser, M. and Ortiz-Ospina, E, Global Rise of Education, in "Our World in Data", 2017, https://ourworldindata.org/global-rise-of-education (accessed Apr 24, 2019).

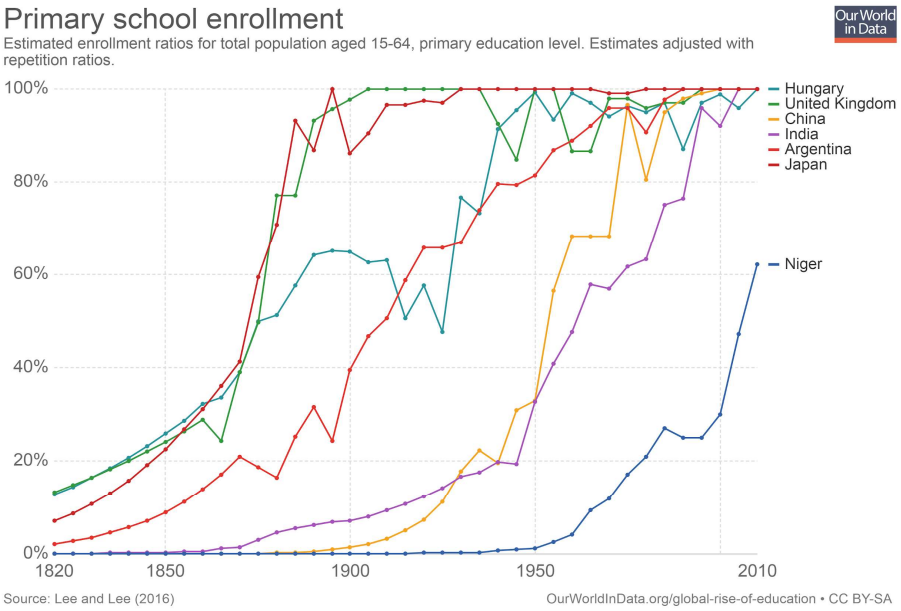

FIGURE 10

Education and human growth are strictly related to all the complexity of quality of life. Compared to what has been said so far, a number of aspects that denote the quality of life, in its quality aspect of the environment, has had a reversal of tendency, catalyzing a strong attention from the international public.

1.3.1 CLIMATE DATA COMMUNICATION

CO2 and greenhouse gas emission, air pollution and natural catastrophes are different issues included in the same folder of quality of environment. Since the Industrial Revolution, however, energy-driven consumption of fossil fuels has led to a rapid increase in CO2 emissions, disrupting the global carbon cycle and leading to a planetary warming impact[41]. Global warming and a changing climate have a range of potential ecological, physical and health impacts,

[41] Ritchie, H., and Roser, M., "CO_2 and other Greenhouse Gas Emissions", in *Our World in Data*, May 2017, https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions (accessed Apr 24, 2019).

including extreme weather events (such as floods, droughts, storms, and heatwaves); sea-level rise; altered crop growth; and disrupted water systems.

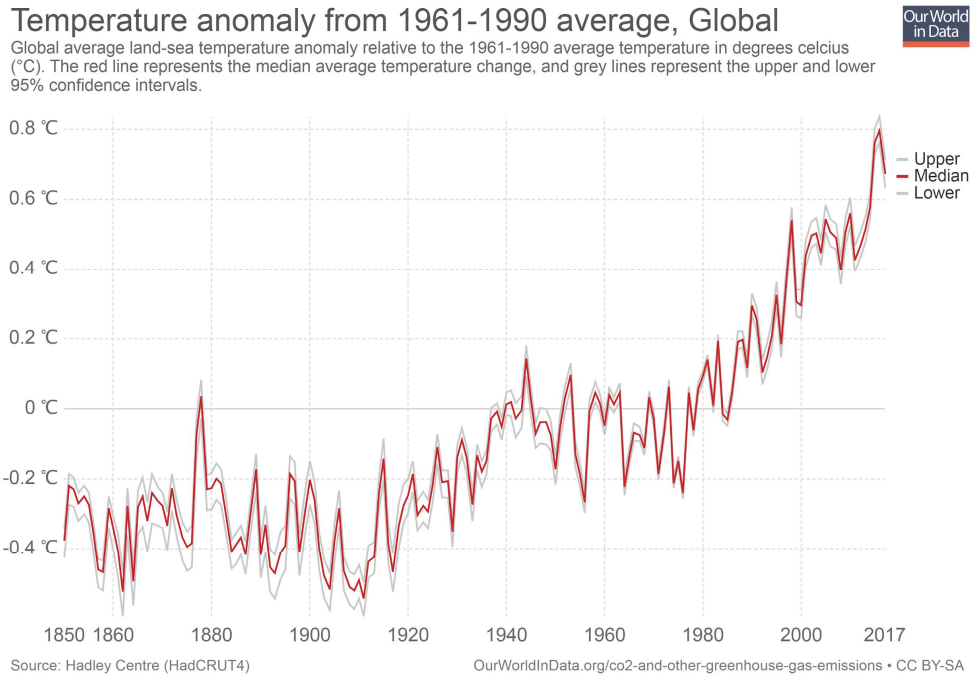

FIGURE 11

At the same time, natural disaster and people injured by natural disaster seriously increased in the last 40 years, pointing out how there is a trend that can be highlighted as inversely proportional to the increase in the quality of life in the world for man. This happens, roughly, for three reasons:

- quality of life is defined by parameters that can be controlled directly and/ or indirectly by man;
- these parameters, though not related to man in himself, are subject to the rules of human development;
- the environment is the only parameter that contrasts with and is inversely proportional to human development.

What we are looking for in this research, is to evidence that today the communication on a global issue as climate change, and the urgency related,

is linked only with the concept of emergency. Climate change is the main struggle for our society because of intangibility of the topic. At the same time, the connection with the quality of life create a distortion, making the below underlined issues on climate change a priority path toward a change in the society. Technology and digital mass communication could improve the strength between men, society and environment; create a melt and a proper multi-faceted system. “At the same time, our own relationship to technology is moving beyond the instrumental to the existential. There is an accelerating centripetal dance between what technologies are doing outside us and inside us. Externally, technology no longer simply processes our instructions on a one-way street. Instead, it increasingly provides intelligent feedback. Internally, we are moving beyond using technology only to dominate nature toward making ourselves the template for technology, integrating technologies within ourselves physically. We don’t just use technology; we absorb it”[42].

In the age of communication and intangible disciplines, climate change could become a quantitative measurement that hits the society in a way that society itself does not realize the clear challenge that it faces. “The Hybrid Age is a liminal phase in which we cross the threshold toward a new mode of arranging global society. The philosopher Karl Jaspers saw such times as both destructive and constructive, because our “unquestioned grasp on life is loosened” and we “ask radical questions”. Nicholas Negroponte of MIT, whose seminal 1995 book Being Digital foresaw the Internet as a “global social fabric”,

[42] Khanna, P., and Khanna, A*., Hybrid Reality: Thriving in the Emerging Human-Technology Civilization*, TED Books Book 15, 2012, Kindle version, pos. 14.

now argues that the Internet is only a transitory instrument that facilitates the far deeper shift now under way"[43].

In this regard, a change of perspective and clear understanding of what we are facing could shift the attention from the emergency issue to what we call a quantum leap. We do not need the umpteenth series of absurd claims, movies, and messages on emergency on climate to protect the survival of human species, or another international empty strategy without smart (specific, measurable, appropriate, realistic, and time-based) objectives, that taken on its own represents not more than a declaration of intentions. However, by the looks of it, the answer is clear. The communication process in the hybrid era needs to face the tendency of integration between humans and technologies, at the same time it needs an inclusion of nature and environment within this process. Not exploitation of nature and natural resources for human interest, rather than the integration of nature in the hybrid process as a new path of communication for climate change and environment crisis.

[43] Ibid.

2. HISTORY OF THE CLIMATE CHANGE COMMUNICATION

2.1 THE ANTHROPOCENE ANALYSIS

The development that has characterized the path of understanding on what has been the communication on climate change must take into consideration a change of paradigm. The vision of the environment over the last century has passed from what we have always considered something external from us, in the anthropocentric vision of the planet, to what is a system that we have modified in a sensitive and considerable way.

To consider what has been the evolution of the analytic environment that led to the detection of climate change, one must consider the worldview that has been promulgated over at least the last century. From this, we draw inspiration from the geological analysis of the planet earth, and from the mutation that man has made of the planet earth in the last centuries.

Anthropocene is a term that spread in the eighties of the twentieth century by the biologist Eugene F. Stoermer and was adopted as a reference term by Paul Crutzen in the article “Geology of Mankind”[44]. Its spread must be traced back to 1973, used by V. Shantser, under The Anthropogenic System of the second volume of Great Soviet Encyclopedia (1973):

> “The Anthropocene, in the scientific worldview, stands for both a quantitative and qualitative break with all previous geological epochs. Changes on a scale that can be seen as dividing major geological epochs, previously occurring over millions of years, are now taking place over decades or at most centuries due to

[44] Creutzen, P.J., “Geology of mankind” in Nature, 415, Jan 3, 2002.

> human action. In this respect, the Anthropocene represents a sharp break from the relatively stable Holocene epoch of the last 11,000–12,000 years, the onset of which marked the end of the last ice age"[45].

The word identifies and defines the geological epoch in which we live, an era in which the causes of planetary and climate changes are attributed to the human being and to what he produces.

Man's ability to change the planet has been of such magnitude and has had such an impact that it has produced different consequences. Climate change is one of the consequences.

> "Anthropocene is a widely proposed name for the geological epoch that covers human impact on our planet. Nevertheless, it is not synonymous with "climate change," nor can it covered by "environmental problems." Bigger and more shocking, the Anthropocene encapsulates the evidence that human pressures became so profound around the middle of the 20th century that we blew a planetary gasket"[46].

As highlighted by Julia Adeney Thomas, the earth system is a concept that amplifies the scope of the problem, highlighting how climate change is the effect of a process within the earth system.

> "The phrase "Earth System" refers to the entirety of our planet's interacting physical, chemical, biological, and human processes. Enabled by new data-collecting technologies like satellites and ever more powerful computer modeling, Earth System science reframes how we understand our planet. Climate is just one element of this system. If we focus on that alone, we will misunderstand the complexity of the danger. The term "environment" helps us understand ourselves as part of ecosystems but fails to capture the newness of our current situation. We have always lived in the environment; only very recently, just as Asia began its

[45] Foster, J., and others, "Imperialism in the Anthropocene", Monthly Review, Jul. 1, 2019, Https://Monthlyreview.Org/2019/07/01/Imperialism-In-The-Anthropocene/(accessed Aug 18, 2019).

[46] Thomas, J. A., "Why the Anthropocene Is Not Climate Change", Common Dreams, Feb. 28, 2019 https://www.commondreams.org/views/2019/02/28/why-anthropocene-not-climate-change (accessed Aug 18, 2019).

skyrocketing development, did we begin living in the altered Earth System of the Anthropocene"[47].

The process of developing the narrative on climate change is substantially affected by what the scientific ecosystem has begun to produce as research and as a hypothesis, since it does not represent a single principle detached from the rest, but climate change is the effect of a system of thought and debate within the scientific community.

[47] Ibid.

2.2 THE CLIMATE CHANGE SCIENCE

The history of the communication of climate change starts at the beginning of the nineteenth century with the first formulations of theories of the mutation of the earth's climate due to anthropic causes.

With the start of the 20th century, anthropocentric theories of climate change begin to be supported by evidences and initiated the first discussions on the validity of the proposed calculations.

During the 60s of the 20th century, the effect of atmospheric warming produced by carbon dioxide became increasingly convincing, although some scientists also pointed out that human activities, in the form of atmospheric aerosols (for example pollution), could also have a cooling effect. During the 1970s, the opinion of scientists was increasingly in favor of warming views[48].

During the 1970s, scientists were increasingly in favor of opinions on heating.

In 1973, thanks to James Lovelock, it was suggested that chlorofluorocarbons (CFCs) could have a direct effect on global warming. In the course of laboratory studies, in 1975 V. Ramanathan found that a CFC molecule could be 10,000 times more effective in absorbing infrared radiation than a carbon dioxide molecule, making CFCs potentially relevant in increasing global warming, despite their concentrations in the atmosphere being very low. In contrast to studies focusing on ozone depletion, in 1985 Ramanathan and other researchers showed that CFCs, along with methane and other gases,

[48] Le Treut, H. and Somerville, L., *Historical Overview of Climate Change Science*, in IPCC: Reports, 2007, https://www.ipcc.ch/site/assets/uploads/2018/03/ar4-wg1-chapter1.pdf (accessed Jul 12, 2019).

could have an equally important effect on the climate. This meant an increase in the speed at which the earth warmed up, twice as fast as expected. In this regard, global warming would reach twice the predicted speed[49]. One of the turning points in the assessment of the role of carbon dioxide took place in 1985 during a joint UNEP/WMO/ICSU conference where, in its conclusions, it was predicted that greenhouse gases are predicted to cause significant warming in the next century and that some warming is inevitable. As a result, in 1988, at the "Implications for Global Security" conference that brought together hundreds of scientists in Toronto, Canada, in 1988, it was concluded that changes in the atmosphere due to human pollution "pose a serious threat to international security and are already having harmful consequences in many parts of the globe", with a warning to reduce emissions by 20% by 2005[50]. The 80s were a revealing time for the most insidious issues and at the same time saw important discoveries to reduce emissions and mitigate the effects of global warming. Ozone depletion was mitigated in 1985 by the Vienna Convention and in 1987 by the Montreal Protocol.

In 1988 the WMO established the Intergovernmental Panel on Climate Change with the support of UNEP. The Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental body of the United Nations that aims to provide the world with objective scientific information to understand the

[49] The Discovery of Global Warming, in American Institute of Physics, https://history.aip.org/climate/othergas.htm (accessed Jan 15, 2020).
[50] WMO (World Meteorological Organization), *The Changing Atmosphere: Implications for Global Security*, Toronto, Canada, 27–30 June 1988: Conference Proceedings (PDF). Geneva: Secretariat of the World Meteorological Organization. https://www.academia.edu/4043227/The_Changing_Atmosphere_Implications_for_Global_Security_Conference_Statement_1988 (accessed Jan 15, 2020).

scientific basis for human-induced climate change, its natural, political and economic impacts and risks, and possible response options[51].

The IPCC produces reports that contribute to the work of the United Nations Framework Convention on Climate Change (UNFCCC), the most relevant international treaty on climate change. The objective of the UNFCCC is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (man-induced) interference with the climate system"[52]. The IPCC has produced several reports throughout its history, covering "scientific, technical and socio-economic information relevant to understanding the scientific basis for human-induced climate change risk, its potential impacts and options for adaptation and mitigation"[53]. The succession of reports produced by IPCC follows the evolution of the climate change debate.

> "In 1990, the First IPCC Assessment Report (FAR) underlined the importance of climate change as a challenge with global consequences and requiring international cooperation. It played a decisive role in the creation of the UNFCCC, the key international treaty to reduce global warming and cope with the consequences of climate change. The Second Assessment Report (SAR) (1995) provided important material for governments to draw from in the run-up to adoption of the Kyoto Protocol in 1997. The Third Assessment Report (TAR) (2001) focused attention on the impacts of climate change and the need for adaptation. The Fourth Assessment Report (AR4) (2007) laid the groundwork for a post-Kyoto agreement, focusing on limiting warming to 2°C. The Fifth Assessment Report (AR5) was

[51] "Principles Governing IPCC Work", in Inter Governmental Panel on Climate Change (IPCC), https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf, (accessed Jan 15, 2020).
[52] "First steps to a safer future: Introducing The United Nations Framework Convention on Climate Change", in United Nations Framework Convention on Climate Change (UNFCCC), https://web.archive.org/web/20140108192827/http://unfccc.int/essential_background/convention/items/6036.php, (accessed Jan 15, 2019).
[53] "Principles Governing IPCC Work", in Inter Governmental Panel on Climate Change (IPCC), https://archive.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf, (accessed Jan 15, 2020).

finalized between 2013 and 2014. It provided the scientific input into the Paris Agreement"[54].

In the 1990s, thanks to improved computer model fidelity and observation work confirming Milankovitch's ice age theory, a consensus was reached that the greenhouse effect was involved in most climate change and that human emissions led to serious global warming problems. Since then, most of the scientific work has been geared towards producing reports from the Intergovernmental Panel on Climate Change (IPCC - the international body for assessing the science related to climate change).

The primary consideration that leads to a substantial analysis of what has been the history that has defined the climate in its change, is what will be precisely analyzed in this research: the difficulty of communicating climate change for a constant confrontation and clash between those who claim existence and the detractors. This crash led to what we consider today to a political and public debate that slows the process toward rapid and consistent remedies on the climate issue. First, the climate challenge has been a communication challenge, started in late nineties and continues nowadays.

2.2.1 Multi Proxy Analysis

It was 1998 when Michael E. Mann — a researcher, climatologist and geophysicist at Penn State University—published an article in Nature magazine that would go down in history. Written together with Raymond S. Bradley and Malcolm K. Hughes, the article reconstructed the changes in the Earth's climate (above all, the changes in mean temperature) over the last 600 years. The term

[54] "History of IPCC", Reports, in Intergovernmental Panel on Climate Change, https://www.ipcc.ch/about/history/, (accessed Jan 15, 2020).

of reference through which they developed the quantitative analysis of the data, since there is no certain data, was based on proxy data, which allowed them to reconstruct the climate of the past. This included ice cores, corals, lake sediments and tree rings:

> "Spatially resolved global reconstructions of annual surface temperature patterns over the past six centuries are based on the multivariate calibration of widely distributed high-resolution proxy climate indicators. Time-dependent correlations of the reconstructions with time-series records representing changes in greenhouse-gas concentrations, solar irradiance, and volcanic aerosols suggest that each of these factors has contributed to the climate variability of the past 400 years, with greenhouse gases emerging as the dominant forcing during the twentieth century. Northern Hemisphere mean annual temperatures for three of the past eight years are warmer than any other"[55].

In 1999, the three researchers extended their estimates on the planet's climate history to cover 1000 years, with a focus on the northern hemisphere. In this regard, what we call "hockey stick" graph was born, which got its name from its distinctive shape: in describing the earth's mean surface temperatures over the last millennium, a staggering rise could be observed over the course of just a few recent decades.

[55] M. E. Mann, M. E., and others, "R. S. Bradley, M. K. Hughes, Global-scale temperature patterns and climate forcing over the past six centuries", in Nature, 392, pp.779–787.

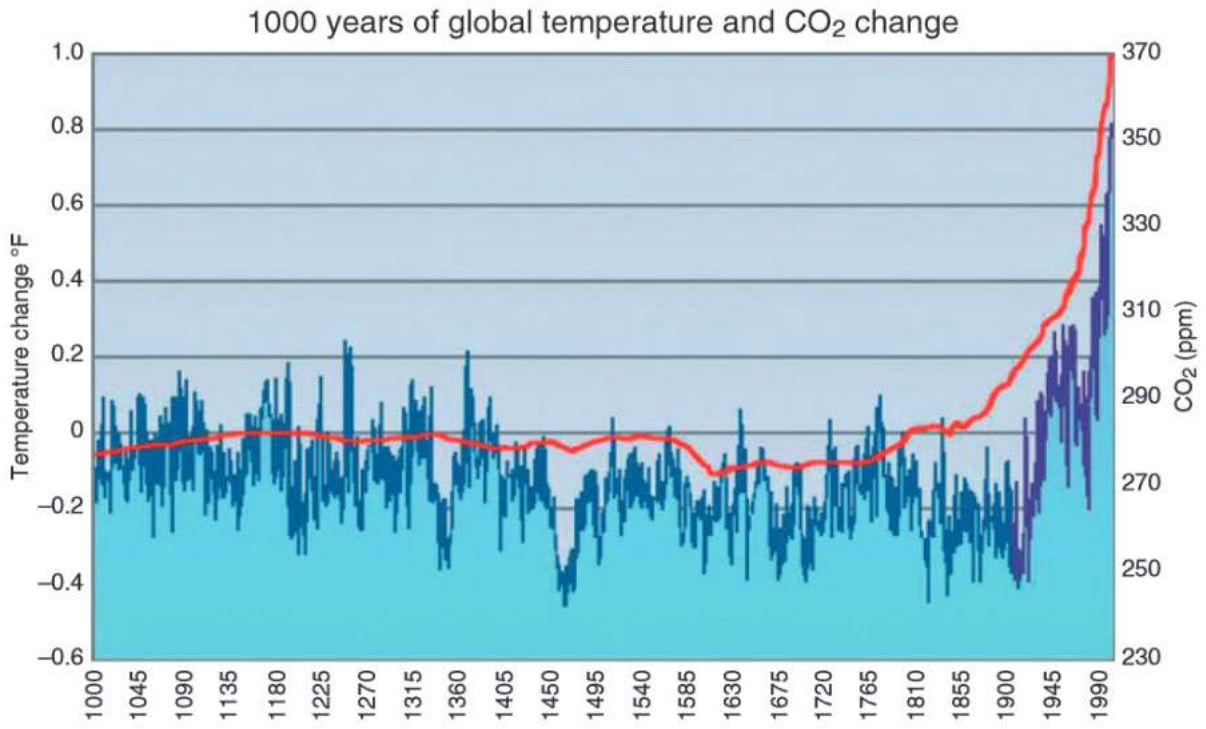

FIGURE 12

It was hard not to connect this rise with human activity. Although there was some variability due to the use of proxy data, the overall trend was undeniable. This study would have become famous two years later, in 2001, when the IPCC was formed. The IPCC was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Program (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation included it in its third report[56]. In this regard, the institutionalization of climate change was the first step ahead toward the public debate on the data validity.

In view of what Jones et al analyzed and reconstructed in 1998, Manna Bradley and Hughes reviewed their own research trying to re-examine the 24

[56] "Intergovernmental panel on climate change (IPCC)", Working Group I, The Physical Science Basis, in IPCC, Geneva, https://www.ipcc.ch/working-group/wg1/ (accessed Jan 15, 2019).

proxy records by extending them before the fifteenth century. Specifically, Mann extracted a series of statistical data alternately removing proxy records to see how this affected the results. This led to some critical issues with the reconstruction, highlighting how the data they reported had a validity in a time no earlier than 1400[57].

An analysis of the effect of heat and the increase in CO2 levels on some trees identified by Gray Bill and Idso, has allowed reporting in a conclusive and correct way the data, and canceling out the uncertainties that had arisen in this regard[58].

The reconstruction of Mann, Bradley and Hughes, which covers a period of about 1000 years and is called MBH99, was disseminated and published between 1998 and 1999 (notes), underlining above all that the temperatures of the twentieth century had been the highest ever. So, Mann's statements:

> "As you go back farther in time, the data become sketchier. One can't quite pin things down as well, but our results do reveal that significant changes have occurred, and temperatures in the latter 20th century have been exceptionally warm compared to the preceding 900 years. Though substantial uncertainties exist in the estimates, these are nonetheless startling revelations."

[57] Stevens, W.K., "Song of the Millennium: Cool Prelude and a Fiery Coda", New York Times, Mar 9, 1999, https://www.nytimes.com/1999/03/09/science/song-of-the-millennium-cool-prelude-and-a-fiery-coda.html (accessed Mar 21, 2019).
[58] Mann, M., Michael E., *The Hockey Stick and the Climate Wars: Dispatches from the Front Lines*, Columbia University Press, New York, 2012.

While the reconstruction supported theories of a relatively warm medieval period, Hughes said "even the warmer intervals in the reconstruction pale in comparison with mid-to-late 20th-century temperatures"[59].

However, there was no evidence of the factors that had influenced the rise in temperatures in the period before the fifteenth century[60].

An important moment that marked a step in the consolidation of the data proposed by Mann Bradley and Hughes, were the conclusions is that came the working group 1 part of the IPCC Third Assessment Report, where in a specific section was used multiproxy analysis as a reference point for temperature rise during the twentieth century and as the hottest decade in history that of the nineties of the twentieth century itself[61].

After several debates and comparisons that confirmed what was reported in the analysis of the multiproxy records, the report of the working group one was unanimously approved by all the countries representing the member governments and circulated through the world media[62].

The third report of the IPCC was taken into account by experts especially for the graphical reproduction of the hockey stick graph, which regardless of the

[59] University of Massachusetts Amherst, 1998 Was Warmest Year of Millennium, in UMass, UMass Amherst Climate Researchers Report, UMass Amherst Office of News & Information, Amherst, Mar. 3rd March 1999, https://www.umass.edu/newsoffice/article/1998-was-warmest-year-millennium-umass-amherst-climate-researchers-report (accessed Feb 12, 2019).

[60] Wahl, E. R., and Ammann, C. M., *Robustness of the Mann, Bradley, Hughes reconstruction of Northern Hemisphere surface temperatures: Examination of criticisms based on the nature and processing of proxy climate evidence*, Springer Science Business Media, Berlin, 2007.

[61] "Intergovernmental panel on climate change (IPCC)", Working Group I, The Physical Science Basis, in IPCC, Geneva, https://www.ipcc.ch/working-group/wg1/ (accessed Jan 15, 2019).

[62] Kirby, A., "SCI/TECH: Human effect on climate beyond doubt", BBC News, Jan 22, 2001, http://news.bbc.co.uk/2/hi/science/nature/1130501.stm (accessed Mar 22, 2019).

scientific value of the graph itself, has been widely used by the media to support issues related to climate change point at the same time was the basis of controversy a those who denied climate change comma and those countries that opposed the ratification of the Kyoto Protocol on climate change[63].

A further step towards bringing closer what we are now analyzing as the effects of the communication on climate change is the report published in 2007, the IPCC Fourth Assessment Report (AR4), which implements and defines in a more structured way what had already emerged in the report signed by countries in 2001[64]. In this report, it is reaffirmed that the twentieth century was probability been the hottest century in the last 400 years, and that in the second half of the twentieth century temperatures have certainly been higher than the last 500 years and probably the highest in the last 1300 years[65].

The result of the report reaffirmed what was said above, consolidating the rise in temperatures more with specific tests and comparisons as a certain and incontrovertible fact.

Nonetheless, climate change deniers wasted no time in finding flaws, despite the fact that the data in Mann's study—which were already solid from the outset—only seemed to get stronger[66] as the years passed. In the article

[63] Monastersky, R., "Climate Science on Trial", The Chronicle of Higher Education, Sep 8, 2006, https://www.chronicle.com/article/Climate-Science-on-Trial/34665 (accessed May 20, 2019).
[64] "Intergovernmental panel on climate change (IPCC), AR4 Climate Change 2007: Synthesis", in IPCC, Geneva, https://www.ipcc.ch/report/ar4/syr/ (accessed Jan 16, 2019).
[65] Ibid.
[66] Mann, M.E., and others, Proxy-based reconstructions of hemispheric and global surface temperature variations over the past two millennia, Proceedings of the National Academy of Science of United States of America (PNAS), Sep 9, 2008, Washington DC, https://www.pnas.org/content/105/36/13252 (accessed Mar 5, 2019).

published in 2008[67] Mann and other researchers reached the conclusion, that extend previous one, that recent Northern Hemisphere surface temperature increases are likely anomalous in a long-term context:

> "Recent warmth appears anomalous for at least the past 1,300 years whether or not tree-ring data are used. If tree-ring data are used, the conclusion can be extended to at least the past 1,700 years, but with additional strong caveats. The reconstructed amplitude of change over past centuries is greater than hitherto reported, with somewhat greater Medieval warmth in the Northern Hemisphere, albeit still not reaching recent levels"[68] .

The year 2009 should be considered as a crucial year for climate change studies and, consequently, in a day by day more widespread public debate on it. In December of that year, an international climate summit was held in Copenhagen, namely COP15 (Conference of the Parties to the United Nations Framework Convention on Climate Change). The main goal of the conference was for participating nations to reach an agreement on limiting greenhouse gas emissions, to slow the pace of rising global temperatures. After long, difficult negotiations among the countries delegates, the result was that the conference was unable to yield any significant results. What happened? As is often the case in these contexts, developing nations (in particular China and India, which in a strong economic growth) had starkly different opinions on the matter compared to more industrialized nations. The request to limit emissions and the subsequent sacrifices that that would entail would have had a different impact on each country. This difference led to heated clashes, despite the fact that

[67] Ibid.
[68] Ibid.

nearly the entire scientific community agreed that greenhouse gases were making the planet warmer and warmer.

The hockey stick graph shows estimates of the earth's mean surface temperatures over the last millennium. It gets its name from the fact that the last part of the graph shows a sharp rise in temperature.

However, despite this near total unanimity, the controversy surrounding anthropogenic global warming was already raging. That is because the scandal known as "Climategate"[69] had broken about a month earlier, following the illegal release of some private emails and documents belonging to the Climate Research Unit (CRU)[70] at the University of East Anglia in Norwich, England.

[69] "The Guardian, Q&A: Climategate", in The Guardian: Climate Change, Nov. 2009, https://www.theguardian.com/environment/2010/jul/07/climate-emails-question-answer (accessed Feb 1, 2019).

[70] "Climate Research Unit", in University of West Anglia: CRU, http://www.cru.uea.ac.uk/ (accessed Jan 12, 2019).

2.3 THE CLIMATE CHANGE INFORMATION

The dissemination of scientific news and the media's revival of global references have created the first real process of massification of information on climate change. After the cyber-attacks, in fact, in a few weeks the hacked data and documents of the research institute were disseminated through websites managed by conspiracy theorists and climate change deniers. The issue, in addition to the less authoritative press channels, was also extensively discussed on the website of the Daily Telegraph, which hosted a blog of the British conservative - and climate change denier James Delingpole[71]. Some phrases were taken completely out of context and used to discredit or undermine the work done by the CRU and the IPCC. There was an extract from e-mails in particular that threatened to damage the work of Mann and his collaborators, and that those who were turned towards a denial opinion of climate change, such as the American conservative Sarah Palin, immediately reused: in essence, it seemed that scientists had some difficulty in demonstrating that today's temperatures were really so different from those of the past. In addition, the deniers claimed that the data contained in the very first graph of the "hockey stick" had been falsified to show an increase in temperatures that had never actually occurred.

[71] Jones, P., "University of East Anglia emails: the most contentious quotes", The Telegraph, London, Nov 23. 2009, https://www.telegraph.co.uk/news/earth/environment/globalwarming/6636563/University-of-East-Anglia-emails-the-most-contentious-quotes.html (accessed Feb 22, 2019).

In the controversial email, one of the CRU's climatologists, Phil Jones, seemed to refer to a "trick"[72] that Mann had used in his original graph to hide a problem, namely that the data provided by tree rings in high-latitude locations—again, one of the proxy indicators used to estimate temperatures—were not in agreement with the general trend depicted in the graph after 1961. Thus, it seemed that Mann had hidden this fact by eliminating those data from the final version of the graph. In a certain sense, this was true, but mainly because it did not make sense to use proxy data when instrumental temperature data were available for that period. Indeed, this discrepancy between tree-ring data and instrumental data seems to be of secondary importance given the overwhelming amount of evidence in support of anthropogenic global warming. In any case, there is still no explanation for it. Known as the "divergence problem"[73], the most widely believed theory is that widespread droughts, most of which occurred at high northern latitudes, slowed tree ring growth to a rate that would have been expected during a cooler period than normal.

Once Climategates was shown to be unfounded[74], the press quickly moved on. Nonetheless, this manufactured scandal still managed to cause substantial damage, empty claims and all. Having broken right before the Copenhagen summit, it only served to encourage climate change deniers. And although it

[72] Jones, P., University of East Anglia emails: the most contentious quotes, The Telegraph, London, Nov. 23. 2009, https://www.telegraph.co.uk/news/earth/environment/globalwarming/6636563/University-of-East-Anglia-emails-the-most-contentious-quotes.html (accessed Feb 22, 2019).

[73] Skeptical Science, Tree-ring proxies and the divergence problem, in Skeptical Science, Jul. 25, 2015, Https://Skepticalscience.Com/Tree-Ring-Proxies-Divergence-Problem.Htm (Accessed Mar 12, 2019).

[74] Fischer, D., "Climategate Scientist Cleared in Inquiry, Again", Scientific American, Jul 1, 2010, https://www.scientificamerican.com/article/climategate-scientist-cleared-in-inquiry-again/ (accessed Mar 23, 2019).

was not the main reason for the summit's failure, it certainly played a role in delaying a formal agreement among nations—something that would only occur in 2015[75] at COP21 in Paris. Unfortunately, this fake scandal continues to act as fodder for climate change deniers to this day. CRU climatologists from back then are still subject to accusations and threats[76] of all kinds. And two other Climategates were pushed in the years that followed, which were even flimsier and more ungrounded than the first. Once again, emails and data were taken completely out of context in the hopes of proving a conspiracy on the part of climatologists. The scandals blew over just a few days after the fake news came out, only further demonstrating the ridiculousness of the claims.

These events should make us reflect on how to talk about the issue of global warming. We have to avoid making naive errors, which only serve to complicate our approach to the problem. While it is true that certain turns of phrase used by Phil Jones were published illegally and completely out of context, it is also true that he used a rather poor choice of words in his emails. For example, Jones had spoken of a "trick" to hide the divergence problem, when in reality it was the only logical decision to make in that situation. Nonetheless, the decision not to have an open discussion about discrepancies in tree ring growth data turned out to be a mistake, as this made it easy to accuse scientists of misusing data, lacking transparency and being intellectually dishonest. And it was a careless mistake at that, as making the issue known and discussing it publicly

[75] "European Commission, Paris Agreement", in *European Commission: Climate Negotiations*, https://ec.europa.eu/clima/policies/international/negotiations/paris_en (accessed Jun 3, 2019).
[76] Milman, O, "Climate scientists face harassment, threats and fears of 'McCarthyist attacks'", The Guardian, Feb. 22, 2017, New York, https://www.theguardian.com/environment/2017/feb/22/climate-change-science-attacks-threats-trump (accessed Nov 1, 2018).

would have been enough to show people that this was just a minor problem when compared to what the world was facing. While it is true that scientists did not make major mistakes in handling the situation, the fact remains that the repercussions of this manufactured scandal reinvigorated climate change deniers. In addition, it is important to remember that hoaxes and fake news stories never really die out: they stay in a sort of limbo for years or even decades, waiting for someone to revive them.

There has been pressure from industry and politics over time, which has had an impact on communication. This, primarily, has to do with the intangibility of the subject and, therefore, with the simplest manipulation. In an article in the New Scientist, some climatologists claim to be under enormous pressure to distort or conceal any scientific findings that suggest that human activities are responsible for global warming. A survey of climatologists reports that "almost half of respondents reported pressure to remove the words “global warming” and “climate change” from a variety of statements. These scientists have been under pressure to align their publications with the Bush administration's skepticism about climate change[77].

In June 2008, an internal NASA investigation showed that some NASA employees had avoided publishing data to protect the Bush administration during the 2004 presidential election[78]. Some scientists, who also support the theory of global warming, expressed concern about the exaggerations and

[77] New Scientist Environment and Reuters, “US climate scientists pressured on climate change”, in New Scientist, Jan 31, 2007, https://www.newscientist.com/article/dn11074-us-climate-scientists-pressured-on-climate-change/, (accessed Jan 18, 2020).
[78] Goddard, J., “Nasa 'played down' global warming to protect Bush”, in *The Scotsman*, June 4, 2008, http://news.scotsman.com/world/Nasa-39played-down39-global-.4147975.jp , (accessed Jan 18, 2020).

dramatization of the future effects of climate change by activists and the press[79]. Richard Lindzen, professor of meteorology at MIT, said that: "...(in the) winter of 1989 Reginald Newell, a professor of meteorology [at MIT] lost funding from the National Science Foundation for the analysis of data that did not show a net increase in temperature in the past century," Lindzen speculated that four other scientists had lost their funding or their jobs after questioning scientific support for global warming[80].

Nowadays, the work of scientists like Mann is not just important from a research point of view—it also carries enormous political weight. The only way for scientists not to be attacked by those whose minds are already made up is to present clear and indisputable scientific data. Moreover, this is something that should be done at all times regardless of the situation, be it a scientific publication, a conference or even a private email exchange between colleagues. Climate change deniers are always on the hunt for scandals and conspiracies—that is the main way they increase their ranks. Thus, it is of paramount importance to use the correct words and to be transparent, even when presenting any discrepant data.

It is always a good idea to avoid sensationalism. Nonetheless—and unfortunately—it is still a common occurrence. For example, the fact that global levels of carbon dioxide in the atmosphere passed 400 parts per million[81] is completely irrelevant. What matters is the trend, namely that there is a rapidly

[79] Hulme, M, "Chaotic World of Climate Truth", Nov 4, 2006, http://news.bbc.co.uk/2/hi/science/nature/6115644.stm, (accessed Nov 3, 2018).
[80] Lindzen, R., "Climate of Fear", The Wall Street Journal, https://www.wsj.com/articles/SB114480355145823597, /accessed Jan 21, 2020).
[81] 400 PPM, in 400 PPM, http://400.350.org/ (accessed Nov 3, 2018).

growing concentration of this greenhouse gas in the atmosphere. That is what merits attention. Constantly. Every single day. Choosing a number as a symbol of climate change or publishing tear-jerking images[82] of polar bears starving to death might be a good way to raise money or tug at the public's heartstrings, more emotion based than fact based. Moreover, we should not have to rely on propaganda to describe an issue that is crucial to the future of humanity, especially when it is corroborated by increasingly detailed scientific data. The ultimate goal should be to communicate the clearest and most accurate information possible, which can be done by using other communication strategies that are more intellectually honest and just as effective. One example is a Bloomberg page[83] that identifies the cause of global warming in just a few clicks, using language appropriate for all audiences; it leaves very little room for doubt. Another example is a diagram[84] created by Finnish researcher Antti Lipponen that shows anomalies in average global temperatures from 1900 to today on a nation-by-nation basis. Two other websites that summarize decades of research and thousands of publications in an accessible format are Skeptical Science and Climalteranti[85].

We are constantly exposed to all kinds of news, be it through newspapers, television, websites and other information sources of varying credibility. In

[82] Gibbens, S., "Heart-Wrenching Video Shows Starving Polar Bear on Iceless Land", in *The National Geographic*, Dec. 7, 2017, https://www.nationalgeographic.com/news/2017/12/polar-bear-starving-arctic-sea-ice-melt-climate-change-spd/ (accessed May 7, 2019).
[83] Bloomberg, "What's really warming the world", in *Bloomberg*, Jun 25, 2015, https://www.bloomberg.com/graphics/2015-whats-warming-the-world/ (accessed Jan 23, 2019).
[84] St Fleur, N., "Visualizing the Invisible Drivers of Climate Change", in *The New York Times*, Dec 16, 2016, https://www.nytimes.com/2016/12/16/science/carbon-dioxide-satellite.html (accessed Jan 23, 2019).
[85] Caserini, S., "Psicologia e cambiamenti climatici", in *Climalternanti* https://www.climalteranti.it/2011/07/08/psicologia-e-cambiamenti-climatici/ (accessed Oct 2, 2019).

addition, every day some issues emerge which, by their very nature, spark debate. Each one of us is naturally inclined to support a side (we know this as confirmation bias), school of thought or idea—it is human nature and well within reason. Thus, topics such as GMOs, animal testing, alternative medicine, pesticides and other science-related issues are constant sources of debate. Again, there is nothing wrong with that, asking questions and having doubts are fundamental parts of scientific research. What is important, however, is that this subject is far too important to be defiled by using an approach other than based on pure curiosity and a desire to know the facts. Global warming is, without a doubt, one of the most consequential topics of discussion in science today, and everyone knows why: if humankind admits that it is its guilty the excessive rise in average global temperatures (with all the possible consequences that that entails), there will be serious political and economic repercussions. The data show[86] that reducing greenhouse gas emissions to limit the damage and prevent average global temperatures from increasing by more than 2ºC is a colossal undertaking for nations. However, the world has no choice if it wants to avoid causing even greater damage than what has already been inflicted upon ecosystems and the economy, especially in developing nations.

The best way to tackle an issue as crucial as climate change is to first understand where the skeptics and deniers are coming from. Are they motivated by a distrust of science? Are they biased from the outset? Do they have good or bad intentions? Science is neither a creed nor a political

[86] Titley, D., "Why is climate change's 2 degrees Celsius of warming limit so important?", in *The Conversation*, Aug 23, 2017, http://theconversation.com/why-is-climate-changes-2-degrees-celsius-of-warming-limit-so-important-82058 (accessed Jan 22, 2019).

movement—it is a method. It is the best method we have for understanding how our world works. In this sense, however, we must consider that the debate on the scientific method has been one of the fields of confrontation in the history of thought, especially in the last two centuries. It is precisely this debate that is central to the development and evolution of the climate change debate, Feyerabend, for example, in "Against the method. Outline of an Anarchistic Theory of Knowledge" aims to demonstrate that any attempt to find an order in the world of science, creating schemes to rigorously define the processes of research and discovery, can only be doomed to failure, and this is due to the intrinsic nature of the path of discovery, which cannot be restricted or limited by the rules of a rigid method. From which it follows that the only rule necessary for scientific progress can be traced back to the need not to be conditioned by rules, maintaining absolute methodological freedom[87]. Feyerabend, therefore, argues that science could not have developed if scientists had applied the method as conceived by most philosophers of science, and brings some examples of scientists who have supported a theory against the evidence of experimental data.

Less radical and targeted criticisms of the idea that scientific progress really develops according to a scientific method were put forward by Thomas Kuhn, who believes that scientific progress is non-linear and characterized by the imposition of new successive paradigms that constitute a real scientific revolution. The language and theories of different paradigms could not be translated or evaluated rationally with each other; that is, they would be

[87] Feyerabend, P., *Against Method*, Verso, London, 1993.

immeasurable. This has given rise to many debates about peoples and cultures that would have radically different worldviews or conceptual patterns; so different that they could not understand each other even if one of them is the best[88]. To complete an overview of the theories of scientific method in the 20th century, Karl Popper in The Logic of Scientific Discovery explains that science cannot relate to methods based on induction: no matter how many observations of a phenomenon one could never deduce anything general, nothing allows us to establish that the next case observed will behave like the previous ones; in this regard the example of the inductivist turkey has become famous. According to Popper, science should adopt a methodology based on falsification, since no number, however large, of experiments can establish something as the truth, but a single experiment can contradict it. Popper believed that all theories based on empirical research should be characterized by falsification[89].

Science is certainly the method on which we entrust our paths to truth, and as such those for understanding and counteracting climate change. The convergence on the existence of climate change by the scientific community places climate change as a proven phenomenon[90].

[88]Kuhn, T., *The Structure of Scientific Revolutions*, The University of Chicago Press, 1995.
[89]Popper, K., *The Logic of Scientific Discovery*, Martino Fine Books, 2014.
[90] Watts, J., "No doubt left about scientific consensus on global warming, say experts", in *The Guardian*, Jul 24, 2019, https://www.theguardian.com/science/2019/jul/24/scientific-consensus-on-humans-causing-global-warming-passes-99, (accessed Jan 22, 2019).

2.4 CLIMATE CHANGE DENIAL

2.4.1 THE GENESIS OF THE CLIMATE ISSUE

The denial of man-made global warming (sometimes also called climate denial, climate change denial or climate science denial) is the denial, the unawareness, the fight against the scientific consensus of ongoing climate research on global warming. These include the denial through the advocacy of dogmas, of these factors:

- that the land is currently a living being;
- of the anthropogenic, i.e. artificial effect;
- that heating causes serious social and ecological problems.

In addition to the three basic categories of denial of trends, denial of causes and denial of consequences, there is also a fourth category of denial of consent, namely denial that these fundamental statements have long been undisputed in research[91].

Although, as we have seen, consensus in science has prevailed since the beginning of the 1990s and is shared by all research and academic centers in all major industrialized countries[92], some sectors of public opinion continue to reject the existence of man-made global warming. The rejection is clearly pronounced in the states where a narrative that has been influential over time

[91] Shwed, U., and Bearman, P. S.,"The Temporal Structure of Scientific Consensus Formation", in *American Sociological Review*, *75*, New York, 2010, pp. 817–840.
[92] Mann, M. E., Toles, T., *The Madhouse Effect: How Climate Change Denial Is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy*, Columbia University Press, New York, 2016.

has been created, especially fed by economic reasons with great financial commitment by companies, especially in the field of extraction and use of fossil fuels, whose purpose is to conflict with the almost unanimous consent of the scientific community on climate change[93]. One can therefore distinguish between "naive denial" by lay people based on ignorance of scientific literature, and "motivated denial" by people and organizations that have access to relevant information.

The connection between climate change skepticism and actual denial goes through a dialectical factor, with skeptics open to rational arguments while deniers of (change) close[94]. The denial of scientific findings about climate change is not skepticism in the scientific sense, but rather a denial of the anthropogenic factor of global warming. Numerous scientific studies show that climate issues are debated and, at the same time, fought for political and ideological reasons. The denial of man-made climate change is a form of pseudoscience that has similarities with other forms of denial of science, such as denying the theory of evolution or the harmful effects of smoking on health, or even believing in conspiracy theories. Some of these forms of denial of scientific knowledge are linked by personal, organizational and economic links. The term of reference used in all denialists analyses is the creation of artificial controversies such as the alleged controversy over global warming[95]. The denial of climate research is considered "by far the most coordinated and

[93] Stern, P. C., and others, "Sociology. Impacts on climate change views", in *Nature Climate Change*. Band 6, 2016, pp. 341–342.
[94] Dunlap, R. E., "Climate Change Skepticism and Denial: An Introduction", in *American Behavioral Scientist*, *57*(6), pp. 691–698.
[95] Hansson, S. O., *Science Denial as a Form of Pseudoscience*, Studies In History And Philosophy Of Science Part A, Volume 63, June 2017, pp. 39-47.

funded form of denial of science" and at the same time represents the backbone of the anti-environmental movement and its opposition to environmental research. The denial of climate research is "the most widely coordinated and funded form of denial of science"[96].

During the mandate of Ronald Reagan, in particular, a neoliberal transformation of society led to a strong fight against state regulatory measures, especially in the environmental field. In this sense, a group of anti-environmentalist politicians occupied a considerable number of key positions within the government and held key positions in the government, including the EPA and the Ministry of the Interior. This brought to a series of conflicts with the environmental movement, causing an adverse effect of strengthening it, but holding back initiatives in favor of the government's own environment[97].

To understand the value of think tanks' actions in distracting attention from climate change issues, there are specific examples of American policy that have created decision-making crossroads that have made a difference in the long run. In 1989, a booklet published by the George C. Marshall Institute stopped the creation of a slowdown in the government's actions to protect the environment[98]. This think tank was set up to defend the Strategic Defense Initiative. After the collapse of the Eastern bloc, it focused on environmental and

[96] Conway, E.M., and Oreskes, M., *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming,* Bloomsbury Publishing, London, 2012, p. 34.
[97] Dunlap, R., McCright, A.M., "Challenging Climate Change. The Denial Countermovement", in Dunlap, Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change*, Oxford University Press, Oxford, 2015, pp. 300–332.
[98] Conway, E.M., and Oreskes, M., *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming,* Bloomsbury Publishing, London, 2012, pp. 236-238.

climate policy issues. In this context, representatives of the George C. Marshall Institute Robert Jastrow, William Nierenberg and Frederick Seitz gave a lecture at the White House that ended by stating that the sun is responsible for global warming. In that analysis there was a specific reference to the existing scientific literature, but with an incorrect interpretation. The original study, to which the authors referred, reflects various causes of climate change during the 20th century. It was concluded that global warming before 1940 was probably due to increased solar activity, and that carbon dioxide emissions could be considered at the orifice of warming after 1975, since there had been no increase in solar activity in this period. These results were recorded in six different graphs. However, Jastrow, Nierenberg and Seitz presented only the part where solar activity is responsible for climate change. This report has had a major impact on the White House and is considered one of the main causes of the Bush Senior government's inaction on climate change. The scientific community rejected the claims of the Marshall Institute, also in view of the conclusions reached by the IPCC[99].

When, in the early 1990s, global environmental problems such as global warming or the loss of biodiversity has become an important issue in international politics, environmental protection became a much greater threat to the conservative movement and industry and their policy objectives, particularly for unregulated markets. With the collapse of communism, they have also lost their image as a long-standing ideological enemy, and the conservative movement has moved to replace the "red threat" of communism

[99] Ivi, p. 239.

with a green threat of environmental protection concepts[100]. Climate change has thus become the new main threat, since its fight has required extensive regulatory intervention in the market. Consequently, the conservative movement and industrial companies have been working together to prevent climate change policies, by denying the existence of climate change and its negative effects.

The conservative movement and industry took initiatives that did not directly attack the concepts of environmental protection, since the population generally supported them and considered them a task for the state. For this reason, the attack on scientific knowledge meant the intention to question the foundations on which the debate was based[101]. To undermine this scientific foundation, they relied on the strategy of developing controversy and doubt. This strategy, in which industry deliberately sabotages scientific evidence of the dangers of its products, had already been successfully used for decades by industrial companies and branches of industry such as the tobacco industry to protect their products from regulations and lawsuits. Fomenting insecurity has become the main strategy in the fight against environmental protection initiatives and finally in fueling an alleged scientific controversy[102].

[100] Dunlap, R., McCright, A.M., *Challenging Climate Change. The Denial Countermovement*, in Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change*, Oxford University Press, Oxford, 2015, pp. 300–332.

[101] Ibid.

[102] Painter, J, and Ashe, T., "Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10", in *Environmental Research Letters*, Volume 7, Number 4, Oct 4, IOP Publishing Ltd, Bristol, 2012, https://iopscience.iop.org/article/10.1088/1748-9326/7/4/044005 (accessed Jun. 13, 2019).

2.4.2 Classification of Denial

The path of denial of climate change, in addition to being part of the political vicissitudes of the last thirty years of the twentieth century, is the basis of the difficulty of communication and conveyance of the principles of climate change. The classification of the denialist categories carried out by the German climatologist Stefan Rahmstorf[103] works as follows:

- Climate change deniers tout court;
- Climate change deniers, man-made climate change, who argue that human influence is almost non-existent and irrelevant
- Deniers who deny the accuracy of the data and the causes, who support the non-accessibility of the data or the imperfection of the data them;
- Solution deniers, who support the ineffectiveness of solutions and, therefore, the absence of the need to deal with climate change.

At the same time, denialism also resides in the scientific community[104], with a classification that can follow the following scheme:

- Scientists who deny the credibility of the United Nations and of the IPCC in particular;
- Scientists who deny every main stream issues;
- Scientists link to the polluting industry.

[103] Ibid.
[104] Washington, H., and Cook, J., *Climate Change Denial. Heads in the Sand,* Routledge, London 2011, p. 11.

Moreover, there is a path of negation, a repeated process of different passages at a narrative dialectical level that can be represented with standard expressions[105]:

- "The earth is not warming up";
- "Okay, it's heating up, but the cause is the sun";
- "Okay, people are the cause, but it doesn't matter because the heating won't cause any damage. More carbon dioxide will actually be useful. The more plants will grow";
- "Of course, global warming could prove dangerous, but we can't do without it";
- "Sure, we could do something about global warming, but the cost would be too high. At the moment we have more urgent problems, such as AIDS and poverty";
- "We may be able to afford to do something about global warming at some point; but we have to wait for solid science, new technologies and geoengineering".
- "The earth is not warming up. Global warming ended in 1998; it has never been a crisis".

Following Stanley Cohen's classification, three psychological types of denial can be distinguished from scientifically recognized conditions such as global warming: literal rejection, interpretative rejection and implicit rejection[106].

[105] Powell, J. L., *The Inquisition of Climate Science*, Columbia University Press, New York, 2012, p. 172.
[106] Washington, H., and Cook, J., *Climate Change Denial. Heads in the Sand,* Routledge, London 2011, p. 98.

- Verbal denial ensures that something has not happened or is not true. In terms of global warming, this form of denial is similar to the invention of energy companies' contraindications that there is no global warming. Literal rejection is therefore the argumentation strategy of the organized climate industry[107].
- In interpretative denial, facts are not denied, but interpreted in a deviant way. For example, euphemisms, technical jargon, and changed terms are used to question the meaning of events. An example is the use of the word collateral damage for the involuntary killing of civilians by military action. Interpretative denial therefore corresponds to rotation (politics). It is often used by governments and companies, which make many announcements, but in reality, face few concrete acts[108].
- Implicit denial is the most widespread form of denial in society. It denies the psychological, political or even moral consequences and the consequences of known knowledge. This does not reject information about global warming per se, but rather prevents people from applying existing knowledge in everyday life and from applying the knowledge necessary for behavioral changes in their lives. Therefore, they have the necessary information and accept it as true but choose to ignore it for a number of reasons. In terms of man-made climate change, much of this knowledge is accepted but not translated into concrete actions or behavioral changes

[107] Ibid.
[108] Ibid.

Research on the history of science communication, and specifically on climate change issues, has shown that the spread of skepticism or rejection of statements in areas where there is general consensus by the scientific community, particularly with a large financial effort and well-organized campaigns, plays an important role in the overall economy of scientific fiction. This has happened and is happening particularly in climate research, through the establishment and dissemination of an alternative, skeptical discourse[109]. Organized denial is conscious and rational behavior with clear political and economic objectives[110]. Efforts to deny the existence and importance of global warming began immediately after the first mass dissemination of the results and evidence of manufactured climate change in the late 1980s. In 1989, a year after climate change became of public interest; the Global Climate Coalition established a first working group whose mission was to question global warming, causing an increase in the network of deniers[111].

The scene of organized climate deniers - known in English language research as a denial machine - has its origins in the United States and is still rooted there until today. From there, man-made climate change denial has spread to other parts of the world, often supported by US think tanks and scientists[112]. Scientific research shows that systematic misinformation is the

[109] Farrell, J., *Corporate funding and ideological polarization about climate change,* School of Forestry & Environmental Studies, Yale University, Yale, pp. 92-95.
[110] Lewandowsky, S., Oberauer, K., "Motivated Rejection of Science", in *Current Directions in Psychological Science*, n. 4, 2016, p. 220.
[111] Dunlap R., McCright, A. M., "Challenging Climate Change. The Denial Countermovement", *in* Riley Dunlap, R., Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change,* Oxford University Press, Oxford, 2015, p. 300.
[112] Ivi, p. 155.

main reason why half of the American population has increasingly lost confidence in climate research:

> "From the beginning, the campaign employed all the well-honed tools of public relations developed earlier by Big Tobacco: the use of "front groups" funded by the fossil fuel industry, including biased "think tanks"; fake "Astroturf" grass-roots organizations and established trade associations willing to assist in the effort; the recruitment and funding of scientists (of any discipline) skilled at public relations and willing to oppose the "conventional" viewpoint on climate change; the use of a media "echo chamber" to repeat and amplify their message; the use of dubious "petitions" to create the false impression of disputes among climate scientists; ad hominem attacks, including "SLAPP" suits, against legitimate climate scientists to intimidate them and discredit their research; the use of established public relations methods such as focus-group testing, polling, advertising, mass mailings, "educational" materials distributed to schools, and biased internet sites, to spread their doctrine and gauge progress toward the "goal" of perpetual public doubt; and finally, an unrelenting attack on science itself, a tactic developed earlier by Big Tobacco to discredit research showing the harmful effects of smoking"[113].

The financial movements are significant and clarified as follows: "In brief, this counter-movement uses money and resources from industry and conservative foundations to organize a large contingent of conservative think tanks, lobby organizations, media, front groups, and Republican politicians to disregard, suppress, disguise, and raisin-pick scientists and their research to deny the reality and seriousness of climate change"[114]. In total, in the United States alone, the denial movement has more than $900 million a year at its disposal, with a majority of obscured or invisible donors[115].

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[113] Tucker, W. C., *Deceitful Tongues: Is Climate Change Denial a Crime?*, Ecology Law Quarterly, Band 39, 2012, p. 845.

[114] McCright, A, Dunlap, R., "Combatting Misinformation Requires Recognizing Its Types and the Factors That Facilitate Its Spread and Resonance", in *Journal of Applied Research in Memory and Cognition*, 2017, p. 391.

[115] Brulle, R. J., *Institutionalizing delay: foundation funding and the creation of U.S. climate change counter-movement organizations*, Climatic Change, Volume 122, Issue 4, Springer Science+ Business Media Dordrecht, Feb 2014, pp. 681–694.

The evolution of the denials narrative on climate change has led to a classification of the actors, procedures and argumentative schemes used.

The subjects that have driven and continue to drive the skeptical and denials discourse on climate change are thus classifiable:

- Companies, many of them recognized as energy companies in the oil and coal industry, steel companies, mining and car manufacturers[116]. Fossil energy companies in particular have identified in advance the consequences that potential climate protection measures would have on their business activities and have therefore fought climate research and policy very early on. Many companies and associations such as ExxonMobil, Peabody Energy, American Petroleum Institute, Western Fuels Association and Edison Electric Institute have funded climate skeptical scientists, and conservative think tanks who have denied the existence of global warming and various organizations that undermine climate research[117]. The companies themselves were soon informed of the existence of the threatening consequences of man-made climate change long before information campaigns on the effects of climate change were launched. Exxon has been aware of the dangers of global warming since the 1970s and has been able to validate this knowledge through internal research laboratories. It used this knowledge to exploit Arctic oil deposits, while investing tens of millions in climate

[116] Björnberg, K. E., and others, *Climate and environmental science denial: A review of the scientific literature,* Journal of Cleaner Production, 2017, p. 236

[117] Dunlap, R. E., McCright, A. M., *Organized Climate Change Denial*, in Dryzek j. D., and others, The Oxford Handbook of Climate Change and Society, Oxford University Press, Oxford, 2011, p. 148.

change rejection campaigns and combating climate change mitigation[118].

- Think tanks play an important role in mitigating scientific discoveries, the most conservative ones, whose role in public and political debate on climate is becoming increasingly central to research[119]. Think tanks are among the most influential and visible players in the organized climate industry and have been involved in climate change issues since the late 1980s. In the late 1990s, when many companies withdrew from the open sponsorship of climate deniers, partly because of their bad publicity, think tanks stepped up their efforts. At the same time, they are taking on an integrative support function that brings together the different elements of the climate change denial movement and at the same time increases their social value and reach[120].

- Front groups, with short-term astroturfing campaigns, aim to deny global warming, but also undermine applied legislation in the form of environmental and climate change laws. Front groups of industrial companies and business associations have been set up to hide and protect their activities in denying man-made climate change[121]. Frontal groups often give each other euphemistic names intended to mask their

[118] McKinnon, C., *Should We Tolerate Climate Change Denial?*, Midwest Studies In Philosophy, Band 40, n 1, 2016, pp. 205–216.
[119] Boussalis, C., Coan, T. G., *Text-mining the signals of climate change doubt,* Global Environmental Change, 2016, pp. 89–100.
[120] Ibid.
[121] Dunlap R., McCright, A. M., "Challenging Climate Change. The Denial Countermovement", in Dunlap, R., Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change,* Oxford University Press, Oxford, 2015, p. 314

true intentions. One technique here is the so-called Green scamming, in which anti-environmental organizations, for example, with the choice of a name that can arouse enthusiasm and emotion, like some environmental organizations. Examples include the Global Climate Coalition, the Alliance for Environment and Resources and the American Council on Science and Health. These names confuse the audience and create confusion, promoting concepts contrary to environmental groups and in denial of the effects of climate change[122]. The most important front-line organization was the Global Climate Coalition (GCC), founded in 1989 as a response to the IPCC. It was funded, among others, by major energy companies, car manufacturers and industry associations and immediately questioned the need to protect the climate and attacked climate research.

- The politicians of the Republican Party play an important role in the United States, the country of origin of the organized denial of global warming. In the 1990s, Republican congressional representatives ignored and attacked climate research and challenged scientific evidence on climate change. During the presidency of George W. Bush (who worked in the Texas oil industry from 1978 to 1992), the White House was a central component of the climate issue scene[123]. With the presidency of Donald Trump, since January 2017, a climate denier has

[122] Heald, S. (2017*) Climate Silence, Moral Disengagement, and Self-Efficacy: How Albert Bandura's Theories Inform Our Climate-Change Predicament*, Environment: Science and Policy for Sustainable Development, Volume 59, 2017, pp. 4-15.

[123] Dunlap, R., McCright, A. M., *Challenging Climate Change. The Denial Countermovement*, Dunlap, R., Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change*, Oxford University Press, Oxford, 2015, p. 315.

been elected president of the United States. He has also been involved in climate change policy assignments with climate change deniers, including former ExxonMobil Chief Rex Tillerson Secretary of State, former Attorney General and lobbyist Scott Pruitt, EPA Chief of Environment, former Texas Governor Rick Perry Minister of Energy and environmental opponent Ryan Zinke Minister of the Interior[124]. Climate skeptics or deniers of man-made climate change have previously been presidents or heads of government in several states. These include former US President George W. Bush, who was criticized, among other things, for his efforts to deliberately undermine climate research, the Australian Prime Minister (September 2013 to September 2015) Tony Abbott, who doubted the human impact on the climate. A vehement opponent of climate action was the Canadian Prime Minister Stephen Harper (2006-2015), which admitted that climate change posed a serious threat, but shared similar views and the Kyoto Protocol of Bush without signature, as well as the Czech President (2003-2013) Václav Klaus , who compared global warming with communism and maintained close ties with skeptical American climate lobby organizations and think tanks such as the Heartland Institute. The conservative politicians have pursued strategies to divert public attention from climate policies and climate protection projects. These included the appointment of climate experts as chairpersons of scientific panels, the abolition of scientific (research) advisory groups and programs, the cancellation of state funds

[124] Jentleson, *B. W., Global Governance, the United Nations, and the Challenge of Trumping Trump*, Global Governance: A Review of Multilateralism and International Organizations, 2017, pp. 143–149.

for environmental programs, the redistribution of research funds to more industry-relevant research and the censorship of environmental and climate research, which are now being seized under Donald Trump[125]. Governments under Stephen Harper (Canada) and John Howard (Australia) have also targeted measures that have fueled public ignorance in order to keep public commitment to climate protection low. George W. Bush is considered one of the main actors in the "scientific war", even against climate research[126]. In Europe, it is mainly the right-wing political spectrum parties that doubt or denies man-made global warming. Of the 21 right-wing and right-wing populist parties examined in 2018, the overwhelming majority denies human influence on current climate change (seven parties, including the AfD) or attach little importance to the issue or do not maintain a clear position (eleven parties); only three parties have recognized man-made global warming[127].

- Conservative media, right-wing media such as Fox News and the Wallstreet Journal, as well as several newspapers of News Corporation (now News Corp.), controlled by Rupert Murdoch, are critical to spreading climate storm arguments. Together they often act as an echo chamber in which these statements can virtually circulate in an indefinite way.

[125] De Pryck, K., Gemenne, F., *The Denier-in-Chief: Climate Change, Science and the Election of Donald J. Trump*, Law Critique, n. 2, 2017, pp. 119–126.
[126] Björnberg, K. E., "Climate and environmental science denial: A review of the scientific literature published in 1990–2015", in *Journal of Cleaner Production*, 2017, pp. 229–241.
[127] Schaller, S., Carius, A., *Convenient Truths – Mapping climate agendas of right-wing populist parties,* Europe, Adelphi, 2019, p 11.

- Conservative media, particularly in the United States, play a central role in the propagation of climate arguments. Especially the Wall Street Journal, the largest American newspaper, is considered an influential medium for the information proposed by the climate change denial movement, which often leaves room for those who deny man-made climate change[128]. According to a 2017 study, the WSJ was also among the major U.S. newspapers that reported less about the negative effects of global warming. At the same time, it largely reported the most negative effects of climate protection policies. Fox News plays an important role among TV channels. Fox News reports much more frequently than other TV channels on global warming but does so in a way that raises doubts about the real causes of climate change. Overall, those who watched Fox News Channel as one of the main TV channels were more skeptical about climate change[129]. Research has shown that climate skepticism is more widespread in conservative media than in non-conservative media. This does not apply only in general to factual reports, but particularly to editorial and opinion contributions, where the denial of man-made climate change is particularly present. Particular attention is paid to climate deniers and their theses in the United States. In other Anglo-Saxon states, such as Australia and the United Kingdom,

[128] Dunlap, R. E., McCright, A. M., *Organized Climate Change Denial, in* Dryzek, J. S., and others, *The Oxford Handbook of Climate Change and Society,* Oxford University Press, 2011, pp. 144–160.
[129] Feldman, L., "Climate on Cable: The Nature and Impact of Global Warming Coverage on Fox News, CNN and MSNBC", in *The International Journal of Press/Politics*, n 1, 2012, pp. 3–31.

denial is also disproportionately widespread, while in other states the claims of climate deniers receive little attention[130].

- Blogs and social media play an important role allowing climate skeptics and alleged scientists to have huge echoes, partially integrating and replacing traditional media. Blogs have a wide following and often receive hundreds of responses to their observations, often denouncing malicious criticism of climate scientists, climate activists and climate change advocates. Through the blog approach, climatologists are partially harassed and bullied[131]. Blogs are also a strong voice of skeptical climate content in other social media platforms, for example linking blogs on Facebook or Twitter. In addition, skeptical statements about climate seem to be present in the comments of online newspapers. Through all these mechanisms, climate change statements are gaining a lot of attention, and are helping to spread the denial of global warming internationally. Especially in the social media, contributions of climate deniers are disproportionately widespread. For example, in November 2016 there were over 500,000 videos on YouTube, spreading the myth that global warming is a lie, while there were only about 40,000 videos dealing with climate deniers[132].

[130] Dunlap, R., McCright, A. M., *Challenging Climate Change. The Denial Countermovement*, in Dunlap, R., Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change*, Oxford University Press, Oxford, 2015, p. 316.
[131] Ivi, p. 317.
[132] Ibid.

2.4.3 Methodology of Denial

Climate change deniers use a variety of tactics to deny and to make scientific evidence unpopular. The methods of interest groups that deny man-made climate change "range from the constant repetition of long-disputed arguments, false fictitious news, the presentation of scientific jargon adorned with pseudo-expert studies to the defamation and intimidation of climate researchers "[133].

A communicational procedure conducted by deniers can be classified, which is likely to cause doubts and to emphasize the scientific inaccuracy of the data:

- Emphasize uncertainties and doubts, aimed at allowing experts deniers of climate change and interest groups to have a strategic advantage in influencing the public over scientists. While scientists must convince the public of their discoveries in order to take political action, it is enough for deniers to arouse insecurity in order to achieve political inactivity[134]. One of the main arguments of deniers is therefore the presentation that scientific findings on the existence, causes and consequences of global warming are insecure and that it is wise to wait because one is not certain that the climate will change. Therefore, appropriate statements or events are often circulated with the aim of arousing insecurity and thus giving the impression of contradicting scientific consensus[135].

[133] Mann, M. E., Toles, T., *The Madhouse Effect: How Climate Change Denial Is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy*, Columbia University Press, New York, 2016.
[134] Ivi. p. 9.
[135] Weber, E., Stern, P. C., *Public Understanding of Climate Change in the United States*, American Psychologist, n 4, 2011, p. 321.

- Create an artificial controversy, with the aim of giving the public the impression that there is a great debate and opposition in public opinion, and within the scientific community on the existence of environmental warming. Indeed, the so-called "global warming controversy" is considered the first example of an artificially created "controversy" fed by interest groups in business and politics without any real correspondence in science. In order to create this alleged controversy, conservative companies and think tanks have recruited some climate skeptics and other alleged experts (often without experience in climate issues), who should not only criticize, but provide an alternative to true scientific research by knowingly confusing public and politics. The work of real research is deliberately imitated[136].

- Domino strategy defined by the fact that the negative consequences of global warming affect all parts of the environment and society. Therefore, in their argument, climate deniers often focus on certain observations they make, omitting the context, so that these observations seem to contradict the negative consequences of global warming. The aim is to circulate the idea that hundreds of arguments for global warming can be disproved by a single discussion that, like a domino effect, can refute global warming as a whole[137].

- Denial of the urgency of climate protection and attention to adaptation measures, aims at arguing that it is too late to stop global

[136] Dunlap, R., McCright, A. M., *Challenging Climate Change. The Denial Countermovement*, in Dunlap, R., Brulle, R. J., *Climate Change and Society. Sociological Perspectives. Report of the American Sociological Association's Task Force on Sociology and Global Climate Change*, Oxford University Press, Oxford, 2015, p. 308.

[137] Harvey, J. A., *Internet Blogs, Polar Bears, and Climate-Change Denial by Proxy*, BioScience, n 4, 2018, pp. 281–287.

warming. Denialists who rely on this interpretation initially see themselves as rational interpreters of scientific evidence, also to support the need for adaptation, highlighting the positive aspects of global warming and the need for control of mitigation measures[138].

In order to achieve their goal of convincing public opinion and media that there is not enough knowledge to take action for the climate, climate deniers use various models of argument, many of which are rhetorical one. These are intended to give the appearance of a legitimate debate, in which such a debate does not actually prevail[139]. These include, for example, the frequent accusation that climatologists and scientific bodies such as the IPCC are alarmists, deliberately exaggerating scientific findings and feeding unjustified hysteria. In fact, scientific research has concluded that IPCC's assessment reports are cautious in their assumptions and tend to underestimate rather than exaggerate certain aspects of global warming[140].

[138] Washington, H., and Cook, J., *Climate Change Denial. Heads in the Sand,* Routledge, London, 2011, p. 78.
[139] Ivi, p. 43.
[140] Brysse, K., and others, *Climate change prediction: Erring on the side of least drama?*, Global Environmental Change, 2012, pp. 327–337.

3. GLOBAL COMMUNICATION ENVIRONMENT

3.1 INFORMATION OVERLOADING

The proliferation of fake news and contradictory news in a post-truth environment is only possible with a huge amount of information. In this sense, the narrative excursus on the climate change occurred in the second half of the twentieth century was possible thanks to the enormous proliferation of news.

A careful analysis of what happens today and occurs as a global trend, is that today we face a cognitive bombardment that is unprecedented in history. We can see how in 2008 the University of California had calculated that the average individual is exposed to 34 gigabytes of content every day, to the persistence of one hundred thousand words[141].

[141] Bilton, N., "The American Diet: 34 Gigabytes a Day", Bits, Dec 9, 2009, https://bits.blogs.nytimes.com/2009/12/09/the-american-diet-34-gigabytes-a-day/ (accessed Jun 22, 2019).

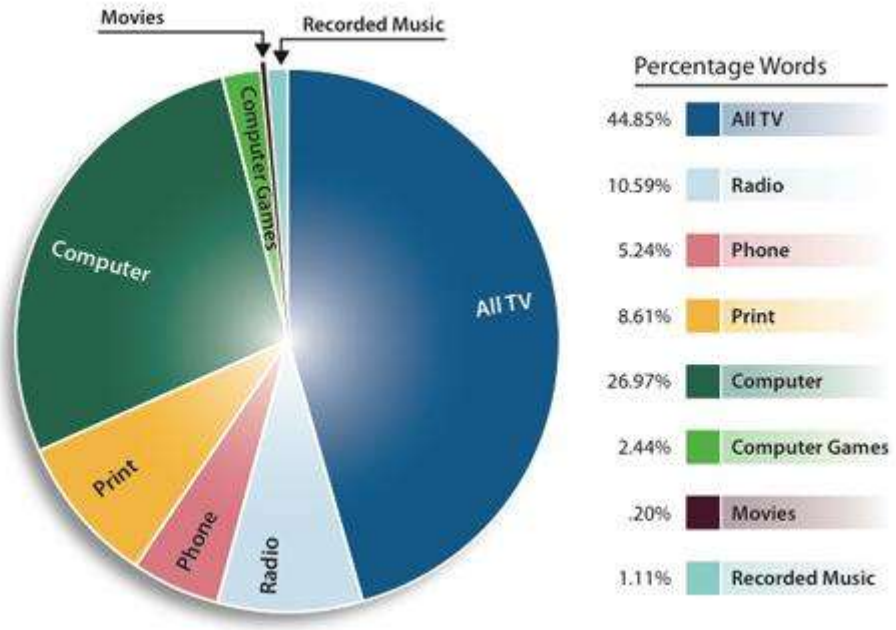

FIGURE 13

It is considered that the human mind can process a maximum of 120 bits of information per second[142]. The information that can be elaborated is not to be considered a few, but it must be borne in mind that a normal conversation alone consumes about a third of the processing power of the human mind[143].

Humans are, by most biological measures, the most successful species our planet has seen. We have managed to survive in nearly every climate our planet has offered (so far), and the rate of our population expansion exceeds the one of any other known organism. Ten thousand years ago, humans plus their pets and livestock accounted for about 0.1% of the terrestrial vertebrate biomass inhabiting the earth; we now account for 98%. Our success owes in large part to our cognitive capacity, the ability of our brains to flexibly handle information. However, our brains evolved in a much simpler world with far less

[142] Levitin, T, *The Organized Mind: Thinking Straight In The Age Of Information Overload*, Penguin, London, 2014.
[143] Levitin, D. J., "Why It's So Hard To Pay Attention, Explained By Science", Fast Company, Sep 23, 2015, https://www.fastcompany.com/3051417/why-its-so-hard-to-pay-attention-explained-by-science (accessed Nov 23, 2019).

information coming at us. Today, our attentional filters easily become overwhelmed.

Attentional filters can be considered as receptors for material that can be processed and filtered at the same time. The excessive amount of information leads to a significant removal of what is not relevant to us, making us develop a trust mechanism that is more important to the information we have retained.

The concept of information overload was coined in 1964 by Bertram Gross, defining it as the data overload is a state in which a decision maker faces a set of information (i.e., an information load with informational characteristics such as an amount, complexity, and a level of redundancy, contradiction and inconsistency) comprising the accumulation of individual informational cues of differing size and complexity that inhibits the decision maker's ability to optimally determine the best possible decision. The probability of achieving the best possible decision is defined as decision-making performance. The suboptimal use of information is caused by the limitation of scarce individual resources. A scarce resource can be limited individual characteristics (such as serial processing ability, limited short-term memory) or limited task-related equipment (e.g., time to decide, budget)[144]. As the number of stimuli grows, our ability to be focused on the stimuli themselves decreases.

All this affects our ability to receive, select and understand the stimuli that convey important information for us. In addition, all this has consequences. The image of collective hypnosis of people walking around with their eyes attentively

[144] Roetzel, R. G., *Information overload in the information age: a review of the literature from business administration, business psychology, and related disciplines with a bibliometric approach and framework development*, Business Research, Jul 2018.

focused only on the cell phone screen, risking incidents, has now become a collective cliché.

What becomes certain is that with the increase for stimuli, our ability to be careful decreases. A study conducted by Microsoft in 2016 certifies that, compared to the year 2000, the time window of attention for those on the network has been reduced by one third: if previously it was twelve seconds, today it has decreased to eight seconds[145].

This phenomenon, incidentally, has an effect whereby if the ability to pay attention decreases, and if, at the same time the availability of information increases; the competition to capture the lack of people's attention intensifies dramatically. In this sense, we rely on:

- strong emotions;
- outstanding titles;
- surprise effect (given by fake news).

The large amount of junk stimuli have to be considered much more powerful and effective than the average stimuli we commonly receive, clogging up the brain and our sensory system in general. The further consequence is that, allowing the most overbearing stimuli (not the most important ones) to capture our very little attention, we expose ourselves to a distorted and anxiogenic perception of what surrounds us[146].

[145] Hooton, C., "Our attention span is now less than that of a goldfish, Microsoft study finds", in *Independent*, May 13, 2015, https://www.independent.co.uk/news/science/our-attention-span-is-now-less-than-that-of-a-goldfish-microsoft-study-finds-10247553.html (accessed Apr 4, 2019).

[146] Vosoughi, S. and others, "The spread of true and false news online", in *Science*, Mar. 9, 2018, http://science.sciencemag.org/content/359/6380/1146.full (accessed May 13, 2019).

As a consequence of the dispersion of attention, it is important to bear in mind that many of the stimuli we receive contain an explicit request for feedback, through imperative and explicit commands (for example, look! buy it!, follow us!, etc.). In this sense, our mind is urged to decide whether or not to adhere to these commands. This represents, besides an additional source of solicitations, also a constant cognitive presence, which does not allow us to give more space to essential and important information[147].

Another factor to consider is that toxicity and sharing of highly dramatic stimuli can make us more insensitive and less involved. The effect of the spectator, as defined by the social psychologist Stanley Milgram, in which the non-action by a group authorizes me not to act[148].

What is diluted is that the more information is available, the more the preliminary and additional fatigue of analyzing and selecting what we need increases, the more the number of decisions to be made increases, the more fatigue, the sense of inadequacy, the indifference increase. The other factor that best expresses the sense of delegating the decision for excessive exposure to information is the search attracted to the search engines.

If we look for something through a search engine and we take into consideration only the first among the thousands of results, we delegate the decision on the news to express to the algorithm behind the search engine itself.

[147] Krockow, E. M., "How Many Decisions Do We Make Each Day?", in *Psychology Today*, Sep 27, 2018, https://www.psychologytoday.com/us/blog/stretching-theory/201809/how-many-decisions-do-we-make-each-day (accessed Jun 14, 2019).
[148] McGregor, J., *Coping with Aggressive Behaviour,* Sheldon Press, 2017, p. 14.

This has a substantive effect, binding on free will that regulates (and will regulate) substantial decisions about what is true and what is fake in communication[149]. This reference structure can be identified with a moment and an historical informational period, the era of post-truth.

[149] Harari, N. Y., "Los cerebros 'hackeados' votan", in *El Pais*, Jan. 6, 2019, https://elpais.com/internacional/2019/01/04/actualidad/1546602935_606381.html (accessed Mar 12, 2019).

3.2 POST TRUTH AND FAKE NEWS

3.2.1 HISTORY OF POST TRUTH

The first term associated to post-truth as concept was politics, to underline the specific reference to political information as the field where the truth was called into question (Post-truth politics, also referred to as post-factual politics[150] and post-reality politics[151]). Post-truth differs from ancient contesting and disproof of facts by relegation facts and knowledgeable opinions to be of secondary importance relatively to the attractiveness to feeling:

> "Thus, the right to free speech has morphed into the ability to say and spread anything, no matter how daft or dangerous. Hence the buzz around the idea of "post-truth politics" – although a cynic might wonder if politicians are any more dishonest than they used to be. Perhaps it's just that fibs once whispered into select ears are now overheard by everyone"[152].

Whereas this has been represented as a recent downside, some observers have exemplified it as a long-standing a part of political life that was less notable before the arrival of the web and the consequential social changes.

This is intended as political culture within which discussion is framed for the most part by appeals to feeling disconnected from particularities of policy, and

[150] Forstenzer, J., "Something Has Cracked: Post-Truth Politics and Richard Rorty's Postmodernist Bourgeois Liberalism", in *Ash Center Occasional Papers*, Harvard Kennedy School, Boston, 2018, pp. 5-8.
[151] Holmes, J., "Trump's Campaign Manager Offered Her Most Brilliant Defense yet of Trump's Lies", in *Esquire*. Sep 26, 2017.
[152] New Scientist, "Free speech has met social media, with revolutionary results", in *New Scientist*, June 1, 2016.

by the recurrent assertion of talking points to that factual rebuttals measure unheeded.

In 2016, post-truth was chosen as the Oxford Dictionaries' Word of the Year,

> "Defined by the dictionary as an adjective "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief", editors said that the use of the term "post-truth" had increased by around 2,000% in 2016 compared to the previous year. The spike in usage, it said, is "in the context of the EU referendum in the United Kingdom and the presidential election in the United States"[153].

Since 2018, political analysts have known post-truth politics as always more common in several nations. Like different areas of discussion, a mixture of the 24-hour news cycle, false balance in news reportage, and the increasing presence of social media can be driving this.

> "It is thus tempting to dismiss the idea of "post-truth" political discourse—the term was first used by David Roberts, then a blogger on an environmentalist website, Grist—as a modish myth invented by de-haut-en-bas liberals and sore losers ignorant of how dirty a business politics has always been. But that would be complacent. A strong case is a shift towards a politics in which feelings trump facts more freely and with less resistance than used to be the case. Helped by new technology, a deluge of facts and a public much less given to trust than once it was, some politicians are getting away with a new depth and pervasiveness of falsehood. If this continues, the power of truth as a tool for solving society's problems could be lastingly reduced"[154].

The demonstration of the entrance of post truth dynamic is necessarily evident within environment issues, as it is well indicated in the shifting in politics:

> "Mining leaders openly acknowledged that the debate had moved beyond rational discourse and others described the emergence of "post–truth politics" in Australia. [...] Repeal of the carbon laws is a travesty of policy because it is clear from the government's own reports and independent data that, over their two-year

[153] Flood, A., "Post-truth' named word of the year by Oxford Dictionaries", in *The Guardian*, Nov 15, 2016.
[154] The Economist, "The post-truth world: Yes, I'd lie to you", in *The Economist*, Sep 10, 2016.

life, the carbon laws were working. Pollution is declining in a growing economy. The latest National Greenhouse Gas Inventory showed the greatest emissions decline since records began. A government report calculated that two years of the carbon laws would reduce pollution by 40 million tons below business as usual. Independent analysts predict annual default emission limits in the laws would see Australia reduce pollution to at least 15 per cent below 2000 levels by 2020"[155].

Post-truth becomes a social paradigm effect of commingling of information and new technology, allowing as many people as possible to declare opinions and ask questions on major issues:

"The idea that the fusion of technology and media may have revolutionary outcomes – primed this time round by politicians rather than proletarians – will alarm those who prefer the status quo: there have been calls for the new media titans to be regulated. To be sure, they cannot carry on dodging their responsibilities. Nevertheless, the ultimate answer is not policing social media for rabble-rousing mistruths but bursting the filter bubbles and talking to those who disagree with us. Because we need democracy to be more than just a popularity contest"[156].

The concept started its own path of meaning in the early 2000s, concomitantly with at least some issues:

- the epochal event of 11 September;
- the spectacularization of this event;
- the spectacularization of the consequences of narration and its political effect.

We started talking in this sense in the early 2000s about the ambiguity of truth in information, alluding to different terms, which then in their use of

[155] Connor, J., "Tony Abbott's carbon tax outrage signals nadir of post-truth politics", The Age, Jul 14, 2014, https://www.theage.com.au/opinion/tony-abbotts-carbon-tax-outrage-signals-nadir-of-posttruth-politics-20140717-ztz2b.html (accessed Apr 23, 2019).
[156] New Scientist, "Free speech has met social media, with revolutionary results", New Scientist, Jun 1, 2016, https://www.newscientist.com/article/mg23030763-000-free-speech-has-met-social-media-with-revolutionary-results/ (accessed Feb 1, 2019).

everyday life have taken the form of post-truth, as well explained by Ralph Keyes:

"Dishonesty in suppliers more euphemisms than copulation or defecation. This helps desensitize us to its implications. In the post truth era, we do not just have the truth and lies but the third category of ambiguous statements that are not exactly the truth but the fall a of a short of a lie. Enhanced truth it might be called. Neo-truth. Soft truth. Faux truth. Truth lite. Through such aggressive euphemasia we take the sting out of telling lies. Euphemasia calls up remarkable powers of linguistic creativity. In addition to golden oldies such as "credibility gap", "reframing", and the wisdom Churchill's of terminological inexactitudes"[157].

Again, the same type of term is used the same year to define the political environment, when of a "post-truth political environment" and coined the term "the post-truth presidency" in his investigation of the distorted statements made by the Bush administration after 9/11[158].

In parallel, during the same period, the elaboration *in nuce* of the term and the jargon related to the post-truth, the British essayist Colin Crouch used this term in his own book, titled Post-democracy, to outline a model of politics in which elections do exist and can change governments", but where "the public electoral debate is a strictly controlled spectacle, run by rival teams of professionals who are experts in persuasion techniques, who choose only a small range of topics to deal with during the debates " . Crouch attributed to the "model of advertising industry" applied to political communications. The causes of the crisis of trust and accusations of dishonesty that a few years later other people associated with post-truth policies[159].

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[157] Keyes, R., *The Post-Truth Era: Dishonesty and Deception in Contemporary Life*, New York: St. Martin's Pr., New York, 2004, p. 35.

[158] Alterman, E., *When Presidents Lie: A History of Official Deception and Its Consequences*, Viking, New York, 2004 p. 305.

[159] Crouch, C*., Post-democracy,* Polity, Cambridge, 2004, p. 4.

In 2009, the French political scientist Dominique Moïsi titled his book *La géopolitique de l'émotion* (geopolitics of emotions), a text, which states that the post-truth spreads in the network and in social networks: the uncontrolled flow of news predisposes us to media bubbles. The mechanism of followers and likes does not disassociate falsehoods; on the contrary, it reinforces them. Finally, according to the political scientist, the post-truth, understood as a political hoax, becomes a monologue repeated to infinity and that replaces the dialogue between opposing parties[160]

In these terms, Jonathan Ladd wrote "The existence of an independent, powerful, widely respected news media establishment is an historical anomaly […] prior to the twentieth century, such an institution had never existed in American history"[161]. Fake news is however one symptom of that shift back to historical norms. The large range of reports shops, the heterogeneousness of the coverage, the low public esteem toward the press, and therefore the obvious partisan leanings of publishers restricted the facility of the press to be influential[162].

Among the best imaginative representations of the process that today identifies itself as post-truth, there is the one of George Orwell in his 1984. In his examination of Winston Smith, the Inner Party ruler, O'Brien, warns:

"Reality is not external. Reality exists in the human mind, and nowhere else…whatever the Party holds to be truth, is truth. It is impossible to see reality except by looking through the eyes of the Party. Winston still objects that the party has no mastery over gravity, climate, unwellness or death: "O'Brien silenced him by a movement of his hand. "We control matter

[160] Moïsi, D, *La géopolitique de l'émotion: Comment les cultures de peur, d'humiliation et d'espoir façonnent le monde*, Flammarion, Paris, 2008.
[161] Ladd, J. M., *Why Americans Hate the News Media and How It Matters*, Princeton University Press, Princeton, 2012.
[162] West, D. M., *The Rise and Fall of the Media Establishment*, Springer, Berlin, 2016, p. 22.

because we control the mind. Reality is inside the skull … there is nothing that we could not do. Invisibility, levitation – anything. I could float off this floor like a soap bubble if I wish to … You must get rid of those nineteenth-century ideas about the laws of Nature. We make the laws of Nature"[163].

Also, in the novel by Philip K. Dick, the Man in the High Castle, there is an alternative vision of the historical evolution of the '900, in a world that represents itself the meta-experiment of post truth.

The coherent plot is based in the world where the Allies had lost the World War II. Philip K Dick writes a vision of the planet as it might have been the African continent just about to be wiped out, the Mediterranean drained to create farmland, the United States divided between the Japanese and the Nazis. Within the neutral zone, that divides the rival superpowers in America lives the author of an underground best-seller. His book – a rallying needs all people who dream of overthrowing the occupiers – offers another theory of world history: "All these hundreds of thousands in this city, here. Do they imagine that they live in a sane world? Or do they guess, glimpse the truth...?[164]"

Another example of how much the '900 has prepared as an anticipation of what would have been the post-truth, is The Captive Mind by Czeslaw Milosz. Milosz's denouncement of despotism created instant contestation at a time once modern society was permitting itself to become fascinated by the socio-political doctrines of Communist Russia.

[163] Orwell, G., *1984*, Houghton Mifflin Harcourt, New York, 1983, p. 254.
[164] Dick, Philip K., *The Man in the High Castle*, Houghton Mifflin Harcourt, New York, 2012, p. 42.

The Captive Mind analyses the ability of tyrannical regimes to subjugate humans, not simply through terror, however through ideas and rhetoric:

"The pressure of an all-powerful totalitarian state creates an emotional tension in its citizens that determines their acts. When people are divided into "loyalists" and "criminals" a premium is placed on every type of conformist, coward, and hireling; whereas among the "criminals" one finds a singularly high percentage of people who are direct, sincere, and true to themselves. From the social point of view these persons would constitute the best guarantee that the future development of the social organism would be toward good. From the Christian point of view they have no other sin on their conscience save their contempt for Caesar, or their in correct evaluation of his might"[165].

What we must understand is if the term post-truth is exclusively linked to the lie, whether it is exclusively linked to politics, or is a general phenomenon conveyed by the communication apparatus of the digital age, or in any case by mass communication. As presented in current debate, the word "post-truth" is irreducibly normative: it is an expression of concern by those who care about the concept of truth and feel that it is under attack. However, what about those who feel that they are merely trying to tell the "other side of the story" on controversial topics? Is there really a case made for alternative facts? The idea of a single objective truth has never been free from controversies. The idea of truth in philosophy goes all the approach back to philosopher, who warned (through Socrates) about the risks of false claims to information. Ignorance, Socrates felt, was remediable; if one is ignorant, he/she may be tutored. The bigger threat comes from people who have the *hubris* to assume they already recognize the reality, for then one can

[165] Columbia University College, *Man in Contemporary Society: A Source Book*, Volume 2, Columbia University Press, 1955, p. 618.

be impetuous enough to act on a falsehood[166]. It is important at this point to give at least a minimal definition of truth. Perhaps the most famous is that of Aristotle, who said: “to say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, and of what is not that it is not, is true”[167].

Throughout the history of philosophy, thinkers have fought for centuries that this kind of "correspondence" vision is correct, so we judge the truth of an affirmation only by the way it fits into reality. Other important conceptions of truth (coherentist, pragmatic, semantic) reflect a variety of opinions among philosophers about the correct theory of truth, even though truth is always considered as a fundamental value.

The debate on post-truth and the genesis at the philosophical level, also involves Gianni Vattimo:

> "Vattimo, even if nobody says so, is the real inventor, at the level of media culture, of post-truth. (...) Only that, here a difference with the current "end users" of the term, Vattimo gave a positive and not negative value to the phenomenon: abandoning the truth, or converting it into a rhetorical form, was for him a process of emancipation, liberation, liberation from those devices of death which were ultimately the "forms of truth" inherited from the great tradition of Western metaphysics”[168].

This defines the level of the discussion underway, due to a cogent problem that has already attracted twentieth century thinking.

There is a lot of discussion about the fact that basically this is not a new phenomenon: in the political campaigns, the discrediting of the adversary with

[166] Socrates, *Apology,* 23a.
[167] Aristotle, Metaphysics, book 4, 1011b25.
[168] Ocone, C., “Rubrica”, Huffington Post, Jan. 9, 2017.

false news is always a widely used instrument, and the propaganda of the regime from a certain point of view is a post- truth; from antiquity to today there have been many examples, even outside of politics, in which emotions and personal convictions have come to overwhelm the objective data. Basically speaking, more than the language, we are talking about lack of correctness and morality; and this is an endemic problem unfortunately not strictly linked to our time[169]. The characteristics and the dimensions assumed by the phenomenon in our days are however different and there are some factors that must be particularly underlined, all linked to the network: globalization, capillarity, viral speed of diffusion of the various post-truths; and then the generality of the actors who can feed them, often with a hidden and unexpected propaganda that can come from pseudo-research institutes, from improvised experts. And if all this concerns the production of post-truth, no less worrying is the analysis of its reception: because there is a very strong complicity on the part of those who "suffer" the emotionally appealing or partisan data, given that the data are almost always easily verifiable by endogenous means, easily accessible through the same network (while within a regime, for example, it is certainly not easy to counteract the non-truthfulness of propaganda information)[170].

3.2.2 Misinformation and Disinformation

[169] McIntyre, L., *Post-Truth*, The MIT Press Essential Knowledge series, 2018, p. 178.
[170] Nichols, T., *The Death of Expertise: The Campaign Against Established Knowledge and Why it Matters*, Oxford University Press, 2017, pp. 106-107.

In February 2017, Claire Wardle wrote an article in First Draft News, in which the scholar proposes to go beyond the classic meaning of fake news or fake news distinguishing "the ecosystem of misinformation" misinformation and disinformation[171].

Misinformation is the activity of involuntary diffusion of false information; disinformation, unlike the first, is the deliberate creation and dissemination of false information for commercial or political purposes. In order to understand the complex functioning of this ecosystem, Wardle underlines three fundamental points:

- Know the different contents created and shared;
- Know the motivations for which a fake news is created;
- Understanding the way in which the content is disseminated.

Seven ways are also defined where a false content can be shared in the information ecosystem, in other words, seven types of misinformation:

- Misleading connection: when the content deviates from the title, image and / or caption;
- Misleading context: when there is part of a real content but accompanied by false contextual information;
- Manipulated content: when the image, or the actual information itself, is manipulated to mislead the reader;

[171] Wardle, C., *Fake News. It's complicated*., in First Draft News, Feb 2017, https://medium.com/1st-draft/fake-news-its-complicated-d0f773766c79 (accessed Nov 16, 2017).

- Misleading content: when information is conveyed to a problem or a person;
- Deceiving content: when the information is passed off as originating from a source that existed;
- Complete fake content: when the whole content is false and wants to mislead;
- Manipulation of satire: when the intent is not to cause damage, but the content is satirical and deceptive.

However, it is not enough to know only the different types of content to break down the disinformation mechanism. Therefore the scholar combines eight possible reasons that would explain the creation of the aforementioned fake content, along with the previous seven voices: profit, political influence, propaganda, bias, provocation, parody, bad journalism, special interest.

A significant case that has returned to the history of misinformation, or falsified conduct within the information, is that of the Texas gulf sulfur company, which occurred in 1963 with repercussions in 1964 and subsequent years[172]. This case is interesting, because every time there is a filter on information, that is in the public domain, there can be an opportunity to profit through the lack of the same information. For example, if a news item is negative for a company, at the level of the financial markets, it is possible to sell the reference shares or obtain bank loans, before making it clear that the company itself is in difficulty. At the same time, if it is good news, not making it public can mean being able

[172] O'Kelley, C.R.T., Thompson, R. B., *Corporations and Other Business Associations: Cases and Materials*, Wolters Kluwer Law & Business, 2014, pp. 1077-1083.

to buy shares in advance before the markets have evidence that the company's value has increased. This makes it possible to understand the consistent value of information within the whole social system, ranging from financial markets to public regulations. In this sense those who play with information to the possibility of obtaining an advantage by excluding the public domain want to create information asymmetries. Returning specifically to the case of Texas golf, the case is known precisely as regards the specific characteristic of the company, namely the drilling. In fact, in 1963 during a drilling in Ontario, the operators found a rich deposit of raw materials, such as silver, copper, zinc, etc. in this sense, to disdain specific opponents in the running for the acquisition of resources in the area, the company released the discovery only a year later, through a haphazard statement that underlined the discovery of scarce resources and not significant deposits:

> “NEW YORK, April 12 -- The following statement was made today by Dr. Charles F. Fogarty, executive vice president of Texas Gulf Sulphur Company, in regard to the company's drilling operations near Timmins, Ontario, Canada. Dr. Fogarty said: "During the past few days, the exploration activities of Texas Gulf Sulphur in the area of Timmins, Ontario, have been widely reported in the press, coupled with rumors of a substantial copper discovery there.” These reports exaggerate the scale of operations, and mention plans and statistics of size and grade of ore that are without factual basis and have evidently originated by speculation of people not connected with TGS. The facts are as follows: TGS has been exploring in the Timmins area for six years as part of its overall search in Canada and elsewhere for various minerals -- lead, copper, zinc, etc. During the course of this work, in Timmins as well as in Eastern Canada, TGS has conducted exploration entirely on its own, without the participation by others. Numerous prospects have been investigated by geophysical means and a large number of selected ones have been core-drilled. These cores are sent to the United States for assay and detailed examination as a matter of routine and on advice of expert Canadian legal counsel. No inferences as to grade can be drawn from this procedure. "Most of the areas drilled in Eastern Canada have revealed either barren pyrite or graphite without value; a few have resulted in discoveries of

> small or marginal sulphide ore bodies. "Recent drilling on one property near Timmins has led to preliminary indications that more drilling would be required for proper evaluation of this prospect. The drilling done to date has not been conclusive, but the statements made by many outside quarters are unreliable and include information and figures that are not available to TGS. "The work done to date has not been sufficient to reach definite conclusions and any statement as to size and grade of ore would be premature and possibly misleading. When we have progressed to the point where reasonable and logical conclusions can be made, TGS will issue a definite statement to its stockholders and to the public in order to clarify the Timmins project"[173].

This jamming operation, so it is called at the level of information, and specifically but an attempt to stop any action by possible competitors, is to acquire information and be able to in turn operate directly in the field. The actions in this case is to be able to circulate false news, or otherwise defined through a reality mitigated with facts not quite corresponding to the same, so that it is difficult to define what is true and what is false. In this sense both this example and in general, when Jamming techniques are implemented, the fact that disinformation operations can be performed without:

- particular preparation in the communication field;
- technicalities;
- knowledge of the relevant public;

but only by generating doubts and therefore disorientation within the circles of interest of the object itself that is being treated.

What is understood here is that in the competition to have more or less importance in the information world, technically, it is not necessary that something is important or true: what (must) be communicated is only what

173 Ibid.

makes us act in a certain way. Information can be generated from nothing and make us act in a certain way to create certain types of effects.

3.2.3 Significance of Post Truth

In a methodical analysis on the post-truth, Anna Maria Lorusso defines three different meanings of the same:

> "In short: three meanings of post-truth, discussed around a television table as if they were a: post-truth as the predominance of an emotional logic; post-truth as a pluralization from the bottom of different versions of the facts, once the institutions have been in crisis as reliable information agencies; post-truth as rhetorical potential of communication, always available for manipulative purposes. Three meanings that add up to those I mentioned earlier, for a total (which I outline without any pretense of completeness!) Of at least five different meanings, having to add to the three: post-truth as a hoax; post-truth as a possibility of oscillation between a position and its opposite: bi-thought"[174].

At the same time, the definition shows that there is no clear and conclusive definition of post-truth, but there is a clear contextualization of the post-truth that needs careful analysis of the media used and the discourses developed, where the central issue is the truth itself: "What I want to say is that we cannot think of the problem of truth outside the discursive practices that produce it, presuppose it, multiply it"[175].

[174] Lorusso, A.M., *Postverità: Fra reality tv, social media e storytelling*, Gius. Laterza & Figli Spa, Kindle Vesion, pos. 81. (English translation provided by the author)
[175] Ivi, pos 121.

The post-truth phenomenon is closely related to the evolution of the media. The development of communication requires an in-depth analysis of the means but also of the contents that these same half-lines produce. As if this were a natural evolution, post-truth is a successive stage of this evolutionary path of communication studies:

> “Post-truth is not a caesura, or a surprise, in the contemporary communicative panorama; it is the result of a long-term evolution, which is above all a media evolution […] I mean that the media does not represent a real "already done" that is somewhere out there, autonomously, but above all they build the real, they shape it, offering those value, identity, community paradigms with which we act and make the world. In short, the media are spaces in which reality is built and in which models are defined.”[176].

The second phenomenon that emerges is the nature of post-truth, which acts in harmony with the evolution of the media and which clarifies the path of unveiling the denial process, as:

> "Post-truth does not deny the truth. It multiplies it and privatizes it"[177]. This makes it clear that there are different declinations of what we call truth and that the term itself becomes somewhat outdated:” We knew that many kinds of truth existed; we all know, for example, that historical truth is one thing and legal truth another […] In the same way we know well that certain versions of facts, which have also summarized reality for many, do not correspond to truth; they are ideological versions or banal manipulations that have the merit of aesthetic effectiveness. We know well that we have a very partial and sweetened version of Italian colonial affairs in Africa, as we well know that the famous photo of the oil-stained cormorant to synthesize the first Gulf war is false, because there are no cormorants in Iraq”[178].

The other central factor of the post truth that is remembered, is that the density and the multitude of information that is absorbed today within the

[176] Ibid.
[177] Ivi, pos. 142.
[178] Ivi, pos. 162.

infosphere is such that today the confusion penetrates the attention of every single subject involved in the information landscape and communicative:

> "The true / false opposition is hardly usable in such a confusing panorama (but paradoxically this opposition is constantly referred to). It is difficult to proceed with a selection of truths based on the idea of correspondence to the facts"[179].

What happens is what has already been mentioned before. Truth disregards information itself, it is an extensive journey that penetrates the same information and makes it so in a process that ignores the truth itself:

> "that truth is essentially a matter of putting to the test, the outcome of a process that is very different from a verification of correspondence between discourse and reality. Most of the time in identifying the truth we find ourselves facing a problem of credibility: credibility of the source and credibility of the statement. Credibility of the source means that not all sources are the same; the skills must count; direct experience is not enough, otherwise the risk of a return to a very dangerous relativist individualism. But how do skills come about, in turn? Through the credibility of what they say, or the hold over time, the explanatory power, the modeling ability. It is not true that all statements have the same force; there are easily invalidable affirmations and affirmations that instead require many efforts to be invalidated (because they involve the questioning of many already consolidated assumptions)"[180].

The first reference term that arises in the process of proof of truth in the process of information densification is the importance of competence. Competence is not just a residual or marginal phenomenon, as it could often result in a first reading of what happens, but it is the generating principle of diffusible communication, according to ethical principles, which penetrates the same potential for debate.

[179] Ivi, pos. 185.
[180] Ibid.

The question of competence is one of the first ramifications in the heated debate on post-truth: “Knowing things is not the same as understanding them. Comprehension is not the same thing as analysis. Expertise is a not a parlor game played with factoids”[181]. In the dichotomy of understanding and knowledge we play one of the essential values of post-truth, the process amplified on the concept of truth, but which focuses on the falsified perception of knowing a thing.

3.2.4 Post Truth and Perception

The problem of perception about oneself over what is understood and what is known can be considered as an analogy with holography. According to Oxford Dictionary, a hologram is “A three-dimensional image formed by the interference of light beams from a laser or other coherent light source”[182]. The hologram that represents reality as it is, through a fiction, in that reality is not present there, but is illusory. Nevertheless, how do holograms work?

> “To make a hologram, you record an object (or person) in a clean environment with a laser beam and apply the information to a recording medium that will clean up and clarify the image. The laser beam is split in two and redirected with mirrors. One of the beams is directed at the object. A portion of the light reflects off the object and is recorded on the medium. The second beam (reference beam), is directed toward the recording medium. This means the beams coordinate to make a precise image in the hologram location. These two laser beams interfere and

[181] Nichols, T., *The Death of Expertise: The Campaign against Established Knowledge and Why it Matters*, Oxford, 2017, Kindle Version, pos. 669.
[182] Lexico.com is a collaboration between Dictionary.com and Oxford University Press (OUP), https://www.lexico.com/en/definition/hologram. (accessed Sep 2018).

intersect with each other. The interference pattern is imprinted on the recording medium to recreate the 3D image."[183].

The hologram is therefore a good plan of comparison on what we mean as a false perception between understanding and knowledge. as much as when we read an information and understand it (the image that the hologram reproduces), this does not mean that we know it (the hologram itself), nor even if we know how to use it does not mean that we know how the hologram is generated (the difference between knowing how to do something, and being able to advise or instruct others on the thing itself):

> "Doing something well is not the same thing as becoming a trusted source of advice or learning about a subject (Notice that the same people who think they can become singers never think they can become voice coaches). This lack of self-awareness and intellectual limits can produce some awkward interactions between experts and laypeople"[184].

The second term of reference is the perception that we have of the news and the hyper-dramatic vision we have of the world. As Hans Rosling explains well, our vision of people, of things and of the general world suffers from a tendency to dramatize everything, the result of a conservative evolution, which has always made us fear things or be wary of them anyway:

> "My experience, over decades of lecturing, and testing, and listening to the ways people misinterpret the facts even when they are right in front of them, finally brought me to see that the overdramatic worldview is so difficult to shift because it comes from the very way our brains work"[185].

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[183] Kurcikova, A., *What Can We Expect from Hologram Technology in the Future?* , Nasdaq, Jul 2018, https://www.nasdaq.com/article/what-can-we-expect-from-hologram-technology-in-the-future-cm992373, (accessed Sep 2018).
[184] Nichols, T., *The Death of Expertise: The Campaign against Established Knowledge and Why it Matters*, Oxford, 2017, Kindle Version, pos. 672.
[185] Rosling, H., *Factfulness: Ten Reasons We're Wrong about the World--and Why Things Are Better Than You Think*, Coronet, 2018, Kindle Version, pos. 258.

The dramatization view of reality has a factual relapse in the creation process of the truth in the age we call post-truth, because the tendency to direct our attention to the negative aspect of reality, it does not allow us to be objective than real state of things, making us more easily conditioned:

> "In large part, it is because of our negativity instinct: our instinct to notice the bad more than the good. There are three things going on here: the misremembering of the past; selective reporting by journalists and activists; and the feeling that as long as things are bad it's heartless to say they are getting better"[186].

Specifically, we refer to the work of Peter Berger and Thomas Luckmann, The Social Construction of Reality, as one of the most important and influential theoretical works for understanding the contemporary communicational environment[187].

As the authors emphasize in the introduction to the work, there are two fundamental theses in this work:

- Reality is socially constructed;
- the sociology of knowledge must analyze the processes by which this happens.

Reality" is understood as a series of phenomena external to subjects (who cannot control their existence in the world) and knowledge is the information related to the characteristics of these phenomena. Reality and knowledge are

[186] Ivi, pos 820.
[187] Berger, P. and Luckmann, T., *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*, Penguin, London, 1991.

intimately linked by the process in which the body of knowledge of a given phenomenon is socially affirmed as reality.

Amongst other things, in the list of understanding the value of truth in the debate on communication, the importance given by the authors to social interaction and language in the construction of reality is highlighted.

In the analysis of emergencies that will be carried out in the next chapter, the issue of dramatization will be central to the definition of why emergency communication takes place and why it is acted in a certain way. In the process of analyzing the post-truth, dramatization takes on the role of accentuating the subject's perceptive attention towards certain topics, or in any case assuming a dramatic sense towards topics to which a choice of opinion must act, in their development during the course of time and potential transmissibility:

> "Keeping the level of aggression, persecutory spirit, and always active self-defense implies a management of communication oriented more to contact and "communion" than to the progress of awareness, of knowledge, of criticism"[188].

This induces a further phenomenon, which is that of the fragmentation of reality, a serious of private realities that do not communicate with each other, and which can be excluded at the choice of the interested party. This phenomenon is well highlighted in the communication concerning climate change, in which everyone can say their own, and what interests them is not the point of view of the other to create a debate or a dialectic to form more awareness and ideas that they can be shared, but a backward path that is made

[188] Lorusso, A.M., *Postverità: Fra reality tv, social media e storytelling*, Laterza & Figli Spa, Kindle Vesion, pos. 672.

up of exclusions and insertions, but only of what interests to validate the opinion one has:

> "It is not simply that climate-change deniers don't believe in facts, it's that they only want to accept those facts that justify their ideology. Like all conspiracy theorists, they feel entitled to a double standard whereby they simultaneously believe (with no evidence) that the world's climate scientists are part of a global conspiracy to hype the evidence on climate change, but then cherry pick the most favorable scientific statistics that allegedly show that the global temperature has not gone up in the last two decades."[189].

Understanding the post-truth era means understanding the attitude of us men towards what is communicated.

The post-truth makes the communication landscape a sort of battlefield where strategies, strength and perseverance of the communicators can get the better of the attention of those who receive the communication, making the infosphere of communication a panorama of strategies and gambling. This is clearly highlighted by Anna Arendt:

> "A mixture of gullibility and cynicism had been an outstanding characteristic of mob mentality before it became an everyday phenomenon of masses. In an ever-changing, incomprehensible world the masses had reached the point where they would, at the same time, believe everything and nothing, think that everything was possible and nothing was true...The totalitarian mass leaders based their propaganda on the correct psychological assumption that, under such conditions, one could make people believe the most fantastic statements one day, and trust that if the next day they were given irrefutable proof of their falsehood, they would take refuge in cynicism; instead of deserting the leaders who had lied to them, they

[189] McIntyre, L., *Post-Truth*, MIT Press Essential Knowledge series, Kindle version, pos. 231. See also Mooney, C., "Ted Cruz's Favorite Argument about Climate Change Just Got Weaker," in Washington Post, March 7, 2016, https://www.washingtonpost.com/news/energy-environment/wp/2016/03/07/ted-cruzs-favorite-argument-about-climate-change-just-got-weaker/?utm_term=.fb8b15b68e30 (accessed June 2018).

> would protest that they had known all along that the statement was a lie and would admire the leaders for their superior tactical cleverness"[190].

In a communicational ecosystem like this, the theme of climate change is, and has resulted, very often empty and lacking in strength to be able to corrupt the attention of the general public, including decision makers, who have found themselves using a theme such as this to generate political consensus. The primary form with which the discourse on climate change has been articulated so far is the catastrophic one, which relies on the sense of dramatization of individuals.

[190] Arendt, H., *The origin of totalitarism*, Paperback, 1973, p. 382.

3.3 COMMUNICATION OF EMERGENCY

The communication manuals analyze several factors that could be summarized in. The perspectives are considered as the reference point for the discussion on the issues we call emergency communication. In fact, if on the one hand the reference context of the communication on climate change is that of post-truth, on the other the mode of communication of climate change is that of emergencies. The experience of communication that meets the criteria of the communication on emergencies is borrowed from many areas of study of the communication itself.

Emergencies, disasters and crises have in common the disastrous event that must be communicated. the definition of crisis communication can be deviant with respect to what can be understood and to the methodologies to be followed. Communicating the crisis, in fact, today, may mean something related to economics and finance (especially after the facts that took place with the Lehman Brother Investment Bank of 2008), or with an unforeseen event, difficult to control immediately, and which could give rise to a difficult management situation (crisis situation) with a lack of clarity on the methodology to be followed for its solution. An example of this kind can be an epidemic, a terrorist act, etc.

A simpler definition of crisis communication separates the concept of communication that involves the attention of the public from its stakeholders and the public itself. For example, crisis communication could simply be the effort of community leaders to inform the public that they must evacuate before a hurricane. In this definition, participation in the disaster process is

inaccessible, and the information is empirically valid so that the individual can judge his veracity without the help of an expert.

The common thread in crisis communication is that the organization is experiencing an unexpected crisis and must respond. The crisis does not imply any control by the Communicator[191].

3.3.1 Risk Communication

Another facet of emergency communication is risk communication. Through risk communication, the communicator hopes to provide the recipient with information on the type of expectation (good or bad) and the extent (weak or strong) of a result from a behavior or exposure. Generally, this is a discussion of an adverse outcome and the likelihood of a story occurring for an individual. In some cases, risk communication has become a major factor in medical treatments, continuing to live at a nuclear power plant, understanding whether to take a drug or make a vaccine. Another central moment in risk communication is the one relating to cigarette smoking and their possible damage in the medium and long term. Risk communication is a question of possibility and security.

3.3.2 Emergency Risk Communication

[191] Wrigh, K.B., and others, *Health Communication in the 21st Century*, John Wiley & Sons, 2012,

The communication of the emergency risk is the necessity of the communication of the disaster of the emergency communication with the request of evaluation of the risks and the benefits.

Emergency risk communication is differentiated from crisis communication in the sense that the communicator is not perceived as a participant in the crisis or disaster, except as an agent to resolve the crisis or the emergency. The communication of the emergency risk is an experiment for the enterprises, to take possible decisions within the defined temporal limits, in consideration of the factual character of the disaster.

Precisely in the temporal narrowness lies the diversity of the communication of emergency risk, and its specific character, since the decision could be irreversible, the outcome of the decision may be uncertain, imperfect or incomplete information.

In this sense, these are words that we no longer consider communication on the emergency, differentiating ourselves in the approaches and in the companies, as well as the well-defined temporal infrastructures[192].

3.3.3 Climate Change and Emergencies

[192] Reynolds, B.J., Shenhar G., *Koenig and Schultz's Disaster Medicine,* in Cambridge University Press, 2016, https://www.cambridge.org/core/books/koenig-and-schultzs-disaster-medicine/crisis-and-emergency-risk-communication/033A3D62FE0E87623A2200D5D3105A24, (accessed October 2018).

Climate change is one of the main cases of communication on emergencies in the recent years. The first decade of the 21st century has been of great interest in everything concerning environmental sciences and their correlation with politics. Climate change has become the most significant new point from the Millennium Development Goals to the Sustainable Development Goals[193].

Ironically, it was also the decade, in which doubts and the public and political debate started, therefore bound to the search for consensus, on the scientific truth concerning climate change[194]. The year that had a concentration of public attention on the economic and financial crisis, was also, at the same time, the coldest year and a colder year in many regions of the world, and in this sense what worried the scientific community has lost, for the apparent series of circumstances, of interest[195].

The different alternation of positive and negative public opinion perspectives highlights the central theme regarding awareness raising and involvement methods used to make a complex scientific problem understandable for the masses. Focusing attention on the communication of the drama and the catastrophe brings us to a first aspect, that there is attention from the public. All

[193] The SDGs build on the successes of the Millennium Development Goals (MDGs), which embodies specific targets and milestones in eliminating extreme poverty and the worst forms of human deprivation. The SDGs expanded its scope to 17 goals from the eight (8) goals in the MDGs, which covers universal goals on fighting inequalities, increasing economic growth, providing decent jobs, sustainable cities and human settlements, industrialization, tackling ecosystems, oceans, climate change, sustainable consumption and production as well as building peace and strengthening justice and institutions. Unlike the MDGs, which only targets the developing countries, the SDGs apply to all countries whether rich, middle or poor countries. The SDGs are also nationally owned and country-led, where in each country is given the freedom to establish a national framework in achieving the SDGs. https://psa.gov.ph/content/how-are-sustainable-development-goals-different-mdgs (accessed Jul 21, 2019).

[194] Hanson, F., *Lowy Institute Poll 2009: Australia and the world - Public opinion and foreign policy*, Sydney, Lowy Institute for International Policy, 2009.

[195] Solomon, S., and others, *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Vol. 1, Cambridge University Press, Cambridge, 2007, https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf, (accessed Apr 2018).

this although there is no commitment on the part of politics and public administration. We believe it is important to get insights thanks to a better understanding of how climate change has been communicated to date and how this communication has been received and interpreted. Communication on climate change has always been very challenging and its focus has usually been catalyzed on the catastrophe.

The first thing that characterizes a communicative approach based on emergency is involvement. What communication can do is to bridge the gap between scientific information and mass information, fueling public attention. This acts on several levels, the cognitive, emotional and behavioral levels, in such a way that people mentally procure the problem and act with actions and behaviors that lead to effective political, economic, commercial decisions, etc.[196].

The term engagement and the commitment that one hopes can be taken by the individual is the key to understanding the need for communication and the alley on the emergency factor, which is based on the three specific assumptions:

- Science alone cannot provoke the action of individuals, making them assume a judgment and an interpretation that are properly binding to action. In this sense, between the end of the 2000s and the first half of the '10s, science fully satisfied the doubts and perplexities surrounding the factors relating to climate change, the centrality of man in the rapid acceleration of this change, and the possible repercussions

[196] Lorenzoni, I., and others, *Dangerous climate change: The role for risk research*, Risk Analysis, Dec 2005, pp. 1387–98.

on the planet[197]. These tests have been the main driver of mass information on climate change;

- In a democracy political action requires a previous action of lobbying, in which non-massive consent is collected, but through the conveyance and orientation of opinions, which produce a clear and defined public commitment;
- Third, communication is the inclusive vehicle for bringing the various social lives into agreement and dialogue, between dissidents, influencers, politicians and managers, and therefore assumes a central, public role in the fight against climate change.

There are several problems that emergency communication can activate as a motor to understand more the complexity of climate change:

- Is the scarcity of information that is easily understood by the public directly proportional to the lack of public commitment (and therefore, more information and explanations are needed to bring people to action)?
- Are the fear and the catastrophic vision of the near future the correct stimulus to ensure that the spectators can act?
- Is the scientific analysis of the phenomenon and the evidence of its results a stimulus or a deterrent?
- Is there a multicultural issue in communication, especially on emergencies?

[197] Parry, M. L., and others, *Climate Change 2007: Impacts, Adaptation, and Vulnerability,* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, 2007, https://www.ipcc.ch/site/assets/uploads/2018/03/ar4-wg2-intro.pdf, (accessed Apr 2018).

These are the questions through which we will try to give an answer on the effectiveness of communication on emergencies, as a method to better communicate climate change[198].

Climate change is difficult to convey as a concept for three main reasons:

- the terms change and climate are both taken individually and together, they are intangible and difficult to convey. One of the main culprits - carbon dioxide and other greenhouse gases that trap heat - are colorless and odorless gases, and their highlighted (and noticeable) effect is only in the medium / long term, and not immediately;
- at the empirical level, the problem has its development capacity too slow over time and has not significantly interfered in those areas of the planet with a high population density and where the strong global media impact capacities reside.

Mainly for these reasons, scientific research, and the information that goes with it, becomes the first relevant resource to give rise to the communication of climate change itself. This therefore requires careful and precise communication.

Communication is always linked to the quality and quantity of information in possession, and the lack of information can damage the potential of being able to cope with emergencies through action. This denotes a cognitive and informative deficit.

[198] Bak, H. J., *Education and public attitudes toward science: Implications for the 'deficit model' of education and support for science and technology,* Social Science Quarterly, Vol. 82 (4), 2001.

Precisely on the cognitive deficit and on the lack of the appropriate amount of information that can untie the knots and allow the development of discourses, it is the origin of the first mass communication phenomena: the former film by the US Vice-President Al Gore "An Inconvenient Truth" , and the communicative apparatus that has characterized its widespread diffusion at a global level, is a key example of mass communication flows that create awareness through a strategy defined through alarmism and perception of emergency[199]. This can cause an effect inversely proportional to what is expected, as it is assumed that only through a mass of consistent and quality information can a process of political action of the same scope be activated. Nevertheless, it is not always like this[200].

The path that leads to the understanding of the effects of communication, through the perception of cognitive deficit, abandon any doubt that the very conspicuous and good information can fail to make people act. However, the multitude of information conveyed are often understandable by people of medium / high culture and presume an analytical capacity that the masses do not have. The association of socialist policies and the fight against climate change have caused a recession of socialist lefts, on a political level, almost all over the world[201]. Furthermore, the characteristic that makes the communication based on the deficit, scarcely feasible and lasting, is the relative exclusion of all those who should not understand or accept defining them as

[199] "The Climate Realtiy Project, Climate 101", in *The Climate Reality Project*, https://www.climaterealityproject.org/ (accessed Sep 22, 2019).
[200] Kotcher, J. E., Nisbet, M. C., *A two-step flow of influence? Opinion-leader campaigns on climate change,* Science Communication, Vol. 30 (3), 2009, pp. 328–54.
[201] Nisbet, M. C., *Communicating climate change: Why frames matter for public engagement Environment,* Vol. 51(2), 2009, pp.12–23.

inappropriate or stupid[202]. In general, there is an organic separation between science and mass communication, or at least from all that science which assumes some specific knowledge for its understanding, also to ensure that the message it wants to convey is not misleading or negative.

Being ignorant about climate change is not necessarily the cause of the lack of action and of raising adequate attention in the public. It is also true that an understanding of what are the possible solutions does not activate effective actions and responses[203].

Unlike an active participation in ideological systems in favor of the environment, adhesions to the parties that move for a consensus to fight against climate change, specific actions in terms of tax benefit, social support to create a culture of the environment, favor the assumption of active behaviors and changes of perspective[204].

Finally, those who are concerned and who are involved in the fight against climate change are not necessarily those who proceed in resilient ways and act change quickly and effectively. Creating a home on the energy front, managing the greening of the roofs of a house or building, developing a bill that favors the decrease in the use of fossil fuels, all this can find a series of impediments that could make even those who are predisposed to change. In this context of inertia of action, being informed, informing, reading, discussing, already creates a condition of satisfaction for having supported the change, creating a toxic

[202] Ibid.
[203] Gardner, G. T., and Stern, P. C*., Environmental Problems and Human Behavior*, Boston: Pearson Custom Publishing, Boston, 2002.
[204] Takahashi, B., *Social marketing for the environment: An assessment of theory and practice,* Journal of Applied Environmental Education and Communication, Vol. 8 (2), 2009, pp. 135–45.

stasis, which makes climate change one of the nth topics to be debated on social media or on the internet[205].

3.3.4 Create Action by Unleashing Fear

The analysis of the communication of emergencies related to climate change focuses attention on climate change as a risk that requires an immediate solution. At the same time, to create an immediate reaction, the communication on emergencies appears one of the possible strategies to bring the human being, as a true potential actor of change, to act. There is a strong debate about the possible effects of news, or images, with a heavy emotional impact, and their effectiveness, in triggering public interest. The need for the appeal to emotions to be properly detailed but effective, through dynamics that evoke fear but do not induce a mechanism of removal (images and projections of climate change and related environmental disasters, evoking concerns and a temporal proximity).

The psychological distance is part of the Construal level theory, a theory developed in the field of social psychology that describes the relationship between psychological distance and the extent to which people's thinking (for example, about objects and events) is abstract or concrete[206]. The central idea of the theory is that the more an object is distant from a psychological level from

[205] Kahlor, L., and Rosenthal, S., *If we seek, do we learn? Predicting knowledge of global warming*, Science Communication, Vol. 30 (3), 2009, pp. 380–414.
[206] Trope, Y., a Liberman, N., *Construal-level theory of psychological distance,* Psychological Review, Vol. 117 (2), pp. 440–63.

the individual, the more it will be conceived as abstract, while the more the object is close to the subject, the more it will be thought of as concrete.

The theory collimates with how the procedures of communication in emergencies put in place, differentiated into categories proper to human perception[207]:

- temporal distance (time);
- spatial distances (space);
- social distances (interpersonal);
- hypothetical distances (future).

The report on how we think of a certain thing creates the basis for the relationship with the thing itself:

> "On the basis of this conceptualization, we posit two related criteria that can be used to distinguish which features of an item or an event are more high level and which are more low level (i.e., which features will be increasingly captured at a higher vs. lower level of construal). The first criterion reflects centrality: Changing a high-level feature has a greater impact on the meaning of an object than does changing a low-level feature. For example, a lecture would change more when the speaker is changed than when the room is changed, suggesting that the speaker is a higher-level feature of the lecture than the room is. The second criterion reflects subordination: The meaning of low-level features depends on high-level features more than vice versa. For example, when learning about a forthcoming guest lecture, location would become important only if the topic is interesting. The topic of the lecture, on the other hand, would be important regardless of the location's convenience. In this sense, details about location are subordinated to details about topic, and thus constitute a lower level of construal"[208].

[207] Trope, Y., a Liberman, N., *The association between psychological distance and construal level: Evidence from an implicit association test,* Journal of Experimental Psychology, 2006, pp. 609–622.
[208] Trope, Y., Liberman, N., *Construal-level theory of psychological distance,* Psychological Review, pp. 440–463.

The theory of the psychological distance clarifies the path that the communication on emergencies can make. Indeed, the communication of risks and disasters is often used to elicit reactions, and to achieve a directly measurable effect on public attention. The image of the polar bear of 2019 that with difficulty tries to walk, evocative of the image already published in 2006 by Time Magazine, are a part of the path on informing climate change through fear, but which are missing precisely from the part of psychological proximity. Likewise, there is a lot of news in newspapers, on television or in advertising campaigns that use images that evoke pain and fear[209].

Scientific information makes itself part of this emergency call process, in a complete and conscious way, trying to achieve all the objectives, as in the existential climate-related security risk: a scenario approach described by the Australia's National Center for Climate Restoration. The report states that

> "Climate change now represents a near-term mid-term threat to human civilization" concluding that "a new approach to climate-related security risk management is thus required, giving particular attention to the high-end and difficult-to-quantify "fat-tail" possibilities [...] urgently examine the role that the national security sector can play in providing leadership and capacity for a near-term, society-wide, emergency mobilization of labor and resources, of a scale unprecedented in peacetime, to build zero-emissions industrial system and draw down carbon to protect human civilization "[210].

Many of those who communicate climate change (newspapers, televisions, international institutions, influencers, etc.) believe that orienting communication towards fear is more than sufficient, and can serve as an effective trigger to

[209] Kolbert, E., *Field Notes from a Catastrophe: Man, Nature, and Climate Change*, Bloomsbury, London, 2006.
[210] Spratt, D., and Dunlop, I., *Existential climate-related security risk: A scenario approach,* Breakthrough - National Centre for Climate Restoration, 2019, www.breakthroughonline.org.au (accessed Oct 2, 2019).

increase the urgency of the problem and induce the people to "do something"[211]. However, fear can cause a process of psychological distancing by not causing the relative action. The rejection of fear can be given by its inadequacy for the subject, or as a perception of a manipulative system (due to its distance, hence its perceived non-existence)[212]. There is a part of the mass public that, related to the distance of the problem and with strong suspicions about potential manipulative modalities, completely rejects the problem, making it a mere political issue[213].

To cancel the distance process, one of the methods is not only to evoke fear, but to provide concrete solutions, although it is often difficult to reach due to the lack of receptivity of the reference system. Fear intersects with the system of relationships and the necessity of everyday life, and its distance from everyday problems (psychological distance) creates a contrary effect of rejection and detachment. Excessive attention to negative impacts without effective emphasis on solutions generally means turning the public into a defenseless rather than involving it more actively[214].

The dialectic that arises between scientific achievement and the lack of action in the face of fear, poses one of the fundamental nodes of how to communicate climate change. The alternatives are many but require careful analysis and accountability to capitalize on the effort and maintain the level of

[211] Nisbet, M. C., and Scheufele, D. A., "What's next for science communication? Promising directions and lingering distractions". *American Journal of Botany*, 2009, pp. 1767–78.
[212] O'Neill, S., and Nicholson-Cole, S., "Fear won't do it: Promoting positive engagement with climate change through visual and iconic representations", *Science Communication*, 2009, pp. 355–79.
[213] Jost, J. T., and Hunyady, O., "Antecedents and consequences of system-justifying ideologies, Current Directions" in *Psychological Science* 14, 2005, pp. 260–5.
[214] Weber, E. U., "Experience-based and description-based perceptions of long-term risk: Why global warming does not scare us (yet)", in *Climatic Change* 77, 2006, pp. 103–20.

seriousness of the same scientific data. This does not mean the massification of images of hope or the mitigation of fear. Instead, this means to create an approach that is positive, without neglecting quantitative data and transmitting solutions that can be expressed in a practical sense by the entire community and that take into account the entire chain of social value, from the economy, to the family, from commerce to education, in an effective circularity process. A communication strategy that can integrate different operational aspects and that takes into account the analysis of the limits of what has been conducted so far, would create a greater openness to information and greater involvement[215].

First of all, communication must have a positive meaning, and must adequately balance scientific information with social needs. Secondly, written information and visual information must give practical and incisive support to a proposal of solutions that can be pursued in order to give concrete results. The proposed solutions must give a sense of effectiveness, so that there can be an immediate involvement to reduce the problem, and, at the same time, the possibility of reproduction in scale of their implementation over time. The sense of response that one wants to unleash should be collective, based on cultural differences and taking into consideration the prejudices and limitations inherent in the narrative concerning climate change[216].

The strong dialectic that was created in the debate on climate change has created a division, often radical, between the parties, since climate change has become part of the phenomenology of the request for consent, resulting an

[215] Kahan, D. M., and Braman, D., *Cultural cognition and public policy,* Yale Law and Policy Review 24, 2006, pp. 147–70.
[216] Segnit, N., and Ereaut, G., *Warm Words II: How the Climate Story is Evolving and the Lessons We Can Learn for Encouraging Public Action*, Institute for Public Policy Research, London, 2007.

important part of the political communication process. This also allows a easier dialogue, bringing it more into evidence. The inclusion in the political dialogue if on the one hand it has limited the process of understanding, on the other it has involved a greater number of people, bringing solutions on the mitigation of climate change to the immediate evaluation and the possible implementation[217]. The communication must be more aware and responsible and, representing a part of the process of change to counteract the effects of climate change, must act by limiting sensationalism, and understand that the attention of the public always undergoes downturns and is cyclical and climate change it is part of the same process[218].

The effect of proximity, the framing of the problem within problems closer to people's everyday life (economy, children, health and safety), can be one of the winning strategic points that would allow a good reception of climate change as a theme by the masses. The intercultural question and the problem of data reliability, then, are the nodal points of the solidity of the information itself.

3.3.5 The Relevant Audience

The scientific discourses on climate change and their bearers have monopolized the debate on climate change, bringing science to the mind of political opinion, often making it the subject of discussions about its validity, and

[217] Kahan, D. M., and Braman, D., *Cultural cognition and public policy*, Yale Law and Policy Review 24, 2006, pp. 147–70.
[218] McComas, K., and Shanahan, J., *Telling stories about global climate change: Measuring the impact of narratives on issue cycles*, Communication Research 26, 1999, pp. 30–57.

delaying the process of action and resilience. The process has focused exclusively on science, in a post-truth communication and change of communication structure, with the entry of the digital infosphere that promoted the reduction of complex concepts to unsubstantiated and consistent discourses analytical. The fact is that scientific analysis on climate change does not appear to be of interest to the general public. Very often, it is not considered, or in any case shunned with respect to problems that are of greater importance due to proximity.

In the cyclical nature of everyday life, individuals often find themselves having to face a decision-making path on what needs to be addressed. This path, which occurs in a reduced manner at a temporal level and is not the manifestation of any comparison, is taken as a decisive input for decisions and actions.

The messages of science are very often learned in a passive manner, are not discussed, and do not have an informative substrate in the recipient that can create a debate. In this sense, they are assumed in a condescending manner and without the possibility of replication. Thinking about the public and not just the message is one of the main topics in communication in general and specifically in the communication of emergencies, as they represent the engine of action. Which audience to involve in addition to how to involve it.

The communication strategy on climate change must place its audience as central to the defining process. Precisely in the communication of emergencies, the public is the supporting asset of the message and the way in which attention is drawn. What has been carried out during these years has placed as central

the problem and the drama of the same, through the stimulus of fear, with strong scientific bases but little understood by the masses.

Identifying the relevant audience means detecting audience interests and thinking about climate change. In addition to this, the arguments regarding environmental sustainability are the positive phenomenon that contains the potential for economic development through a circular economy process. The risk that can be encountered is that an excessive fragmentation of the audience can generate an inconsistency of the message[219].

Understanding the audience of reference implies a survey of the constituent factors of the audience itself, such as language, values, and trends for the professional and social role they cover. Furthermore, the previous knowledge of climate change its developments over time, the historical path of ecological culture and the understanding of risks and possible solutions. Finally, the intercultural differences and the constitutive principles of each one's beliefs.

Understanding the audience means understanding the information channels and the means of communication that everyone uses, the trust they place in the media, and through which potentially a process of change is possible.

Climate change is an intangible and difficult to convey topic (change and climate is already a binomial that differs in perception for different cultures of the world). Communicating massively without a specific audience target has reduced effectiveness. Communication must be based on the cognitive needs and classifications of different clusters and cannot simplify the message.

[219] Leiserowitz, A*., American risk perceptions: Is climate change dangerous?,* Risk Analysis 25, 2005, pp. 1433–42.

Massive communication of complex subjects implied the risk of rejection due to manipulative fear[220]. Understanding the audience facilitates the composition of the information, shaping the message in the most appropriate way so that it can be received. The choice of images, terms and action perspectives offered as a solution to the problem are all-important stimuli to promote the decision-making process.

The decision process, as has already been explained previously, is promoted by the condition of proximity or psychological distance: this forms a brain-frame in the subject receiving the information that states the decision. This brain-frame is made up of the subject's theoretical, social, political and cultural a priori. The subject's culture and theoretical a priori are always the filter for decision-making. Any information that puts at risk the beliefs and the cultural system of the receiving subject, are rejected or in any case not taken into consideration as valid[221].

Research on the processes that make up the communicational phenomenology of post-truth have highlighted how people tend to search, read and listen to information that confirms their beliefs. This produces an obvious exclusion effect. This evidence supports the definition of the audience segment for communicating climate change risks.

This process provokes a diversification of views and a phenomenon of opposition, which does not take into account that 97% of scientists claim that global warming is a reality, and there is almost the same percentage (92%) that

[220] Dickinson, J. L., *The people paradox: Self-esteem striving, immortality ideologies, and human response to climate change*, Ecology and Society 14, 2009, p. 34.
[221] Kahan, D. M., and Braman, D., *Cultural cognition and public policy,* Yale Law and Policy Review, 2006, pp. 147–70.

claims it is caused by human activity[222][223]. There must be, however, a clear correspondence between the person who sends the message and the audience that receives it. Most of the information concerning climate change has been conveyed by scientists, creating a communication gap between the transmitting and the receiving. The recipient cannot understand the language and the message of the sender. The audience, in this sense, has not been profiled[224].

Scientists have maintained the hegemony of information on climate change, but this hegemony has caused a distance from the public. The concept of climate and the concept of change are abstract, and the relevance of man in this process defines a moral issue. Religious leaders therefore have a role in the process. Pope Francis in 2016 was the first religious leader who expressed himself, through an official communication (encyclical) on the issue of climate change. In this document, Pope Francis states that the environmental crisis is not only a scientific, political and economic problem but a moral and spiritual challenge as well[225]. Just to feed the scope of the encyclical and to be able to carry out a generalized process of transmission of the problem, in the same days of its publication the images of nature on the Basilica of St. Peter were

[222] Worland, J, "Study: Most Non-Climate Scientists Agree on Global Warming Too", Time, September 27, 2015, https://time.com/4051338/climate-change-scientists/ (accessed Jun 23, 2019).
[223] Jost, J. T., and Hunyady, O., *Antecedents and consequences of system-justifying ideologies,* Current Directions in Psychological Science, 2005, pp.260–5.
[224] Nisbet, M. C., *Communicating climate change: Why frames matter for public engagement*, Environment 51, 2009, pp. 12–23.
[225] Steffen, L., "Religion and Climate Change", Huffington Post, Jan 13, 2016, https://www.huffpost.com/entry/religion-and-climate-change_b_8900316?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAIQEcEu8kMqfy7k2IVUhDmK4LaH8Tt77IfdJM3vEQmJ6iZzKGgMedghc0QNopGDZwdj5CnQWq6ylKFAdTZWSrMmrFGqu2DLuEtRpuYd4qgpBFt2LLskGf7GSeFiAeujbZNeksxb5VQM2WhU-q4dtrvL1Yk4nqlK4Nv1-kvy8T8s3 (accessed Oct 2, 2019).

projected[226]. Different types of leaders or influencers can reach the different types of audience. If profiling is political and security, a security authority would be the most fit for purpose. If they are children, celebrities or cartoons could be the best authors of the message[227]. The Greta Thunberg phenomenon and the development of the FridaysForFuture movement is exactly a path of communication through audience profiling[228].

Greta Tintin Eleonora Ernman Thunberg is a Swedish 13-year-old who has become one of the most important faces in the campaign for sustainable development and against climate change. Her communication, which began with regular sit-ins every Friday in front of the Riksdag in Stockholm with the slogan Skolstrejk för klimatet (climate school strike), leading to meet world leaders and influencers, and activated street demonstrations throughout the Planet[229].The relevance of the Greta phenomenon in the climate change communication process lies in the fact that those who convey the message must be credible in front of an audience that considers them credible.

Audience profiling can also derive from activation between individuals thanks to proximity and word of mouth. Small groups of people, friendships, families or

[226] The Telegraph: Earth, "Fiat Lux Light Show: St. Peter's Basilica transformed for climate change", in *The Telegraph*, https://www.telegraph.co.uk/news/picturegalleries/earth/12041369/Fiat-Lux-Light-Show-St.-Peters-Basilica-transformed-for-climate-change.html (accessed Oct 2, 2019).
[227] Boykoff, M. T, and Goodman, M. K., *Conspicuous redemption? Reflections on the promises and perils of the 'celebritization' of climate change*, Geoforum, 2009, pp. 395–406.
228 Fridays for Future, in Fridays for Future, https://www.fridaysforfuture.org/ (accessed Oct 22, 2019).
[229] "Newsroom, A phenomenology of Greta Thunberg, daughter of a new generation of consumers", in *Morning Future*, https://www.morningfuture.com/en/article/2019/06/12/greta-environment-consumers-youth-iabichino/648/ (accessed Oct 22, 2019).

others, who are connected to other groups of people, form clusters of influence that may have some relevance in the success of communication[230].

Individuals' personal experience is a central factor in communication between small groups, which can potentially expand into much larger groups (cities), including nation, states and reference cultures (Western culture). The reason for the success of this process is trust.

Psychological distance and network theory[231] are the conceptual infrastructures that allow us to understand how this is particularly important. Trust in who conveys the message is particularly important for an intangible and abstract problem, which hides, as we have seen, pitfalls of a moral, cultural and scientific understanding[232].

It is a part of attitudes that involves a great deal of complex information in the end. This phenomenon produces the simplest consonance with what are a priori beliefs and patterns. Trusting a cultural group, or small groups of belonging, is simple with the request of a limited processing effort, which allows reaching a reduction of information to the minimum terms.

The same thing does not happen if the message or the information comes from an individual belonging to different cultural groups that promote extraneous or simply different value structures[233]. The message cannot

[230] Gilbert, D. T., and others*, The surprising power of neighborly advice*, Science 323, 2009, pp. 1617–19.
[231] Barabási , A., *Linked: The New Science of Networks,* American Journal of Physics 71, 409, 2003.
[232] Marx, S. M., and others, *Communication and mental processes: Experiential and analytic processing of uncertain climate information,* Global Environmental Change 17, 2007, pp. 47–58.
[233] Agyeman, J., and others, *The climate-justice link: Communicating risk with low-income and minority audiences* pp. 119–38, in Moser, S.C., and Dilling, L., *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge University Press, Cambridge, 2007.

undergo in itself a process of simplification and audience profiling is always parameterized with respect to the interactive intensity between the parties.

Those who convey the message cannot be chosen to prescient and must be contextualized with respect to what the audience wants or suggests implicitly. A good strategy must be profiled and assessed individually.

3.3.6 The Role of the Mass Media in Communicating Emergencies

Mass media are certainly the main vehicle of what is mass information, and it is assumed that their effectiveness cannot be questioned. Climate change is one of the most important terms of reference in the history of massive information that needs attention from the entire population of the world. If the first added value of the mass media (and also what is called social media) in the mass communication of emergencies is the possibility of reaching a large number of people in a short time, the main disadvantage is that the enormous density of information of which the infosphere is composed of, reduces the ability to retain information. The information is so often consumed, as if it were a candy, and then forgotten. The loss of information through the mass media is a significant phenomenon, which also affects emergencies[234].

In addition to audience profiling, in communicating emergencies of global importance on a global scale, it is necessary to have a specific knowledge of

[234] Moser, S. C., *In the long shadows of inaction: The quiet building of a climate protection movement in the United States,* Global Environmental Politics 7, 2007, pp. 124–44.

the effectiveness of different mass communication channels in order to create an active involvement aimed at the action of specific audiences[235].

The first differentiation at the level of mass media is the persuasive media or not. The media become persuasive if combined with a persuasive message and they are what we consider for targeted campaigns (for example in the health sector, on vaccines, on pregnancies, etc.) aimed at a wide audience but with an effect of the message conveyed on a reduced percentage of the public itself. If persuasion on strictly private and personal matters, such as health and health related issues, are easier to convey, everything related to climate change, for the reasons explained above, cannot guarantee the same degree of pervasiveness.

The concept of sustainability, which has a more concrete and broader view at the same time, combined with issues concerning more everyday life, has often been used to arouse attention in the reference audience[236]. As before we have already had the opportunity to explain about proximity, being able to relate to a live person has an effect of pervasiveness and greater efficacy, mainly due to the methods of communication that also make use of body language.

Being able to relate to a person directly is not a guarantee of effectiveness, but it certainly allows a potentially increasing attention in the interlocutor. The sense of personality and the completion of words with non-verbal language are

[235] Maibach, E., and others., *What Are Americans Thinking and Doing about Global Warming? Results of a National Household Survey,* Porter Novelli and Center of Excellence in Climate Change Communication Research, George Mason University, Washington DC, 2008.
[236] Kollmuss, A., and Agyeman, J., *Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?,* Environmental Education Review 8, 2002, pp. 239–60.

complemented by the trust that potentially exists between two people who meet[237].

What emerges is that a mixed strategy, which combines both communication from the scientific source to the public and a circuit that goes from the source to the influencer to the profiled audience. This would make it possible to derive maximum benefit from both mass communication and one-to-one communication.

The major limitations of mass channels, in communicating emergencies, is that they cannot profile the message to specific audiences and therefore they cannot obtain a concrete response. At the same time, specific audiences follow mass channels; therefore, the profiling of messages calibrated on media that are followed by a certain type of audience, allows to obtain a result of attention with a higher retention of information[238].

Communication on climate change by adopting communication strategies specific to communication on emergencies, involving the mass media, indicate some limits and some risks of failure. The average masses are considered as the solution to reach large masses, but this is not the case, due to the inability to activate a retention mechanism.

Furthermore, the political use of climate change to polarize the audience, in association with topics that create social division, does not facilitate the process.

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[237] Abroms, L. C., and Maibach, E. W., *The effectiveness of mass communications to change public behavior,* Annual Review of Public Health 29, 2008, pp. 219–34.
[238] Leiserowitz, A*., American risk perceptions: Is climate change dangerous?,* Risk Analysis 25, 2005, pp. 1433–42.

Climate change, as an emergency, can and must be countered through the actions of individuals, in a massive and resilient manner. In this sense, the effectiveness of the channels used is of fundamental importance.

However, the communication on climate change has been unexpectedly successful. In a short time, globally, with some difficulties mentioned above, many people on the planet know what climate change is[239].

What emerges with respect to a broadening of knowledge on climate change is that understanding is superficial, personal concern is relatively low. People do not deal with sustainability to counter climate change at complex times economically or with different priorities.

The strategies adopted so far are those of diversifying, first of all, the sources of information and making denser communication. Secondly, the strategy of fear is always used to activate an action. Finally, the almost unanimous vision of the scientists of the world, tries to make the process of resilience to be followed clear, especially for the influencers.

What we are not able to accomplish today is a process that activates society in a clear manner, since we use strategies and methodologies specific to the most common paths of mass communication. The involvement must be of all levels of society and must take into consideration the endogenous factors of communication, especially the digital one[240].

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[239] Leiserowitz, A, *Communicating the risks of global warming: American risk perceptions, affective images, and interpretive communities,* pp. 44–63, in Moser, S.C., and Dilling, L., *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change,* Cambridge University Press, Cambridge, 2007.

[240] Ockwell, D., and others, *Reorienting climate change communication for effective mitigation: Forcing people to be green or fostering grass-roots engagement?*, Science Communication 30, 2009, pp.305–27.

Communication that wants to bring about change at all levels of society must consist of efforts to increase the motivation to make a change and help lower the obstacles to make it happen.

A better understanding of the reference audience is certainly a part of the emergency communication that is best suited to the needs of communication on climate change.

4. COMMUNICATION CAMPAIGNS ON CLIMATE CHANGE

4.1 KEY PERFORMANCE INDICATORS OF A CAMPAIGN

The communication of climate change can be visually represented as an iceberg, where the visible tip is actions to alert, educate, inform and persuade people to find a solution to the problem. Under the surface, communication in this field is shaped by mental and cultural models, experiences, values and worldviews that change profoundly from individual to individual. More recently, scholars have pointed out that the underlying interpretative model is even more complex than it appears. Communication is in fact part of a deeply articulated system made up of individuals, organizations and institutions that possess an infinite multitude of knowledge, policies and cultures.

Through this dynamic network of processes, societies develop not only their own awareness of climate change, but also above all the misunderstandings, concerns and actions they will undertake[241].

Communicating climate change effectively is perhaps one of the biggest challenges facing communication experts. It is both a technical and an abstract issue and very often it is difficult to pay attention to consequences that may or may not arise. The problems of the present too often appear to be more important and unrelated to the consequences they bring with them. For

[241] Yale program on climate change communication, *Engaging Latinos in the U.S. on Climate Change,* in *Yale program on Climate Change Communication: projects*, https://climatecommunication.yale.edu/about/projects/engaging-american-latinos-climate-change/ (accessed Sep 15, 2019).

example, it sometimes happens that people living in areas that are already heavily flooded and affected by geological changes (due to climate change) strongly demand that the area be further cemented in order not to lose their jobs, but not reflecting, however, on the strong connections between the floods and the extreme cemented of some areas[242].

What is important to understand today is the extreme urgency of recognizing climate change as a real problem that affects everyone's daily lives.

The communication models used up to now have not always given the desired results; on the contrary, sometimes they are counterproductive to the point of jeopardizing the goal that had to be achieved. The four key points of a communication campaign in this field will be analyzed here, examining the choice of message, audience, images and distribution channel.

4.1.1 Definition of the Message

When developing the message to be communicated, one must bear in mind the two main consequences due to the intangibility of climate change: the psychological distance it causes and the consequent denialism. The message must be shaped according to the values of the target audience and must avoid apocalyptic rhetoric as much as possible. But let us proceed with order.

[242] Degano, E., "I cambiamenti climatici sono già qui, ed è la chiave per comunicarli meglio", in *Oggi scienza*, Nov 1, 2018, https://oggiscienza.it/2018/11/01/come-comunicare-cambiamento-climatico/ (accessed Aug 29, 2019).

The psychological distance concerns the egocentricity of the individual: his point of reference is the "I" in the space-time present and the ways in which an object (or in this case, a problem) can be removed from that point, constitute various and distant space-time dimensions. To overcome this egocentricity, the subject must build an alternative mental dimension, but the further we put a problem from direct experience, the higher (and more abstract) will the level of mental construction be need. In support of this analysis, research has shown that the different dimensions are cognitively linked to each other. These are equally influenced by the level of mental construction put in place and have consequences on the thoughts, preferences and actions of the individual[243].

Applied to the field of climate change, the psychological distance thus becomes the tendency to reduce climate change to a problem that will manifest itself in the distant future and that will affect only the inhabitants of remote and unknown areas of the planet[244].

In Italy, for the moment, there is a lack of in-depth studies on the close link that exists between psychology and climate change, but relations that come from the United States propose new interpretative models to promote dialogue between the two sciences[245]. It is important to understand right from the start how the human dimensions of climate change are essentially psychological and social. Psychology therefore becomes a valid help in understanding how people interpret these changes, how they process their consequences and, above all,

[243] Trope, Y., and Liberman, N., *Construal-level theory of psychological distance*, Psychological Review, pp. 440–463.
[244] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.
[245] Caserini, S., *Psicologia e cambamenti climatici,* in Climalternanti https://www.climalteranti.it/2011/07/08/psicologia-e-cambiamenti-climatici/ (accessed Oct 2, 2019).

how to address more effective responses. Dr. Simona Sacchi, a social psychologist at the Università Milano Bicocca who works on the perception of climate change, argues that to activate our alarm system it is not enough to be exposed to a negative stimulus; in reality it is the perception of danger that triggers something in the brain. It is precisely for this reason that international threats generate an immediate response in us, while global warming does not: the former are perceived as imminent and capable of undermining our physical, moral or social safety, while the latter appears distant in time and space and it is precisely this gap that distances us psychologically from the problem[246].

As we will see below, individuals perceive the intangibility of climate change in different ways depending on their awareness of the problem, their knowledge of "facts" and their trust in experts.

The psychological distance due to intangibility that characterizes climate problems very often leads individuals to implement a process that is commonly called climate denialism. People do not psychologically link what they see to climate change, going so far as to deny its existence and opposing expert judgment. The lack of connection with the public is the direct consequence of a message that does not consider the psychological factors that determine the perception of climate change[247].

To avoid that the public feels overwhelmed and loses interest in acting, it is important to talk about real facts and not abstract concepts. The message we

[246] Panciera, N., "Perché c'è chi non crede al cambiamento climatico?", in *Focus* https://www.focus.it/ambiente/ecologia/negazionisti-del-cambiamento-climatico (accessed Oct 2, 2019).
[247] Caserini, S., "Psicologia e cambamenti climatici", in *Climalternanti* https://www.climalteranti.it/2011/07/08/psicologia-e-cambiamenti-climatici/ (accessed Oct 2, 2019).

want to spread must be described with concrete analogies and examples that the public can find in everyday life. It has been shown that combining these practices with valid solutions helps to minimize the psychological distance and increase the engagement of the audience.

Telling the human face behind the scientific data is another valid method to create empathy between scientists and the public: a successful campaign is always based on a well-told story, with real protagonists and concrete situations. In addition, numerous research studies have shown that sensitivity to energy and climate change changes exponentially depending on the point of view with which the problem is presented. Therefore, it is a good idea to choose carefully the frame of your story, in order to be able to capture the attention of your target. For example, the transition to cleaner energy produced by solar panels can be presented under two different perspectives: economic or environmental. While in the first case the emphasis should be on reducing the cost of energy production, in the second case it would be the reduction of CO2 emissions to be the protagonist of the campaign[248].

Changing the point of view of the problem is imperative to achieve effective and lasting solutions. Too often, communication campaigns have acted in a one-way direction, using apocalyptic rhetoric characterized by catastrophic titles and the spectacularization of extreme events.

This attitude has ended up further distancing the interest from the issue, going to overwhelm even those most predisposed to the resolution of the

[248] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.

problem. Various studies have shown how receiving an optimistic message on climate change has helped people to believe more in the phenomenon[249]. This type of communication exploits different frames and talks about topics such as public health, energy security, morality and ethics, helping to give a more human aspect to the issue and a new dimension to climate change. On the contrary, receiving communications with pessimistic or catastrophic endings diminishes one's convictions about climate change[250]. Recourse to the use of fear (defined as any attempt to motivate people to take action to avoid an undesirable threat) could have negative consequences and put the whole campaign at risk, reducing people's commitment to the problem and negatively affecting assessments of their chances of dealing with the situation[251].

The message of a successful campaign should not be about emergencies, but about opportunities, telling a world engaged in concrete actions that allow people, states and nature to adapt to a climate scenario now inevitably changed[252].

[249] Connor, P., "Climate change communication: Key psychological research findings (and why you haven't heard about them yet)", Climate Code Red, Apr 14, 2014, http://www.climatecodered.org/2014/04/climate-change-communication-key.html (accessed Oct 2, 2019).
[250] Hansen, A., Cox, R., *The Routledge Handbook of Environment and Communication*, Routledge Handbooks, London, 2015.
[251] Connor, P., "Climate change communication: Key psychological research findings (and why you haven't heard about them yet)", Climate Code Red, Apr 14, 2014, http://www.climatecodered.org/2014/04/climate-change-communication-key.html (accessed Oct 2, 2019).
[252] Ronzoni, A., "Adaptation, comunicare i cambiamenti climatici in maniera costruttiva", in *National Geographic*, Jul 16, 2019, http://www.nationalgeographic.it/ambiente/2019/07/16/news/adaptation_comunicare_i_cambiamenti_climatici_in_maniera_costruttiva-4477825/ (accessed Sep 18, 2019).

4.1.2 Definition of the Purpose of the Campaign

Keeping in mind the role of psychology within the communication of climate change, a generalized communication that does not take into account the psychological differences within the subjects that make up its target is counterproductive and harmful to the very purposes of the campaign. Knowing one's own target helps in the construction of the message[253]. For example, in some parts of the world, approaching climate change by talking about rising temperatures could be counterproductive because an increase in the average temperature by a couple of degrees, with consequent milder winters, could be perceived as positive.

The facts must be presented differently and put in relation to the values of the target that is being targeted. In fact, individual moral principles (values such as security or equality) and political ideology are key factors in shaping the individual's opinion on climate change.

Research conducted in some English-speaking countries has shown that each individual filters the information he/ she receives according to his/ her own values and that this has led to a consequent polarization of positions on climate change[254]. Studies show that in these countries those who tend to be politically right-wing are more opposed to cutting emissions, perceiving it as a threat to their value system because combating emissions would require strong legislative or state interventions.

[253] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.
[254] Ibid.

Although there are no Italian studies in this field, the situation is similar in our country. The right-wing parties, which focus mainly on economic growth, internal security and refuse European intervention, have not included the fight against climate change in any of their electoral programs. The Euroscepticism that characterizes these parties pushes them to drastically reject European intervention in climate and environmental matters, to the point that from 2014 to 2016 the League voted for more than 90% against measures in favor of climate and energy transition. The party also declared itself against European rules that block agriculture and fishing, considering them a risk for Italian jobs[255]. The interest of the left-wing parties, on the other hand, has been contrary to the European commitment to combat emissions, including in their national plan an "extraordinary investment plan" that guarantees a fair ecological transition and considers social cohesion, work and innovation[256].

Knowing the interests and values of your target audience allows you to understand on which topics you feel most threatened. In this way it will be easier to create a communication plan that highlights not only how climate change threatens the issues that are close to its heart, but above all what opportunities it could bring with it[257].

The target group should always be recognized as a group of individuals who have psychological, cultural and political reasons to act or remain neutral towards the problem of climate change. An American study conducted by the

[255] "Italian Climate Network, Clima Europa, Europee 2019: la classifica dei partiti sul clima", in *Italian Climate Network*, https://www.italiaclima.org/europee-2019-la-classifica-dei-partiti-sul-clima/ (accessed Aug 8, 2019).
[256] Ibid.
[257] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.

Yale Program on Climate Change Communication divided the behavior of the American population into six "types" of attitudes towards global warming, six different audiences that respond to the problem in different ways.[258] The most convinced of the reality and seriousness of the problem are the "alarmed" (Alarmed): they represent 29% of the American population and are the most motivated to act. In fact, they have already taken various actions to counter it, ranging from individual initiatives to political initiatives. The second group, the "concerned", make up the 30% of the population and are equally convinced of the seriousness of the problem, but do not actively address it. The three central groups, the "cautious", the "disengaged" and the "doubtful", represent respectively 17%, 5% and 9% of the Americans and belong to various moments in the process of understanding and acceptance of the problem. However, none of the three is actively involved in the resolution of this problem. The last group, the "deniers" (dismissive) are 9% of the population and are the least convinced of the urgency of the problem, are not particularly concerned and are the least motivated to act; on the contrary, they actively oppose any national effort to reduce greenhouse gas emissions.

Dividing the population into subgroups helps to identify the right targets to refer to. It should not be forgotten, however, that minorities also play a central role in the decision-making process and often, guided by different social and cultural values, may have conflicting opinions with the rest of the population. YPCCC research has shown that in the United States the Latin American

[258] Yale program on climate change communication, "Global Warming's Six Americas", in *Yale Program on Climate Change Communication: our projects*, Nov 1, 2016, https://climatecommunication.yale.edu/about/projects/global-warmings-six-americas/ (accessed Apr. 8, 2019).

minority is more convinced that climate change is happening and that it is caused by man than other demographic groups[259]. However, they are less inclined to act at the political level. Knowing these data represents an important opportunity to improve national communication of the problem and to promote participation within communities. It should not be forgotten, however, that even within minorities there might be cultural differences that shape the values of individuals differently. Other studies have shown that Latin Americans are generally more active than non-Latin Americans are, but within this group those who are native Spanish speakers are even more active than those who are native English speakers.

However, the factors that determine the activism of the Latin population are very similar to those of other groups. The three most important are the perception of risk, the possibility of contacting representatives of NGOs active in this field and the presence of barriers. The first factor has proved to be vital for taking concrete action: the higher the perception of risk, the easier it will be for the subject to contact political personalities, ordering them to act. It should be remembered that a campaign that correctly perceives risk to its target does not resort to the use of fear to frighten it but exploits the values in which it believes to raise its awareness of the problem. The second factor that makes the difference is the first person contact with representatives of organizations

[259] Yale program on climate change communication, *Engaging Latinos in the U.S. on Climate Change*, in Yale Program on Climate Change Communication: our projects, Nov 1, 2016, https://climatecommunication.yale.edu/about/projects/engaging-american-latinos-climate-change/ (accessed Apr. 8, 2019).

that can provide advice and information on the evolution of the situation and is strongly linked to the presence (or absence) of barriers[260].

The increase of the latter is inversely proportional to the activism of the groups. The highest barrier is undoubtedly the lack of information on who to contact to push to combat climate change and that is why a grassroots activity is essential to decrease or remove any obstacle between the population and those who have an active role in the decision-making process[261].

4.1.3 The Role of Images

Currently, the communication of climate change has an extremely narrow visual vocabulary that risks not to involve the public and dangerously undermining awareness activities. Classic photographs of polar bears, melting ice caps and smoking chimneys risk the arouse of cynicism and boredom, which is why recent studies have shown that images that tell real solutions and visible effects on a local scale contribute to achieve more results in the common imagination[262].

[260] Ibid.

[261] Ibid.

[262] This paragraph has been conceived with respect to the guidelines of the climate visual project. The way in which the images are used, their value and impact, is explained at https://climatevisuals.org/sites/default/files/2018-03/Climate-Visuals-Report-Seven-principles-for-visual-climate-change-communication.pdf , with reference to the methodology followed and called seven principles for visual climate change. The research combined two different methods. Four-structured discussion groups (with a total of 32 citizens) were held: two in London and two in Berlin. Participants responded to dozens of climate images, engaging in detailed discussions about what they saw. Following this in-depth research, an international online survey of 3,014 people was conducted, with participants split equally between the UK, Germany and the US. The survey allowed us to test a

Based on research conducted in the UK, Germany and the US, the "Climate Visuals" project has developed a series of principles on which base to create a more effective visual communication. A series of images were selected to change the collective perception of climate change and to bridge the typical psychological gap caused by traditional representations. According to the scholars, it is necessary to abandon the classic models of climate change that portray subjects in pose, and to use real people in real situations. It is also important to change the narrative format, presenting new stories in which people can identify and find themselves in everyday life. For this reason, we must rely on images that show the consequences of climate change on the local climate, portraying people or groups that express clearly recognizable emotions.

Finally, we must never forget to present solutions that generate positive emotions and that are, as far as possible, far from political discourse.

Below we will present some of the most significant images of the project that aim to provide new and more tangible representations of climate change, trying to avoid politicization.

Research has shown that when it comes to waste and reducing the use of plastic, showing a person throwing a bottle in the street could have effects contrary to those desired, as it could be unconsciously perceived as a demonization of the individual. Moreover, classic images that try to bring to light

smaller number of images with a much larger number of people. Following directly from these key findings, climatevisuals.org is organized and structured to be as useful as possible for communicators. There are four galleries (Climate Causes, Climate Impacts, Climate Solutions and New Stories), containing several hundred images which correspond to and illustrate the key findings from the research – the only evidence-based library of climate photography in existence. Every one of the images featured in the image bank is clearly labelled, categorized and captioned for ease of use.

the problem of plastic, such as bodies of animals that have died after swallowing it, can arouse cynicism and boredom in the observer, further distancing his attention. On the contrary, the study has shown that individuals often have difficulty connecting individual behavior to climate change, so showing collective behavior on a large scale can help to develop an immediate connection between practice and its consequences.

In the photo the water from a tap in a kitchen in Bradford Country, United States, catches fire because of the high level of methane content. This simple demonstration clearly documents the effects of hydraulic fracturing and the direct impacts it has on everyday life. A plant that has polluted all the nearby springs is 100 meters from the house.

The population does not have drinking water in the area surrounding the plant and is therefore forced to source it elsewhere. Images like the ones circulating on the internet that portray tap water catch fire, help to change the narrative you want to do: just showing the plant doesn't help people understand the effects it has on the environment and doesn't help make it a tangible cause of climate change. Otherwise, seeing the water in your kitchen catch fire and being aware that you do not have drinking water helps you to understand the consequences that some types of energy production cause.

It has been shown that showing the daily impacts of climate change on identifiable individuals, especially children and families, resonates more with the public. In a photo that circulated on the net, taken in Ecuador, a woman is portrayed laying her clothes on an oil pipeline. The pipelines are owned by Texaco/ Chevron, which for over twenty years has been responsible for the

discharge of toxic waste and crude oil into the environment that has ended up polluting the aquifers. In fact, there have been numerous cases of cancer, birth defects and skin diseases in the areas surrounding these pipes. The company is still trying to cover up the $6 billion case filed 14 years ago by Pablo, a local lawyer and activist. His fight has only recently reached the international public following the CNN Hero Award in the fight for justice category. These kinds of images and stories bear witness to the insoluble link between climate change and fundamental human rights.

The photo of a woman with a mask taken in Warsaw, Poland, portraying her with her daughter trying to familiarize her with a mask that can change colour depending on the level of air pollution. The whole family suffers from respiratory problems due to climate pollution caused by traffic and the continuous congestion of the city. Inside the house the mask remains green thanks to a purifier that makes the air breathable, on the contrary, it changes dangerously color when used outside. It is a familiar and recognizable scene, but it is broken by the unusual mask.

The balance between showing something local and being concerned about the more general problem of climate impacts is very delicate. The health of people living closer to the plant is certainly at risk from questionable energy practices, but telling their stories, human and real stories, always leaves a mark in the minds of the listener. In a photo, which has become famous, you can see Horace Smith in the foreground, sitting on the porch of his house in Texas, while in the background you can see a refinery in operation. Horace has serious breathing problems from inhaling the plant's exhaust gases and constantly

needs oxygen to breathe. His life has changed because of the power plant that has polluted not only the air he breathes daily, but the entire atmosphere.

Images showing people actively interacting with problems related to climate impacts were found to be more powerful than people passively observing them. In a famous picture, taken in the USA, Donnie Reeves, a former unemployed miner, participates in a training course in a new industrial structure so that he can find a new job. The collapse of the coal industry, due to stricter laws and the availability of cheap coal in other regions, has brought some economic decline to the area. Telling stories of people who have found new opportunities and have moved into the field of renewable energy helps to dispel the fear of job losses and demonstrate that a new energy industry is possible.

Research has shown that showing an individual to make a gesture to decrease emissions motivates other individuals to follow his example. Images of people working to insulate the home, or provide with measures that can prevent heat loss, are a substantial vehicle that feed emulation and good practice. Showing people working on clean energy solutions, especially if in unique positions, generate stronger emotions than the same photos without people.

Discussion groups have found that solutions that are perceived to bring real and tangible benefits are more likely to be understood and shared, especially when they are related to identifiable individuals. Let's take as an example a photo in a disadvantaged country, where boys and girls study in a classroom lit by electric light. Thanks to a new set of solar panels that illuminate the school, students are in fact able to study in the evening. The solar panels were installed

as part of a renewable energy program sponsored by Christian Aid during a campaign to help poorer communities cope with climate change.

It is therefore clear that the choice of images to show must be weighed according to the audience in front of you. Showing apocalyptic images, even if they are real, too often helps to alienate the target that you want to influence. Images should be chosen according to the values and habits of their audience and should avoid, when possible, making them feel overwhelmed by events. It cannot be taken for granted that strong images move everyone. On the contrary, those who are more inclined to act after seeing them are very often an individual already predisposed to read and learn about climate change[263]. For the same reason showing images from the other side of the world does not always work. Problems that happen too far apart can contribute to increasing the psychological distance of climate change and using "recycled" or too old images can put the whole campaign at risk[264].

4.1.4 The Role of Media

It is well established that our worldview, values and social rules influence the way we perceive information and how we translate it into concrete behavior. It

[263] Connor, P., "Climate change communication: Key psychological research findings (and why you haven't heard about them yet)", Climate Code Red, Apr 14, 2014, http://www.climatecodered.org/2014/04/climate-change-communication-key.html (accessed Oct 2, 2019).

[264] Hansen, A., Cox, R., *The Routledge Handbook of Environment and Communication*, Routledge Handbooks, London, 2015.

is also well known that the channel through which communication passes is at least as important as the message itself, if not more so.

Very often NGOs do not have the necessary or sufficient contacts with national governments and decision-makers and therefore find themselves having to depend on the media to obtain the publicity necessary to reach the attention of the public and, consequently, of politicians[265].

However, the role of the media is not confined exclusively to advertising, as it is, they who have the power to shape the news. For this reason, NGOs must concentrate part of their work on choosing the most appropriate narrative framework to present to the media. In fact, several studies have reported inconsistencies between the original message of some NGOs and its representation by the media chosen[266].

As previously stated, when it comes to climate change there is a certain tendency to resort to apocalyptic or melodramatic rhetoric, narrative models that derive from journalism and are directly influenced by it[267]. Over the years, the lack of certain news, has forced journalists to adapt the partial information available to an audience that is constantly distracted by other stimuli and this has resulted in the use of a style aimed at winning the front page and generate strong emotions in the reader. For this reason, more attention is generally paid to sporadic events, such as environmental disasters, than to following local

[265] Corner, A., and others, *Principles for effective communication and public engagement on climate change: A Handbook for IPCC authors,* Oxford: Climate Outreach, Oxford, 2018.
[266] H Hansen, A., Cox, R., *The Routledge Handbook of Environment and Communication*, Routledge Handbooks, London, 2015.
[267] Barilla center, Communication on Climate Change, A Challenge for Journalists, in Barilla center for food and nutrition https://www.barillacfn.com/it/food_sustainability_weekly_report/analisi/comunicare-il-cambiamento-climatico-una-sfida-per-i-giornalisti/ (accessed Feb 22, 2019).

events of lesser intensity, but more constant over time. It is not by chance that climate change has been defined as a tragedy in slow motion[268].

If on the one hand the intangibility of climate change represents an obstacle to communication, on the other hand it allows building ad hoc stories to make it psychologically closer to its target. In this context, social media are the right tool to reduce the psychological detachment: the human need to feed on stories goes perfectly with the nature of social networks to create new ones[269].

Nowadays, in fact, people document themselves precisely through the parallel discussion space created on social issues, which encourages the exchange of opinions and encourages a greater knowledge of the problem. Social networks also contribute to reducing the space-time gap at sustainability events, such as live online events where people can follow or review the debate directly from their homes[270]. The creation of hashtags also helps to give voice to multiple points of view on the same problem and to increase the sense of belonging of individuals, making them an integral part of a larger community.

However, it must be recognized that social groups have also contributed to the voice of skepticism: while this can fuel debate and the exchange of information, it is also widely used to fuel denialist and anti-scientific theses[271].

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[268] Barilla Center, "Il Ruolo del Giornalismo Ambientale nei Cambiamenti Climatici", in *Barilla Center for Food and Nutrition* https://www.barillacfn.com/it/magazine/cibo-e-societa/il-ruolo-del-giornalismo-ambientale-nei-cambiamenti-climatici/ (accessed Feb 22, 2019).

[269] Anderson, A. A., *Effects of Social Media Use on Climate Change Opinion, Knowledge, and Behavior*, Oxford Research Encyclopedias, Oxford, 2017, https://oxfordre.com/climatescience/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-369?print=pdf (accessed Mar 19, 2019).

[270] D'acquisto, D., "I social media hanno aiutato a sensibilizzare sul climate change, ma hanno dato spazio anche agli scettici", Ninja Academy, https://www.ninjamarketing.it/2019/03/15/social-media-climate-change/ (accessed Feb 22, 2019).

[271] Ibid.

Fortunately, a study conducted by the Oxford Internet Institute has shown that the general dialogue fed on the two main social networks, Facebook and Twitter, is in line with scientific theses and that only a small part, moreover isolated, and cries out for conspiracy[272]. On Facebook, for example, groups fighting to limit the side effects of human activities on the climate show a wider range of connections to other communities on the platform. On the contrary, deniers' pages tend to remain more isolated, on the margins of dynamics[273]. Research has found that most of the content shared on the two platforms comes from accredited sources, unlike YouTube where an abundance of conspiracy videos has been found.

For this reason, it is important to understand if and how people discuss climate change on social media, how they behave in the face of environmental problems and what terms are used. Even in the case of deniers, it is not so important to understand why they are, as to understand the psychological path that led them to reject scientific theses. An analysis of user behavior is therefore of vital importance for regulating one's communication strategy.

We must not forget that most social networks present the information to users after filtering it with algorithms that select the news according to the trends of the subject in question, presenting the reality with lenses that he considers familiar. Not keeping this aspect in mind during a communication campaign

[272] Grouverman, A., and others, *Climate Change Consensus and Skepticism: Mapping Climate Change Dialogue on Twitter and Facebook*, The Computational Propaganda Project, Oxford Internet Institute, Oxford, Nov 18, 2018, https://comprop.oii.ox.ac.uk/research/climate-change/ (accessed Mar 19, 2019).

[273] Cosimi, S., "Sorpresa, i social non favoriscono le bufale sul clima", La Repubblica, Nov 29, 2018, https://www.repubblica.it/ambiente/2018/11/29/news/sorpresa_i_social_non_favoriscono_le_bufale_sul_clima-212942599/ (accessed Oct 15, 2019).

risks compromising its success, creating posts that reinforce opinions that you want to correct instead.

It is therefore important to emphasize the need to constantly monitor what is reported on the channels chosen to influence the desired target. In fact, some audiences can only be reached through specific channels, forcing NGOs to adapt to this need.

A first attempt to highlight the link between media narrative and the results of an awareness campaign was the study on media use by Greenpeace conducted by Eyerman and Jamison in 1989[274]. The two scholars concluded that the NGO's enormous influence was derived from a precise selection of information about its campaign, combined with its selective sharing with the media. However, Greenpeace itself was negatively affected by the influence of the media, which helped to demonize it in the eyes of public opinion, calling it a terrorist organization several times and condemning the methods they used.

Using the media and social media in the right way undoubtedly contributes to presenting reality as one wish. One example is how the British media have helped to persuade the public about nuclear energy, describing it as low-carbon production and changing people's opinion on it[275].

4.2 ANALISYS OF GRETA THUNBERG COMMUNICATION

[274] Hansen, A., Cox, R., *The Routledge Handbook of Environment and Communication*, Routledge Handbooks, London, 2015.
[275] c

4.2.1 Greta Thunberg from a Communication Point of View

Greta Thunberg is a sixteen-year-old Swedish student who has decided to strike to demand concrete action against the climate crisis. Her interest in environmental issues began long before she became famous. Her mother, Malena Ernman, in her book Scenes from the heart, stated that her daughter had always been attracted to environmental issues[276].

Greta Thunberg was diagnosed with Asperger's syndrome, obsessive-compulsive disorder and selective autism when she was still a child, which, as she said, contributed exponentially to increasing her interest in climate change.

At the end of August 2018, when schools generally start again in Sweden, Thunberg decided not to start again following the lessons in protest against the government's indifference to environmental issues. She sat in front of the Swedish parliament with a sign saying, "Climate strike" and said she would stay there until September 9, when the elections for the new parliament were held.

The timing of his protest was not accidental: Sweden was coming out of an environmentally dramatic summer, to the point that a severe drought had caused abnormal temperature peaks, so intense as to cause numerous fires.

The reasons that led her to choose this form of protest were because being a minor she could not vote yet and felt unable to do anything. Moreover, in Sweden, the law provides that children must go to school until they were 16

[276] Rigitano, E., "Greta Thunberg, la studentessa svedese che sciopera in nome del clima", LifeGate, Aug 22, 2019, https://www.lifegate.it/persone/news/greta-thunberg-sciopero-scuola-clima-svezia (accessed Sep 2, 2019).

years old and at the time Thunberg was 15 years old[277]. Combining these two aspects makes it clear why she decided to skip class. Curiously, her interest in the subject, explained the young activist, was born right at the school desks where she learned for the first time about the notion of climate change and the dangers associated with them[278].

Initially he said he would protest until Sweden aligned itself with the Paris Accord, then over the months, his goals changed slightly.

4.2.2 Greta Thunberg as Medium

Greta Thunberg is the perfect demonstration of how, in a communication campaign, the messenger is much more important than the message.

Scientists have been communicating the same concepts as Thunberg for decades and yet they have never been so successful. Their communication strategy, if any, has never worked: science is complicated and full of contradictions that are not always easy to explain, the language used is often difficult and disconnected from the real world. Moreover, scientists do not always have a direct interest in climate change: very often, it is only their work, not necessarily their ideology[279].

[277] Bucchi, M., "The Greta Thunberg Effect: some reflections on communication" in *Esof 2020* [Online]. Jun 6, 2019, https://www.esof.eu/en/news-reader/the-greta-thunberg-effect-some-reflections-on-communication-427.html (accessed Sep 2, 2019).
[278] Cremonesi, D., "Greta Thunberg fa parte della generazione Z ed un interessante caso di comunicazione e social media strategy"*, in Factory communication*, mar 15, 2019, https://www.factorycommunication.it/greta-thunberg-un-interessante-caso-di-comunicazione/ (accessed Sep 2, 2019).
[279] Ibid.

For Greta Thunberg, the opposite is true: first, it is neither a policy nor an old scientist who is detached from reality. She is 16 years old, a girl who speaks in a very balanced way, but still with her stomach, and who bases her interventions on the empathy of those who listen to her.

Thunberg has undoubtedly changed the paradigm of communication in the environmental field: if before certain news were given by reliable sources, albeit less effective, and supported by long monologues full of data, now you prefer to hear them told by those who are able to speak in the language of the masses. She was clear and tenacious from the very beginning and behaved like a leader rather than a simple data messenger.

In addition, the frequency of her protest played a fundamental role in her campaign, creating a physical point of reference for her followers. Every Friday, undaunted, she protested in front of the Swedish Parliament, reminding the people, and especially the politicians, why she was there and why she would not leave.

The use of social media was another point in favor of the young activist: Instagram is the tool most used by young people and she used it to her advantage, updating her followers in real time on what she was doing and building a bond with them day after day. She immediately showed herself to be authentic, an ordinary girl, and this is imperative to be heard on such large platforms. Today, on Instagram alone, more than 3 million people follow her.

The last point that has played a role that cannot be ignored in her communication campaign is Asperger's syndrome: in a long post on

Facebook[280], Thunberg called it a gift and one of the reasons why she decided to organize her protest in the way she did.

He explained that, briefly, if she had been "normal" and sociable like all the other kids her age, she would have founded an organization or at least sought consensus before starting everything. Instead, she preferred to sit in front of the Swedish parliament alone.

Whatever factor he contributed, it is obvious that Thunberg is an excellent messenger.

4.2.3 The Apocalyptic Message

In the last chapter, we talked about how an apocalyptic message is very often counterproductive and risks scaring one's interlocutor by alienating him further from the message of one's own campaign.

Greta Thunberg would seem, at least apparently, to contradict what she has said, given that one of her main slogans is "I want you to panic", and that her entire communication strategy is because there is no longer much time left to stop climate change. Correct or not, it is still apocalyptic[281].

[280] Facebook, Greta Thuberg response, in Facebook, https://www.facebook.com/gretathunbergsweden/posts/767646880269801?__tn__=K-R (accessed Oct 15, 2019).
[281] Cremonesi, D., "Greta Thunberg fa parte della generazione Z ed un interessante caso di comunicazione e social media strategy"*, in Factory communication*, mar 15, 2019, https://www.factorycommunication.it/greta-thunberg-un-interessante-caso-di-comunicazione/ (accessed Sep 2, 2019).

However, although Thunberg is addressing the whole world and making speeches in the main national and international governmental and non-governmental organizations, its strategy has been successful in a very specific age group: young people aged 13 to 20, the so-called post-millennial, centennials or Z generation. They are the same young people of his generation, accustomed to social networks and rapid communication with click-catching titles.

It should be remembered that it was only after having mobilized a very specific portion of young people that he was able to speak with governments and international organizations. His message was never directed to the summits, although it might seem so. Even when she addresses the powerful, she always uses the words of the people, never betraying the authenticity that has brought her to where she is and this helps her to increase her base of consensus even more[282].

For example, on September 23, 2019, she participated in the climate summit held at the United Nations headquarters in New York, where she gave a more heartfelt than usual speech on the future of the world and its generation. Although he also spoke about scientific data on emissions for a small part of the speech, the part of the intervention that became viral on social networks and that had more resonance was the emotional one. "All this is wrong. I should not be here. I should be at school, on the other side of the ocean. Yet, do you come to us young people to talk about hope? How dare you! You stole my

[282] Iabichino, P., "A phenomenology of Greta Thunberg, daughter of a new generation of consumers", *in Morning Future*, Jun 12, 2019, https://www.morningfuture.com/en/article/2019/06/12/greta-environment-consumers-youth-iabichino/648/ (accessed Oct 2, 2019).

dreams and childhood with your empty words. The major newspapers reported his speech with these words." Thunberg, almost in tears, managed to capture the general attention in a few lines. To identify with her speech becomes simple, especially for the audience of young people she addresses, the same young people who go to school, or who are not going to protest, who have moved from their cities to participate in strikes, who have so many dreams and who desperately seek a cause to believe in.

His style follows the characteristics of the generations to which he addresses: he uses simple and immediate slogans, easily divisible on social networks, his message is disruptive and for this kind of theme is exactly the opposite of what scientists had accustomed[283].

Precisely for this reason, those who claim that it oversimplifies the problem of the climate crisis have harshly criticized it, but the history of recent years shows us how simple and controversial messages at the right point are more successful than more elaborate messages, but more correct. This is the case with Donald Trump in the United States, who based his campaign on building a wall. And he won. This is the case with Matteo Salvini, in Italy, whose slogan was "Italians first". In addition, he won. This is the case of Nigel Farage, who blamed the European Union for the crisis in the United Kingdom. In addition, Brexit won. All three of these communication strategies exploited the excessive simplification of much more complex issues to leverage the masses. Moreover, they worked, from the first to the last.

[283] Ibid.

We are not trying to compare Thunberg to Trump, let alone Salvini, but their approach works. Lately, simplifying the world's problems into dividable pills on social seems to be the only way to unite large groups of people and if on the one hand Trump has used it in an unclean way, the young Swedish activist is using it, at least apparently, for a good cause.

Her approach to the climate issue is impartial and non-partisan and therefore further unites the masses. Thunberg calls for a halt to the use of fossil fuels, a shift to renewable energy and greater justice for communities facing climate change at the forefront, but never takes a position on which renewables are best used or which aspects of international law need to be revised. Nor does it take a position on the meat industry, which is considered one of the largest sources of pollution in the world. The only cause it seems to have explicitly adhered to is the United Nations Sustainable Development Goals (SDGs), which remain general. That this generality is a deliberate choice, or a sort of consequence of being so young, cannot be said with certainty, but certainly in this way it avoids going into issues that for years have divided the scientific community and the environmental activists themselves and helps to unite groups that until now have been divided.

4.2.4 The Global Movement

Greta Thunberg has been considered an individual when she managed to mobilize entire groups of adolescents becoming the symbol of the campaign against climate change.

Initially, Friday's climate strikes spread to countries with a higher ecological awareness: in Switzerland, more than 10,000 protesters had joined from the very beginning, in Germany strikes were seen in more than 20 different cities, in Brussels there were about 35,000 protesters. Over time, other strikes were organized in the United Kingdom, France and in Italy[284].

Students who decide to join Fridays for future, the student movement that organized the Friday strikes, feel that they are the first generation to experience the effects of global warming for themselves and that they are the last to be able to do something concrete to save the planet's climate.

Thus were born young leaders in each country who coordinate protests and lend their face to the movement.

Recently, in Uganda and India, two young girls of fifteen years of age began to protest in the footsteps of Thunberg[285].

In Uganda, young Leah asks her government to abolish the plastic bags that are increasing pollution in her country and to fight for gender equality and women's rights. In India, her contemporary Asheer said she was inspired by Greta's action and accused her government of destroying the environment. She asked the Indian Prime Minister to declare the climate emergency and urged her peers to realize the gravity of the situation.

In Germany, too, the Fridays for Future found fertile ground and gathered around the figure of Luisa Neubauer, who often met with Thunberg. Protests

[284] Bucchi, M., "The Greta Thunberg Effect: some reflections on communication", in *Esof 2020*, Jun 16, 2019, https://www.esof.eu/en/news-reader/the-greta-thunberg-effect-some-reflections-on-communication-427.html (accessed Oct 2, 2019).
[285] 400 PPM, in 400 PPM, http://400.350.org/ (accessed Nov 3, 2018).

led by a leader were also seen in the Netherlands, Malaysia and, albeit to a lesser extent, Italy.

The situation in France, on the other hand, is slightly different because the activists decided not to gather around a single person so as not to run the risk of this person eclipsing the attention from the movement. They have organized themselves into small local groups that coordinate when necessary and, in this way, try to mobilize the masses to follow common beliefs, rather than follow with admiration a single individual.

Some "Grete" have existed since before Thunberg, but for some reason they have never managed to get the same attention as the media.

This is the case, for example, of the so-called Romanian Greta: it is called Paula, it is 13 years old and every day, with the association "Vă vedem", from the Romanian "we look at you", it goes in front of the headquarters of the Socialist Party in Sibiu to protest against the corruption of the government. The "Vă vedem" have existed since September 2017 and therefore for about a year before Thunberg began its sit-in in front of the Swedish parliament. However, despite the interest of local newspapers in their association, they have never crossed the borders of Romania.

The Greta Thunberg movement has reached record dimensions and is gaining more and more power. Only a year has passed since the start of its protests and a climate week has already been organized, which has been described as "the biggest climate mobilization in world history" with almost 8 million people taking to the streets alongside it. Thunberg, in some countries,

has managed to move 3.5% of the population, a figure that according to some studies is necessary to have a real change in society[286].

Together with fifteen other adolescents, she presented a formal complaint to the UN against the governments of five nations (France, Germany, Argentina, Brazil and Turkey) accused of not taking sufficient action to combat the climate crisis and of not respecting the Paris Agreement, thus putting the future at risk for the new generations.

[286] Brenna, L., "Cos'è Extinction Rebellion, il nuovo movimento ambientalista radicale e non violento", LifeGate, May 2, 2019, https://www.lifegate.it/persone/news/storia-extinction-rebellion-nuovo-movimento-ambientalista-non-violento (accessed Oct 2, 2019).

4.3 THE CONSEQUENCES OF GRETA THUNBERG COMMUNICATION

Greta Thunberg's communication campaign was a success. Climate Week has gone down in history as the biggest climate event ever organized and millions of people around the world have joined her in calling for new policies against climate change. Her strategy has unified nations in the four corners of the planet and has managed to cross borders that no one has ever managed to cross.

Her actions have helped to open the eyes of the masses to the use of fossil fuels and the importance of switching to clean energy as never before.

More and more people are talking about climate crises and climate emergencies and are starting to talk about solastalgia[287], literally anxiety about climate change. Greta herself is affected by this distress, because like millions of other people, she feels oppressed by an unstoppable phenomenon and feels the need for global action to stop it.

However, as we said in the last chapter, fear should not be used in a communication campaign, because although it is an effective tool, it brings with its unpredictable consequences that in the future could undermine the goals achieved.

[287] L. Brenna, L., *"Cos'è la solastalgia, definizione ed effetti dell'ansia da cambiamenti climatici"*, LifeGate, https://www.lifegate.it/persone/stile-di-vita/solastalgia-definizione-glenn-albrecht (accessed Oct 12, 2019).

4.3.1 The Greta Thunberg Effect from an Economic Point of View

Whatever one thinks about Greta Thunberg, it is undeniable that, through her protest on ecology and environmental issues, she has gained a place of honor in society[288].

People started to feel the need to know the sustainable commitment of the companies they finance and to do so they started to express their ideas on social networks, where they could compare with other users.

Sustainability has thus become a strategic variant for companies that want to continue to be relevant on the market.

Associations, sites and even applications have been created to keep all those interested in safeguarding the environment up to date and who have contributed exponentially to building consensus, especially among the younger generation, towards the Greta Thunberg campaign.

This is the case of the technology startup We Don't Have Time[289], which was founded in Sweden just before Greta started with the first Friday strikes. Curiously, they have been the first to talk about the young student protesting outside the parliament and, for a certain period, Greta herself had been on their advisory board.

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[288] Allemandou, S., "Pourquoi l'icône écologiste Greta Thunberg dérange la droite française" in *France24*, Jul 22, 2019, https://www.france24.com/fr/20190722-pourquoi-greta-thunberg-derange-republicains-politique-france-ecologie (accessed Oct 12, 2019).

[289] We Don't Have Time App, https://www.wedonthavetime.org/climate-tools#the-app (accessed Oct 12, 2019).

As you can read on the official website, We Don't Have Time wants to leverage the power of social media to increase corporate responsibility for climate change. Their goal is to become the largest social media dedicated to climate change. By quoting their website they want to "connect those who want to be part of the solution and actively influence NGO campaigns, the work of organizations and public personalities". They have a blog dedicated to the "crises" going on in the world where the style of communication follows the urgency and fear also used in Thunberg's communications: you read titles such as "guilt is essential to protect the planet", or "if you're with Greta you're threatened". They have created an app that works in a similar way of TripAdvisor: users can judge the sustainable work of a company by giving it votes, leaving comments and interacting with each other. The app is a middle ground between a social network and an interactive game: members are invited to "be part of the solution" and have "green levels" to unlock to "lead by example" the community.

The idea seems to be a very good one: in this way, companies are forced to implement sustainable actions, otherwise they will be exposed online and lose the trust, as well as the money, of consumers.

The risk, however, is that saving nature becomes a pretext for giving it an economic value that can be exchanged later[290]. So, if, on the one hand, a company interested in saving a species from extinction could finance its protection by investing in new technologies and new markets, on the other, that

[290] Davey, B., "Greta Thunberg, PR and the climate emergency", in *Feasta*, May 6, 2019, https://www.feasta.org/2019/05/06/greta-thunberg-pr-and-the-climate-emergency/ (accessed Oct 12, 2019).

same safeguard could be subject to the interests of the market, which has more empathy for certain species and therefore assigns it different (economic) values. For example, people would be willing to invest more in a company that undertakes to protect tender pandas rather than one that protects crocodiles, leaving the latter at the mercy of poachers.

It is the same risk that you run with PES, Payment for Ecosystem Services[291] or payments for ecosystem services, which are based on an exchange system created to help people who survive through activities that harm the environment to find new sources of income. In practice, this is a monetary value that is assigned to nature in the guise of environmental protection. If carefully organized they can be a real help to communities and the environment, but the problem is that you also risk paying for the protection of one thing, going to unconsciously destroy another.

No company today can think of surviving without green credentials, but we must be careful because not all initiatives are really sustainable. Some of them, grouped under the name of "greenwashing", literally "green painting", are only apparently so and conceal much more complex realities[292].

The sense of urgency to find a solution to climate change, combined with a communication based on the sense of guilt of the masses and their fear, risks making hasty and unbalanced decisions.

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[291] James Hutton Institute, "Payment for Ecosystem Services", in *James Hutton Institute*, Oct 13, 2013, https://www.youtube.com/watch?v=gzNWnREZ2xI (accessed Oct 12, 2019).

[292] Richards, M., and Jenkins, M. *Potential and Challenges of Payments for Ecosystem Services from Tropical Forests*, Forest Policy and Environment Programme, 2007, https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/816.pdf (accessed Oct 12, 2019).

4.3.2 Climate Emergency and The Green New Deal

As much as the masses have leveraged companies to adopt sustainable solutions, governments have also to confront with the growing need to find a solution.

The average population has gone from having little information on climate change to hearing constantly, and rightly so, that this is a crisis, that there is little time to save itself from extinction and that we must act as soon as possible.

This sense of general fear has allowed states to declare the climate emergency[293] and work on plans to meet the three demands that Greta Thunberg and the demonstrators have been making for about a year: stop the use of fossil fuels, yes to a transition to renewable energy and more justice for communities involved in the front line. All with a view to eliminate or at least reduce CO2 emissions into the atmosphere.

On April 23, 2019, Greta Thunberg herself said that "we should no longer measure our well-being and success on the line of economic growth, but on the curve that shows our greenhouse gas emissions".

Treating the climate issue as an emergency legitimized states to allocate extraordinary funds to deal with the time of crisis, money that normally would not have been available.

[293] Associated Press, "Democrats' 'Green New Deal' to eliminate U.S. carbon footprint by 2030", in *Market Watch*, Feb 2, 2019, https://www.marketwatch.com/story/heres-what-we-know-about-the-democrats-green-new-deal-2019-02-07 (accessed Oct 12, 2019).

In a short time in America the proposal for a Green New Deal to combat climate change was born. The name is inspired by Franklin Delano Roosevelt's New Deal, which combines more modern sustainability issues. The idea was already born in 2006[294], but it only emerged during the 2018 elections through the Democratic Party. This project was immediately supported by international organizations such as Greenpeace, Extinction Rebellion and 350.org.

Despite its support at the international level, it has received much criticism at the state level from environmental groups perplexed by the too many grey areas of the proposal, which have even gone so far as to call it a greenwashing of capitalism. In fact, the Green New Deal went on to modify the same plans as the Green Party, creating quibbles that could be reinterpreted in the future[295]. For example, we have moved from wanting to finance "an economy based on 100% renewable energy" to a more general desire to "zero the carbon footprint of the U.S. by 2030".

Although it may seem like the same thing, it opens a dangerous door to other industries, such as nuclear power.

On April 6, 2019, the New York Times published a long article on why it is a fantasy to think that a total transition to renewable energy can meet countries' energy needs. According to the journalist, technologies to meet the energy

[294] Schroeder, R., "The Green New Deal isn't really that new", in *Market Watch*, Feb 12, 2019, https://www.marketwatch.com/story/the-green-new-deal-isnt-really-that-new-2019-02-11 (accessed Oct 2, 2019).
[295] Atkin, E., "The Democrats stole the green party's best"*, in The New Republic*, Feb 2, 2019, https://newrepublic.com/article/153127/democrats-stole-green-partys-best-idea (accessed Oct 2, 2019).

needs of entire cities are still lacking and renewables also need time to lower Co2 levels[296].

The article clearly mentions: "We need the government to be on our side in this transformation towards clean energy with laws and incentives that drive people and businesses away from coal".

A comparison is also made with two countries that have based their energy needs on nuclear power, rapidly achieving decarbonization, an increase in energy and the economy and a decrease in energy costs. The two nations are Sweden and France.

In France, in fact, some environmental groups have found the same ambiguous points of the Green New Deal in the law on energy and climate approved on 26 September 2019 by the parliament and which decreases the climate emergency of the state[297][298].

The Minister of Ecological and Solidarity Transition Elisabeth Borne presented this law as the "new pillar of the ecological transition" of France: the government of the hexagon is committed to achieve carbon neutrality by 2050, to reduce by 40% the consumption of energy produced from fossil fuels by 2030 and to close all coal-fired power plants by 2022. However, the plan also

[296] Goldstein, J. S., "Nuclear power can save the world", in *The New York Times*, Apr 4, 2019, https://www.nytimes.com/2019/04/06/opinion/sunday/climate-change-nuclear-power.html (accessed Oct 2, 2019).
[297] Agence France Presse, « Le Parlement adopte définitivement le projet de loi Energie et Climat, qui décrète "l'urgence climatique" », in *Sciences et avenir*, Sep 26, 2019, https://www.sciencesetavenir.fr/nature-environnement/le-projet-de-loi-energie-et-climat-en-passe-d-etre-definitivement-adopte_137611 (accessed Oct 2, 2019).
[298] Agence France Presse, "Projet de loi énergie et climat : quelles sont les sept mesures clés ?", in *Ouest France*, Sep 26, 2019, https://www.ouest-france.fr/environnement/climat/projet-de-loi-energie-et-climat-quelles-sont-les-sept-mesures-cles-6537770 (accessed Oct 2, 2019).

provides for a 15-year postponement of the country's denuclearization, which should have started in six years' time.

Nuclear power in France meets the needs of 76.3% of total energy and recently power plants have been in the spotlight due to continuous delays and problems with lack of funding[299]. It is early September news that research on fourth-generation reactors would have been blocked due to lack of funding. That research had already cost €738 million and was estimated to need between €5 and 10 billion to complete it. During the summer months, the power plants were tested by the intense heat and had to suspend energy production[300].

A 2018 report on the construction of new reactors, published in the French economic newspaper Les Echos, indicates the need to build new reactors from 2025 onwards[301].

The German climate emergency plan has also left environmentalists perplexed: 100 billion euros have been earmarked to halve CO2 emissions by 2030 and thus comply with the Paris Agreement[302].

[299] Klimm, L., "Vu d'Allemagne. Fermeture de Fessenheim: la France reste prisonnière du nucléaire", Courrier international, Oct 2, 2019, https://www.courrierinternational.com/article/vu-dallemagne-fermeture-de-fessenheim-la-france-reste-prisonniere-du-nucleaire?utm_medium=Social&utm_source=Twitter&Echobox=1570027654 (accessed Oct 12, 2019).
[300] Barolini, A., "La Francia abbandona la ricerca sui reattori di quarta generazione", LifeGate, Sep 4, 2019, https://www.lifegate.it/persone/stile-di-vita/francia-reattori-nucleari-quarta-generazione (accessed Oct 2, 2019).
[301] Le Billon, V., "Nucléaire: le rapport qui gênait Nicolas Hulot", Les Echos, Aug 30, 2019, https://www.lesechos.fr/industrie-services/energie-environnement/exclusif-nucleaire-le-rapport-qui-genait-nicolas-hulot-137634 (accessed Oct 2, 2019).

[302] Barolini, A., "Germania, piano da 100 miliardi di euro per il clima. Critici gli ecologisti", LifeGate, Sep 23, 2019, https://www.lifegate.it/persone/news/germania-piano-clima (accessed Oct 2, 2019).

The plan seems to be good, because it foresees an increase in the cost of petrol, an increase in the number of electric cars, plans to improve the thermal insulation of buildings and a lowering of ticket prices for public transport.

However, the project is based on a balanced budget and the plan to recover the money is to rely on the European ETS, which, however, provides too low penalties for companies that emit Co2[303].

As far as nuclear power is concerned, Germany has tried to proceed with the denuclearization of its energy industry, but it is currently blocked.

The governments of the European Union, through their permanent representatives in COREPER, on Wednesday 25 September approved the position of the Council of the European Union on the introduction of a system of rules for the classification (the taxonomy) of sustainable financial activities and investments[304][305].

Germany, followed by Austria and Luxembourg, called for the exclusion of nuclear and coal-related activities and investments from 'sustainable' activities and investments. "We are strongly concerned that the proposed framework would leave the door open to diverting financial resources from environmentally sustainable activities towards technologies that cannot be considered safe or sustainable," the three countries said in a joint statement. "Nuclear energy is neither safe, sustainable nor economic. We therefore reject the idea of using

[303] Ibid.
[304] Barkin, N., "Once a climate leader, Germany risks being left behind: Al Gore", Reuters, Jun 26, 2019, https://www.reuters.com/article/us-climatechange-gore/once-a-climate-leader-germany-risks-being-left-behind-al-gore-idUSKBN1JM1SB (accessed Oct 2, 2019).
[305] Valero, J., "Council maintains nuclear as eligible for green finance", Euractive, Sep 25, 2019, https://www.euractiv.com/section/energy-environment/news/council-maintains-nuclear-as-eligible-for-green-finance/ (accessed Oct 2, 2019).

EU funds to extend the life of nuclear power plants," said German State Secretary for Energy Andreas Feicht.

But France, thanks to an alliance with the Visegrad countries, has had the upper hand for now. A qualified majority vote established that investments in nuclear power would not be excluded from those considered "green" and that the EU Council would have it say not only on legislative issues, but also on the technical issues of taxonomy.

According to the Council's position, the taxonomy should be established by the end of 2021, to ensure its full application by the end of 2022. Germany, Luxembourg and Austria were in favor of adopting the taxonomy "as quickly as possible" but wanted to exclude nuclear projects from the outset.

The discussion is not yet over, because the positions emerging from the EU Council will have to pass to the European Parliament, which had proposed to exclude investments in nuclear and coal-fired power plants from the future list of "green" investments.

From a geopolitical point of view, the abandonment of oil and the consequent passage to nuclear power would allow some nations to become internationally independent and to produce the necessary energy within their borders.

At European level, some countries, which already have a large nuclear power plant, are investing in nuclear research so that they could produce enough energy to meet their needs and sell the rest to other countries.

The issue of nuclear power, now, would seem to be of no interest to the followers of Greta Thunberg. You yourself said you were against this kind of energy in a post on Facebook on 17 March, but you recognized its potential

especially for countries that do not have the opportunity to base all their energy production on renewables[306]. There is no reason to say that Thunberg has been manipulated by the nuclear lobby, but certainly, the latter has taken advantage of the recent wave of sustainability that has involved the world to obtain subsidies and special funds.

[306] Facebook, Greta Thunberg post, in Facebook, https://www.facebook.com/732846497083173/posts/on-friday-march-15th-2019-well-over-15-million-students-school-striked-for-the-c/793441724356983/ (accessed Oct 15, 2019).

CONCLUSION

The analysis carried out in the project offers a path of understanding to give a foundation to the thesis on the complexity of communication of climate change and the need for integrated communication that considers multiple factors.

As has been pointed out, during the decades of the twentieth century, climate change has imposed itself in the dialogue of the public sphere. Through the extreme and catastrophic weather events linked to climate change that occurred in recent decades, thanks to new scientific studies that produced more stringent evidence, and thanks to street movements that involved mainly young people (along with many other events and issues political, economic, scientific, ecological, meteorological and cultural), climate change has become part of the political, economic, financial, industrial development, etc., of many countries around the world.

In this flow and complexity of events, the central fact is that there has been no change in the communication of climate change, limiting its effectiveness. Despite the in-depth knowledge and scientific studies subscribed to by almost all scientists, communicating climate change has proved to be more complex.

The thesis proposed in this project is that only a planned, multi-platform, multi-channel strategy can address the complexity of the issue of climate change.

Strategic and multi-platform communication is essential for the effectiveness of the communication processes on climate change both at a governmental

level and at non-governmental one, with the involvement of companies, of policy, both at regional and global level.

The other benchmark for effective communication is flexibility and adaptability over time. As highlighted through the crisis communication path, communication activities are expected to need an evolution in order to remain focused, efficient and innovative.

This process requires coordinated planning and programming that can be part of a widespread and shared policy agenda.

Now, when this project is coming to an end, several events still indicate the pursuit of information on climate change, typical of communication in emergencies, and not the planning of the communication itself. The tendency to justify climate change, not only as a real change in the environmental conditions of the planet, as a narrative opposed to denialism, makes us lose sight of the real objective of communication on climate change:

- to find effective solutions;
- to make sudden, implementing decisions;
- to define a potential process of resilience and adaptation;
- to create the conditions for a change in the economic and financial system aimed at developing the circular economy process and closing the carbon cycle;
- to define environmental protection parameters that strengthen rather than weaken local, regional and global economies.

“One of the reasons (among many) that the public discourse on climate change has become so confused is that too many academics do not see it as

their role to engage in it"[307]. The issue of climate change calls into question science itself, in an environment where truth is a vehicle for disposable entertainment.

Within this system of relationships, communicators aim to create a narrative that puts the two ends of the segment into dialogue, between the two opposite poles, the producers and the users of information. The task of communication on climate change is to change the paradigm with which we see the problem, activating the process of information distribution in order to activate the circularity of the economy and to understand the closure of the carbon cycle as an integrated part of the production system. Communication on climate change is not about carbon dioxide, but about values, a union of facts and emotions that require an integrated analysis and that considers the various communication platforms available today.

Communication that explains complexity and makes it usable by the masses must be planned, in the ways and times of instantaneousness and perception of digital. This is possible by:

- defining the objectives;
- identifying the audience;
- profiling messages;
- being flexible in the use of methods;
- evaluating impacts.

[307] Hoffman, A. J., *How culture shapes the climate change debate*, Stanford University Press, Stanford, 2015, p. 8.

This communication process can be pursued by extrapolating errors from what has been proposed and implemented in recent decades, through the tools of strategic communication. The communication on climate change should therefore consider:

- the perception of the audience to know how to manage the expectations of the same;
- the unanimity of scientific consensus as the real added value, conveying it with clarity and simplicity;
- the possibility of talking about solutions considering climate change as a fact through which a positive transition for the economy can be managed;
- communication with images and stories about good practices as the winning method to achieve the goal;
- a positive communication as an asset;
- to give clear guidelines for all.

What has been made clear and what has been done so far, denotes the alternative of communication on climate change, which has two possible ways to achieve the goal: alarming causing fear or opting for a positive engagement and directed to a paradigm shift. For his part, the reader also has two options: to accept or to refuse the information. Strategic and multi-platform planning to address the complexity of the topic consider the cultural and social lenses that affect the reader's perception of the topic itself.

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