Research on Viral Marketing of Global Warming Communication based on the STEPPS Model

Yuhan Song [1, *], Haiting Yang [2]

[1] Business School, University of Nottingham Ningbo China, Ningbo, Zhejiang, 315000, China

[2] Shenzhen College of International Education, Shenzhen, Guangdong, 518000, China

* Corresponding author: biyys33@nottingham.edu.cn

Abstract. Effective communication of global warming information is the basic process to alleviate the climate change problem closely linked to humans' sustainable development. What's more, climate change is not reversible and invisible. The reasons for the failure to communicate global warming-related information can be attributed to obscure language, unidirectional input, and disinformation. Therefore, catching people's eyes in this field isn't easy. Although the United Nations and governments implement lots of policies to reduce the emission of carbon dioxide, global warming has threatened millions of lives of creatures and their habitats. The communication strategies of global warming information or policies need to be more valid to raise people's attention and put them into action. The application of the viral marketing model STEPPS will be the main focus of this essay. The suggestion is theoretically based on this model, combining the current communication challenges from emotions, practical value, story, and social currency. Combining the STEPPS model with scientific information communication is a creative strategy to spread the important message to the audience effectively, and there is research about the application of the viral marketing model in the global warming field. This essay will provide a new and original method to the transmitter of environmental protection organizations.

Keywords: Global Warming, Communication, STEPPS Model, Viral Marketing.

1. Introduction

1.1. Research Background

According to the National Centers for Environmental Information data, the temperature increment in 2023 at 1.01 degrees centigrade to 20th-century average temperature ranks fourth, and 2020 is the second warmest year on record [1]. Moreover, this problem is irreversible, although humans try to limit temperature increment by reducing greenhouse gas emissions. As the Intergovernmental Panel on Climate Change says in its 2023 report the rise in sea levels is unstoppable [2]. Human health will be deeply affected by the increasing temperature and heat waves, such as heat shock, cardiovascular or respiratory disease, and extreme weather [3]. Such a vital problem of global warming in human lives related to sustainable development fails to spread the information compared to sports news and entertainment articles, with the least propagated articles published on the Internet after the original contexts on social media. The total number of global warming articles is also the least among the three [4]. The lack of attention or communication of global warming information may lead to future irreversibly dangerous circumstances for humans. The STEPPS model has been made by Professor Berger, which helps to increase the word of mouth of some information in six aspects mainly used for marketing [5]. However, few articles are related to applying the STEPPS model to global warming communication. The STEPPS model can adjust global warming transmitters' strategy and inspire new content-making and publicity means. With successive communication, the environmental protection awareness of humans can be evoked, leading to more effective action to alleviate global warming. Thus, a path to greater health and prosperity for humans, society, and the planet will be formed.

1.2. Literature Review

Anthony, Connie, Jennifer, and Edward found that the segmentation of 'Global Warming Six Americans' is valuable to improving global warming communication. Its main core is to understand the audience and identify them. The segmentation includes Alarmed, Concerned, Cautious, Disengaged, Doubtful, and Dismissive underlying attitudinal valence and issue involvement. The segmentation is based on the survey containing 2154 adults and 35 variables. According to the conclusion of the study, communication objectives and target audiences are vital to strategic communication. For example, the audience in the 'alarmed' group is actively responding to the climate advocacy organization. One of the main findings of the research is that successive typology can help to spread global warming information. The other is that different resources of communication organizations like museums and advocacy organizations should be arranged with different missions [6].

According to Berger and Milkman, high-arousal emotions like awe and anger are most likely to drive people to share information with others. For 7,000 articles published in the New York Times, use the calculation to classify the positivity of each article by counting how many positive or negative words are in each. Researchers then distinguish more details about what kinds of positive or negative emotions. The finding of this research shows that the emotions related to the activation or arousal, like anxiety and anger, are positively linked to virality. In contrast, deactivated emotions like sadness are negatively linked to virality [7].

Borges, Maria, Flavio, and Carla show that social online users can be divided into three clusters: 'heavy users', 'social-driven users', and 'research-driven users. One result of this study is social pressure has a positive relationship with users' willingness to join in a viral communications process. However, the higher willingness to participate and the opinion of the popular context have no positive correlation with the shared behaviour. The key finding of this study is that users with unique images on social media have different sharing behaviours. For example, heavy users are likelier to participate and share meaningful content than social-driven users. The difference between social-driven and search-driven users is associated with attitude. Moreover, the key reason for the sharing behaviour is that peers share it [8].

Milkman and Berger highlight one research about society: psychology or other social science are more likely to be shareable since people care about people. Additionally, they identify that men and minorities have a relatively high possibility to share the scientific discoveries among other demographic groups. The sense of self-enhancement can also drive people to share news and information. Moreover, from the information's content, the transmission's reflection to people can positively affect the transmissibility. The key to communicating scientific information is making the work seem more emotional, useful, and interesting [9].

Nabi, Gustafson, and Jensen's research article explores the role of emotion, particularly fear and hope, in environmental policy initiatives' gain/loss framing. The study finds that emotions, specifically fear and hope, significantly influence attitudes and advocacy regarding climate change policies. Emotions, especially hope, are essential in bridging the gap between profit-framed messages and desirable policy attitudes and advocacy. However, fear-inducing images and icons did not increase people's sense of personal responsibility or willingness to take action. Instead, they often triggered negative emotions such as fear, guilt, anger, or sadness. The results also highlight sequencing emotional experiences' potential effectiveness in enhancing the persuasive effect [10].

1.3. Research Gap

Most of the research focuses on the segmentation of the audience matching with different strategies or only the role of emotions played in the transmission process, and few researchers apply the whole STEPPS model to the communication of global warming. Thus, there is a blank in applying this model to spreading global warming. The most popular use of the STEPPS model is in marketing and sales. Nevertheless, the STEPPS model can also effectively increase the word of mouth of scientific information like global warming because the core of STEPPS is to 'implant' something directly or

indirectly in people's memory and use some methods to remind and share with others. In addition, some articles state the role of emotions in communication about high-arousal or low-arousal. However, only focusing on one factor may not affect the successive transmission much. This problem, global warming, has already become the most concerning problem in people's lives related to sustainable development. The use of emotion may not influence a large population because people have various feelings for the same words, and it may have a short-term benefit to communication.

1.4. Research Framework

This article focuses on applying the STEPPS model to improve the successive transmission of global warming information. First, the current situation of global warming communication will be analyzed from different perspectives. Then, find the inadequacy in communication. Thirdly, it gives some new transmission strategies based on the STEPPS model combined with the typology of audiences. Research will be done to test whether the suggestion is valid in the form of a survey and then calculation and analysis. The limitations of the STEPPS model used in the communication of global warming will also be mentioned in the end.

2. Case Description

Global warming, one of the greatest threats to the ecosystem and human health, is becoming increasingly serious now. High temperature leads to the rise in the sea level caused by the melting iceberg, and the habits of animals and humans are in huge danger. For instance, according to the IPCC, an increase in temperature of 1.5°C could place 20–30% of biodiversity in danger of extinction. If the earth warms by more than 2°C, most ecosystems will experience difficulties. The cause of this climate change is the formation of greenhouse gases in the atmosphere, which prevents the reflection of IR radiation and absorption of sunlight, leading to higher frequency and intensity of heat waves and droughts [11]. The strong sunlight negatively affects several crops, the main food resources for human development, including rice, wheat, maize, and sorghum. Moreover, more common heat waves, heat-related illnesses, and morality threaten human health, such as water and salt depletion, heat exhaustion, heat stroke, and so on. According to a United States Environmental Protection Agency report, extreme heat may cause three times the mortality rate in 2100 than 2000 per 100 thousand [12]. Unlike other common events, global warming cannot be solved totally, and the thing that humans can do is to decelerate the speed of temperature rise. However, the actions to alleviate this problem are limited due to the problem's seriousness and the people's attention mismatch. This event is worth more attention, but the communication of this information fails because of scientific illiteracy, overloaded information, misinformation, and so on. Some authoritative organizations' posts on Twitter, Facebook, or Instagram don't get attention or retweet, which means the spread of the information is ceased on that page. Global warming is seldom mentioned in people's daily life or related information. People only care about their lives, so they only realize that the temperature might become higher than before, but they don't know what caused the temperature to rise or what the influence of the increasing temperature is. By introducing the model of STEPPS, the spread of global warming can grab people's attention to some extent, raise their awareness of global warming, and inspire action to make changes.

3. Analysis on the Problem

3.1. The Current Situation of Viral Marketing Strategy in a Global Warming Case

Marketing teams and other organizations hope their messages spread like wildfire to every consumer touchpoint. As Sprout Social claims, viral marketing refers to promotional strategies that emerge naturally through word-of-mouth and online communication to make the product, service, or information popular. Having valuable and interesting material spread like a virus on the Internet will naturally arouse people's interest. Viral marketing travels from person to individual and channel to medium like a virus, garnering attention at an incredible rate. Social media platforms are an

appropriate environment for viral marketing since they are built for sharing. YouTube, for instance, might have a motivational video. The video is then shared by fans on Facebook, LinkedIn, and Twitter. Furthermore, viral marketing approaches advertising from the perspective of the customer, which relies on the content's capacity to meet the requirements of a particular audience and motivate them to share. The majority of viral initiatives are spread via word of mouth, through six aspects: social currency, trigger, emotion, public, practical value, and story [13]. Regarding communicating global warming-related information, research from Hard and Feldman shows that climate change usually is one of the nation's lowest priorities. Fighting global warming came in third from the bottom of the list of issues that Americans said should be the top priority for policy, according to a recent survey. [14]. The most common reports on social media with high likes and shares are about amusement circles, constellations, sporting events, instant news, etc., which are fresh and interesting.

3.2. Problem Identified of Viral Marketing Strategy in a Global Warming Case

Based on the discussion before, it can be seen that for the public, the global warming information related to climate change does not go viral. People do not have enough interest and awareness to share it. These trends may stem partly from how the news media reports this information. The way the public views climate change, what is at risk, how to address it, and ultimately, what priority it should be placed. And other related topics is greatly influenced by media coverage of the topic. Additionally, the difficulty in communicating this kind of information can be viewed from two perspectives: the transmitter and the audience. For transmitters, environmentalists like to rely on hard data and scientific arguments. The dissemination of information about climate change, like global warming, is a case in point, where scientists rely on accurate numerical models for their estimations and predictions to make sure their conclusions are convincing. Such a publicity tactic might make sense. People who advocate for a low-carbon lifestyle must provide compelling evidence and scientific findings to back up their claims. How much carbon dioxide can people emit, for instance? What will happen to the Earth with a 2 °C warming? The Earth will become hostile or uninhabitable as a result of rising temperatures, according to scientists. This is what motivates people to take action to curb global warming. However, most environmentalists will stop at data, arguing that only data can change hearts. The over-reliance on data ignores the laws that enable people to absorb information, change their minds, and motivate themselves. The hard numbers and rigid calculations make the articles lack involvement, making the audience feel tedious and confused when facing professional terms. They are confused and cannot find practical value or emotional resonance that fits their hearts. Then, they probably become reluctant to accept the information from one side. Communication needs input from each other, and if scientists state the conclusion, they found instead of what people care about, then the information fails to spread. Besides, some people argue that information such as that polar bears are often regarded as legitimate because it might elicit sympathy from others. are threatened by melting sea ice. However, there are not many people who follow this kind of news, and not everyone is sympathetic, especially in this age of advancing nationalism. In actuality, people's top priorities are their finances, well-being, and security. Although it may sound egotistical, climate communication more successfully engages all three. Indeed, all three are being significantly impacted by climate change. With $240 billion wasted annually in the United States alone due to severe weather and emissions from fossil fuels, the monetary effects of climate change are obvious. The economic benefits of the sun and wind are enormous. People are put in danger worldwide by droughts, rising sea levels, and heat waves brought on by global warming [15]. Tell the information closely related to themselves, which may motivate them to share and talk frequently. Furthermore, the disinformation about global warming goes viral on social media, making people ignore the real situation of this report. The fake information contains the negation of the fact that humans cause climate change, or climate change is a process of controlling the increasing population, according to the research done by Smith on Instagram. They also found that the 50 most popular posts in the sample don’t have any signal indicating unreliable or warning. Instagram users are free to search for these tags or find these posts without any hint [16]. Therefore, they will receive the wrong information and may tend to believe it.

Online social media provide a platform for the information to spread at a high speed, no matter whether it is fake or true. For the receivers, the functions of the Internet are mostly fully developed, and the fast spread of information overloads people. Sharing the posts becomes people's daily schedule, and the connection passes the information to the rest of the world. The large quantity of information makes receivers lose the ability to distinguish the reliability of the information, affecting decision-making.

4. Suggestions

4.1. Mobilizing the High-Arousal Emotions to Promote the Public's Enthusiasm and Action

To solve the problem identified before, the first suggested approach can be designing content that evokes high-arousal emotions, such as excitement or anxiety. It may be possible to increase the likelihood of sharing and ultimately reach a wider audience. According to Berger, arousal increases the likelihood of sharing information with others. When participants were made to experience high-arousal emotions like amusement or fret; they were more prone to sharing content with others than those who were induced to feel low-arousal emotions, such as contentment or sadness [5]. This finding has important implications for understanding how and why people share stories, news, and information. It suggests that content that evokes high-arousal emotions has a higher chance of being shared, going viral online, and getting people's attention. Moreover, the effect of choosing the right emotional direction on the outcome is important. Nabi, Gustafson, and Jensen state that the emotion of hope plays a key role in mediating the relationship between interest-framing communications, advocacy, and desirable policy attitudes. They found that although dramatic, scary, and shocking manifestations of climate change can draw attention to the issue of climate change. However, they can also distance or disengage individuals from this information, and frequently struggle to comprehend their connection to the problem, leaving them feeling useless and overburdened. There is an element of human suffering in these images, illustrating the large-scale impacts of climate change and those that make them generate strong emotions like fear, depression, or pain. The visuals were frequently so disconnected from the participants' actual experiences that, following the initial shock, they were quickly forgotten [10]. Thus, using non-threatening visuals related to everyday life or values may evoke positive emotions, which engage the audience more effectively.

4.2. Displaying Practical Information in News or Reports

Practical content will show stronger vitality in communication. Nowadays, people are most concerned about their benefits like wallets, health, and safety. As long as ideas or information can help them improve themselves, they may greatly help to spread the word. Avoid many problems faced by producing news reports today, including images and texts that make participants feel powerless about climate change. These images evoke feelings of helplessness, alienation, and lack of control. Therefore, crafting global warming content that addresses problems can be more effective on social media platforms, which means showing possible actions people can take efforts, success stories, and the positive effects of these actions. For example, the article can list that in order to reduce carbon emissions and waste, and it is recommended that the public ride bikes or use new energy vehicles to travel and throw garbage into specific categories. Some businesses are told to use green packaging and cutlery reuse resources to promote waste recycling, which is committed to sustainable development. In addition, in news or other reporting, combining display images with textual exposition instead of using a mass of data. Specifically, some organizations should use positive images and text to show the specifics of global warming, such as a photographer's picture of a melting glacier a comparison scene of the once verdant prairies transformed into vast deserts with story elaboration to promote resonance and demonstrate the issue's importance. Hart and Feldman said that conducting an experimental study exposed participants to different combinations of images and texts about climate change and measured their attitudes and intentions. The result revealed that compared

to news stories without images or with text only, news stories with positive images can significantly increase participants' efficacy and behavioral intentions [14].

4.3. Telling a True Story

Hearing stories is a normal human desire. What type of narrative and logic should environmental organizations employ to convey ideas? People will not only exchange knowledge, but it might also be simpler to share narratives based on it. As mentioned before, simply presenting the data can numb the audience. Make the data relevant, local, and personal. Individual stories can create an emotional connection, make audiences care about the story, and lessen the intimidating nature of common global concerns. Starting with a related topic that matters to the audience rather than the word "climate" is preferable. For instance, Dar es Salaam and other cities are combating air pollution by implementing smoke-free buses. Or the new jobs created by clean energy initiatives, like in India's case. Alternatively, consider the power disruptions caused by hurricanes, which Puerto Rico is attempting to mitigate by installing solar power installations [17]. Under this situation, some communication organizations can cooperate with a particular brand. For instance, an energy-efficient company can produce an advertisement, including a video showing the consequences of global warming, which may influence consumer behavior. With viral content, the public will not only be aware of the effects of global warming but will also choose to buy related energy-saving products. It is much easier to talk to people around them. One thing worth noting is to avoid deceptive and unverified claims, which may lead to misunderstandings that do not know the truth from the truth.

4.4. Integrating Action Messages to Mitigate Global Warming with Social Currency

People tend to share something that makes them feel special, knowledgeable, intelligent, and so on. According to this, the environmental protection organization can catch the sense of uniqueness or intelligence that people want to behave to others to communicate global warming information effectively and make the contribution visible to the public. The environmental protection organization can establish an activity about advocating the low-carbon lifestyle, and some rewards will be sent to the people who achieve it. The rewards can be a keychain or a necklace, but they must be something that people can wear in daily life, acting as a fashion item, and should be well designed and related to global warming. For example, the design can contain the factors of Earth, temperature, polar bears, and greenhouse gases, or the color can be changed due to the surrounding weather: hot will be red, and cool will be blue or green. More importantly, the materials for making these rewards should be environmentally friendly. Not only will the fashion style of these items attract people to obtain them, but they can also show others they care about the Earth, the future, and sustainable development. The method to obtain these rewards can be using bicycles as a transport tool, traveling 2km or more 50 times, or taking the bus 70 times. The record will be collected by the QR code scanning for tickets. The record will be collected by the QR code scanning for tickets. The rewards can be used as a tool to spread out the global warming information in three ways. Firstly, not only does everyone have access to these items, but some people also insist on a low-carbon lifestyle for a long time. Therefore, the rewards give them a sense of uniqueness and concern more about the environment than others, which they would like to share with others.

5. Conclusion

In conclusion, this essay first introduced the pressing environmental issue of global warming and the challenge of effectively communicating this information that has not gone viral for the public. Firstly, there may be problems with how news outlets on social media report this information. Although a large amount of data and professional terms support the view to a certain extent, it is not conducive to people's absorption of information and hinders emotional resonance. Secondly, most of the reports are about stating facts, and people cannot find information conducive to their values, so they naturally become reluctant to pay more attention. Beyond that, some false and ambiguous

information makes people unsure of what they see, impeding reception and dissemination. Therefore, based on existing problems, harnessing the power of the STEPPS model, several communication strategies are given to craft more effective content that conveys impactful messages. For example, make content that appeals to high-arousal emotions, like hope rather than fear. And show people useful information from news or stories about changes and meaningful actions they can make so that they feel benefit. Moreover, it tells the true stories with some vivid pictures. Letting people spread this word of worth and inspire.

their action. Some messages about action can also be combined with social currency, and special prizes make people feel different and more willing to tell people around them. All of these will contribute to the research's significance. Professional environmental organizations can make more useful content using the right ways to display it on social media. Let information, thoughts, and actions invade like a virus. Then, more and more people become focused on global warming-related information and willing to spread it. Some can even lead by example and protect the environment with real actions. Finally, the planet, humans, and biology will advance to health and prosperity. However, some restriction exists in the scope of the existing literature or the rapidly evolving platforms and public discourse.

This article mostly uses secondary data instead of primary data. Therefore, it still needs further development to explore viral marketing-based strategies and offer insights into the long-term effects. Moreover, it can get primary data through specific research like online surveys, questionnaires, or interviews in the future.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

References

[1] NOAA National Centers for Environmental Information, 2023 Year-to Date Temperatures Versus Previous Years, 2023.6, 2023.8.26, https: //www.ncei.noaa.gov/access/monitoring/monthly-report/global/202305/supplemental/page-1.

[2] Allan, Richard P., Ed Hawkins, Nicolas Bellouin, and Bill Collins. IPCC, 2021: summary for Policymakers." (2021): 3 - 32.

[3] Kurane, Ichiro. The effect of global warming on infectious diseases. Osong public health and research perspectives 1, no. 1 (2010): 4 - 9.

[4] Sittar, Abdul, Dunja Mladenic, and Tomaž Erjavec. A dataset for information spreading over the news. In Proceedings of the 23th International Multiconference Information Society SiKDD, vol. 100, pp. 5 - 8. 2020.

[5] Berger, Jonah. Contagious: Why things catch on. Simon and Schuster, 2016.

[6] Leiserowitz, Anthony, Connie Roser-Renouf, Jennifer Marlon, and Edward Maibach. Global Warming's Six Americas: a review and recommendations for climate change communication. Current Opinion in Behavioral Sciences 42 (2021): 97 - 103.

[7] Berger, Jonah, and Katherine L. Milkman. Emotion and virality: what makes online content go viral? NIM Marketing Intelligence Review 5, no. 1 (2013): 18.

[8] Borges Tiago, Maria Teresa, Flavio Tiago, and Carla Cosme. Exploring users' motivations to participate in viral communication on social media. Journal of Business Research 101 (2019): 574 - 582.

[9] Milkman, Katherine L., and Jonah Berger. The science of sharing and the sharing of science. Proceedings of the National Academy of Sciences 111.supplement_4 (2014): 13642 - 13649.

[10] Nabi, Robin L., Abel Gustafson, and Risa Jensen. "Framing climate change: Exploring the role of emotion in generating advocacy behavior." Science Communication 40, no. 4 (2018): 442 - 468.

[11] Zandalinas, Sara I., Felix B. Fritschi, and Ron Mittler. Global warming, climate change, and environmental pollution: recipe for a multifactorial stress combination disaster. Trends in Plant Science 26.6 (2021): 588 - 599.

[12] Patel, Lisa, Kathryn C. Conlon, Cecilia Sorensen, Samia McEachin, Kari Nadeau, Khyati Kakkad, and Kenneth W. Kizer. Climate change and extreme heat events: how health systems should prepare. NEJM Catalyst Innovations in Care Delivery 3, no. 7 (2022): CAT - 21.

[13] Vardikou, Chrysopigi, and Agisilaos Konidaris. Viral marketing: A case study from LinkedIn. Envisioning the Future of Communication 1, no. 1 (2023).

[14] Hart, P. Sol, and Lauren Feldman. "The impact of climate change–related imagery and text on public opinion and behavior change." Science Communication 38, no. 4 (2016): 415 - 441.

[15] Tianqi News. Climate change information dissemination-Improves these 12 methods to expand coverage. Available at: https: //www.tianqi.com/news/215365.html (Accessed: 31 August 2023) (2018).

[16] Rory Smith. Climate change conspiracy memes on Instagram extend across the web, (2021. 4.17, 2023. 9.16, https: //firstdraftnews.org/articles/climate-change-misinformation-conspiracy-memes/.

[17] Riseth, Jan Åge, Hans Tømmervik, and Morten Tryland. Spreading or gathering? Can traditional knowledge be a resource to tackle reindeer diseases associated with climate change? International journal of environmental research and public health 17, no. 16 (2020): 6002.