

## Polarization networks around the SDGs in the press from 2020 to 2023

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### Abstract

Polarization in the media is a phenomenon classified as ambivalent and volatile because radical positions change to moderate and neutral. The objective of the study was to demonstrate this process in press releases and expert evaluations regarding the Sustainable Development Goals (SDG). A documentary, cross-sectional, exploratory, and retrospective work was carried out with a sample of press releases with national circulation and published from 2020 to 2023 headed with SDGs. The results verify the null hypothesis of significant differences between the theoretical structures concerning the empirical observations. The scope and limits of the study are discussed, as well as a local risk communication policy.

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### 1. Introduction

The Sustainable Development Goals (SDGs) play a crucial role in risk management by providing a comprehensive framework for addressing various social, economic, and environmental challenges. The several ways in which the SDGs contribute to risk management is the fact that SDGs cover a wide range of interconnected issues, including poverty, hunger, health, education, gender equality, clean water, climate action, and more [1]. By addressing these diverse aspects of sustainable development, the SDGs take a holistic approach to managing risks [2]. This broad perspective helps identify and mitigate risks more comprehensively. SDG 13 focuses on climate action, aiming to combat climate change and its impacts. Given the increasing frequency and severity of climate-related risks, including extreme weather events, rising sea levels, and ecosystem disruptions, SDG 13 is particularly relevant to risk management [3]. Implementing measures to adapt to and mitigate climate change is essential for building resilience against climate-related risks. Several SDGs, such as SDG 1 (No Poverty), SDG 2 (Zero Hunger), and SDG 10 (Reduced Inequalities), address vulnerabilities and inequalities that can amplify risks [4]. By promoting inclusive and sustainable development, these goals contribute to risk reduction, as vulnerable populations are often the most affected by various hazards, including economic shocks, food insecurity, and social crises. SDG 3 focuses on ensuring healthy lives and promoting well-being for all [5]. A strong healthcare system is crucial for managing health-related risks, including pandemics and disease outbreaks. Achieving the health-related targets of SDG 3 can enhance global health security and improve the

ability to respond to health emergencies. SDGs related to economic growth, decent work (SDG 8), and industry, innovation, and infrastructure (SDG 9) contribute to building economic stability and resilience [6]. Sustainable economic development helps reduce the vulnerability of communities to economic shocks, including financial crises and market fluctuations [7]. SDG 6 addresses clean water and sanitation, essential elements for reducing health risks and ensuring the resilience of communities to water-related disasters. Access to clean water and sanitation facilities is crucial for preventing waterborne diseases and improving overall community well-being [8]. SDG 15 focuses on protecting, restoring, and promoting sustainable use of terrestrial ecosystems. Biodiversity loss poses significant risks to ecosystems and can have cascading effects on human societies. By addressing biodiversity conservation, SDG 15 contributes to managing risks associated with ecosystem degradation [9]. SDG 17 emphasizes the importance of global partnerships for sustainable development. Given the interconnected nature of risks, international collaboration is crucial for effective risk management. SDG 17 encourages countries to work together, share knowledge, and mobilize resources to address common challenges [10]. In summary, the SDGs provide a comprehensive and integrated framework for managing risks across various dimensions of sustainable development. By addressing the root causes of vulnerabilities and promoting resilience, the SDGs contribute to a more sustainable and secure future. Implementing the goals requires coordinated efforts from governments, businesses, civil society, and other stakeholders to effectively manage risks and achieve lasting positive impacts.

The literature concerning polarization neural networks is divided into two blocks. The first refers to the relationship between minorities and majorities, it covers the types of influence in different non-media contexts [11]. The second aspect suggests that the media, mainly socio-digital networks such as Twitter, generate and reflect an ephemeral polarization since the groups that present themselves as radicals the next day establish a moderate position [12]. In this way, traditional or classical polarization consists of the influence of the majority over minorities, but if this minority group maintains its position, it can reverse the influence. This is the case of pro-government propaganda versus opposition counterpropaganda [13]. In this sense, the new polarization lies in the emergence of radical groups that the next day become moderates. The theory says that the volatility of polarization is because social digital networks do not maintain a permanent theme or position.

Regarding the Sustainable Development Goals, each of the 17 SDGs refers to radical or moderate positions on education, health, and employment, although the Internet user polarization is closer to point four related to quality education since the theory indicates that it can be achieved if the parties involved establish projects in the short, medium or long term that allow them to collaborate and be critical [14]. In this sense, Internet user polarization contributes to quality education because it reveals that the parties involved are conditioned by the medium in which they disseminate their positions. Point five of the SDGs alluding to gender equality is a central axis of the Internet user polarization agenda since the asymmetries between the parties involved are often fostered by patriarchy, a polarization theme that Twitter amplifies to establish positions that allow dialogue between the parties.

However, SDG 8, which refers to decent work and economic growth, is the central nucleus of Internet user polarization, since those who maintain a radical position point out that a political system can define the strategies to achieve the SDG in question, but moderates they indicate that rather a balance between the market and political power will make it possible to achieve the SDG [15].

SDG 12, alluding to responsible production and consumption, is the quid pro quo of the matter, since the radicals argue that capitalism in its different forms is responsible for ecological deterioration, but the moderates argue that it is the conflict between social classes that inhibits sustained development or any other alternative because the parties involved have always conflicted without agreements or joint responsibilities [16].

SDG 13 regarding climate action is another central axis in the polarization agenda [17]. The radical positions suggest that ecological deterioration is irreversible if the increase in temperature is considered an indicator of global warming, but the moderate wing suggests that it is possible to achieve co-responsibility if conflicts are overcome, and agreements are reached considering common goods.

The Sustainable Development Goals (SDGs) have been praised for their ambitious agenda to address global challenges and improve various aspects of human well-being by 2030. However, like any complex and wide-reaching initiative, they also face criticisms. For example, one common critique is that the SDGs are not legally binding [18]. Unlike the predecessor Millennium Development Goals (MDGs), the SDGs are voluntary, which means that countries are not obligated to take specific actions to achieve them. Critics argue that this lack of enforceability may hinder the effectiveness of the goals. The SDGs cover various issues, from poverty and hunger to climate action and gender equality. Some critics argue that the sheer number and diversity of goals may make it challenging for countries to prioritize and focus their efforts effectively [19]. This can lead to a dilution of resources and attention. Many critics point to the difficulty of implementing the SDGs, especially in developing countries with limited resources and capacity. Achieving such an extensive agenda requires significant financial, technological, and institutional support, and not all countries may have the means to implement the goals successfully. Monitoring progress towards the SDGs involves collecting and analyzing vast amounts of data [20]. Critics argue that some countries may lack the necessary infrastructure and resources for robust data collection, leading to challenges in accurately assessing progress. The interdependence of many goals poses a challenge. Progress in one area may be hindered by setbacks in another, making it difficult to achieve meaningful advancements across all goals simultaneously. Critics argue that a more integrated and holistic approach is needed [21].

While the SDGs outline ambitious targets, there is criticism regarding the lack of emphasis on the means of implementation, including financial resources, technology transfer, and capacity building. Without adequate support mechanisms, achieving the goals becomes more challenging. Some argue that the SDGs do not sufficiently address issues of inequality within and among countries [22]. Critics contend that a more explicit focus on reducing disparities in income, education, and healthcare outcomes is necessary to achieve sustainable development. There are concerns that some entities may use the SDGs for "greenwashing," where they claim to support sustainable development without making substantive changes to their practices. This can lead to a lack of genuine commitment to achieving the goals [23]. The SDGs require international cooperation and coordination. Critics argue that the lack of a robust global governance framework may impede progress, especially in addressing issues that transcend national boundaries. While the SDGs have garnered widespread support, these criticisms highlight the complexities and challenges of implementing such an ambitious and comprehensive global agenda. Addressing these concerns requires ongoing efforts from governments, international organizations, and other stakeholders to ensure meaningful progress toward sustainable development.

However, the polarization of the SDGs has not been related to daily indicators such as droughts, floods, landslides, fires, hurricanes, or frosts [24]. In this sense, disaster risks are a preponderant factor in the local and public agenda that would modify radical or moderate positions on the SDGs, since their intensification would increase some of the opinions or attitudes that are held concerning climate change, global warming, the greenhouse effect, or sustainability.

Therefore, the objective of this paper is to review the dimensions of Internet user polarization concerning the SDGs in disaster risk situations to be able to contrast the media agenda with the evaluations of experts in the field during the period from 2020 to 2023.

## **2. Research method**

A documentary, cross-sectional, exploratory, and retrospective study was carried out with a selection of press releases, considering the national circulation of the source, as well as the period from 2020 to 2023 regarding the search for keywords: "SDG" and "polarization". The PRISMA sampling technique was used, which consists of structuring the information and balancing the search for it from different dimensions and indicators of a theme [25].

To standardize the concepts, a focus group was held with a sample of 10 experts [26]. They were contacted through their institutional email and informed about the objectives of the study and those responsible for the project. They were told that their participation would be voluntary without remuneration, that the confidentiality and anonymity of their answers were guaranteed in writing, and that their academic status would not be affected.

To evaluate the press releases, the Delphi technique was used [27]. In the first phase, the judges assigned a score of zero if they strongly disagreed, but a score of five if they strongly agreed. In the second phase, the initial scores and the averages were included so that the judges could reflect on their criteria and reconsider or reiterate their position. In the third phase, the judges assigned a final grade.

The data was captured in Excel and processed in JASP version 16. The coefficients of centrality were estimated: intermediation, gradation, and influence, as well as grouping and structuring to reveal the learning of the press regarding the diffusion of Internet user polarization relative to the SDGs [28].

Values close to unity were assumed as evidence of neural processing and therefore did not reject the null hypothesis regarding the significant differences between the structures reported in the literature for the observations made in the present work [29].

### 3. Results and discussion

The parameters that establish the centrality of nodes relative to polarization measure betweenness, closeness, gradation, and influence (see Table 1). For SDG 2, alluding to zero hunger, there is a greater positive bias in three of the four parameters to the ratings of the other SDGs reported in the press from 2020 to 2023. In this sense, it is assumed that the SDGs revolve around this node 2 and it is considered that the evaluations of the judges assume this SDG is a priority.

Table 1. Centrality measures per variable

Variable	Network			
	Betweenness	Closeness	Strength	Expected influence
SDG1	-1.006	-1.285	-1.514	-0.420
SDG2	-1.006	-1.820	-1.757	-1.581
SDG3	-1.006	-1.445	-1.597	0.214
SDG4	-0.069	0.889	0.805	0.574
SDG5	0.165	0.244	0.358	-1.047
SDG6	1.571	0.426	0.338	-1.042
SDG7	0.634	0.454	0.614	-1.168
SDG8	-0.303	-0.428	-0.111	-1.006
SDG9	-0.303	-1.139	-0.899	0.288
SDG10	0.165	1.199	0.866	0.985
SDG11	1.571	0.349	0.305	1.568
SDG12	-0.537	0.024	-0.340	-0.968
SDG13	-1.006	0.314	0.594	1.114
SDG14	0.165	0.749	0.563	0.363
SDG15	-0.772	-0.901	-0.870	-0.114
SDG16	2.274	1.625	1.551	1.275
SDG17	-0.537	0.744	1.093	0.964

In other words, the SDGs disseminated in the literature and evaluated by judges generate a polarization in items 2, 3, 9, 12, and 15 related to zero hunger, health, and well-being, industry and innovations, as well as life in terrestrial ecosystems (Figure 1). These indicators refer to public policies not defined by their orientation towards sustainability. Consequently, the polarization between those who expect a regime of order with progress and those who expect a system of solidarity focuses on social justice. In this sense, the analysis of neural

networks indicates that these items of the SDGs are central axes in the discussion on social justice that implies a shared responsibility for the preservation of natural resources.

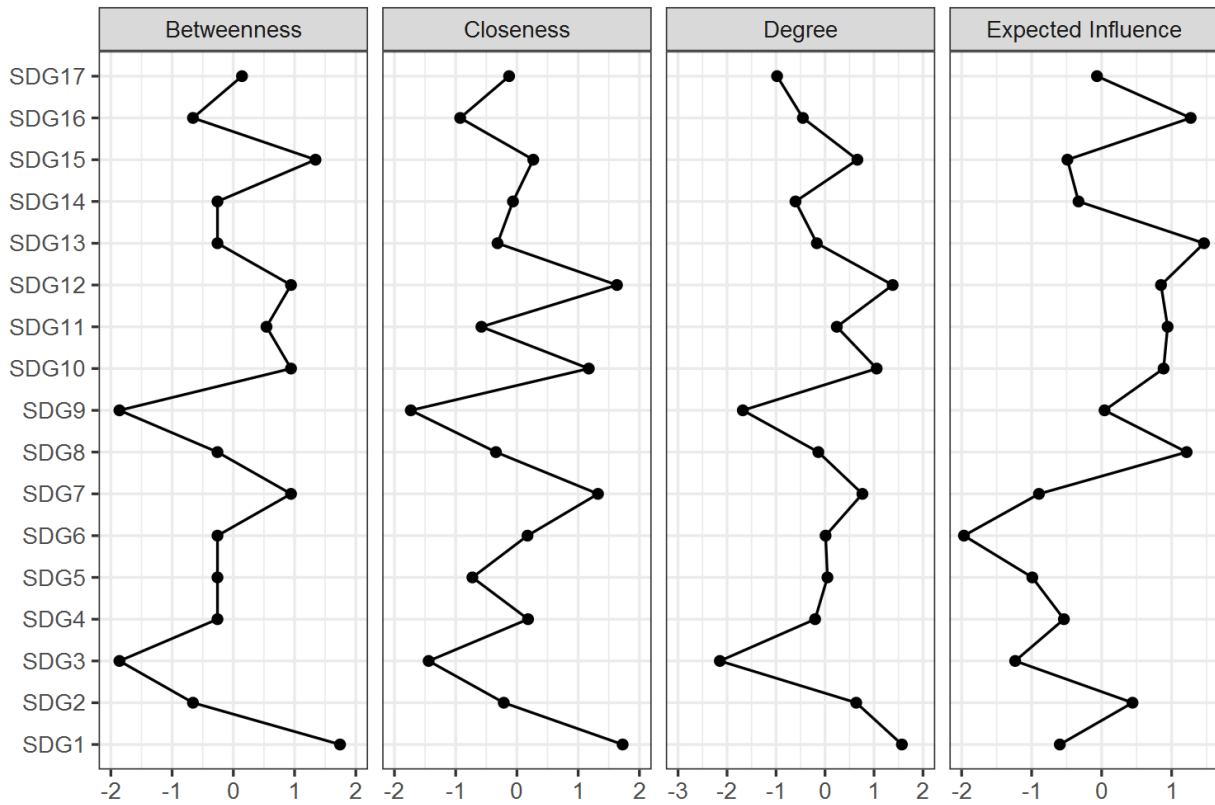


Figure 1. Centrality plot

The next set of parameters that measure the learning of the press evaluated by the judges is the clustering of the ODS nodes (Figure 2). It is observed that only two of the four parameters identify SDGs 9 and 3 related to industrialization and innovation, health, and well-being as those with the greatest agglomeration. In other words, the qualifications of the judges are configured around the prevention of health risks and industrial progress.

Table 2. Clustering measures per variable

Variable	Network			
	Barrat <sup>a</sup>	Onnela	WS <sup>a</sup>	Zhang
SDG1	0.000	-1.565	0.000	-0.009
SDG10	0.000	0.855	0.000	0.550
SDG11	0.000	0.426	0.000	-0.290
SDG12	0.000	-0.550	0.000	0.162
SDG13	0.000	0.628	0.000	1.501
SDG14	0.000	0.410	0.000	1.877
SDG15	0.000	-0.589	0.000	-1.038
SDG16	0.000	1.676	0.000	0.240
SDG17	0.000	0.944	0.000	0.722
SDG2	0.000	-1.702	0.000	-1.190
SDG3	0.000	-1.652	0.000	-1.155
SDG4	0.000	0.671	0.000	1.375
SDG5	0.000	0.261	0.000	0.159
SDG6	0.000	0.339	0.000	-0.081
SDG7	0.000	0.761	0.000	-0.628
SDG8	0.000	0.029	0.000	-0.518
SDG9	0.000	-0.942	0.000	-1.678

<sup>a</sup> Coefficient could not be standardized because the variance is too small.

It means that indicators 3 and 9 of the SDGs referring to health and well-being, as well as industry and structural innovation, are hegemonic centers in the discussion about the SDGs (Figure 2). That is, public policies that support the SDGs as paths of responsibility and social and environmental justice are evaluated as insufficient. The analysis of the neural networks about the topics that are central discussion axes suggests that items 3 and 9 must be redefined based on the participation of the actors. This is the case of health and well-being that is supported by industry and infrastructure. If policies favor this development in some sectors to the detriment of others, then their polarization intensifies. On the contrary, if public policies are oriented towards supportive social development, then consensus is reached on the SDGs as central axes of social and environmental justice for co-responsibility.

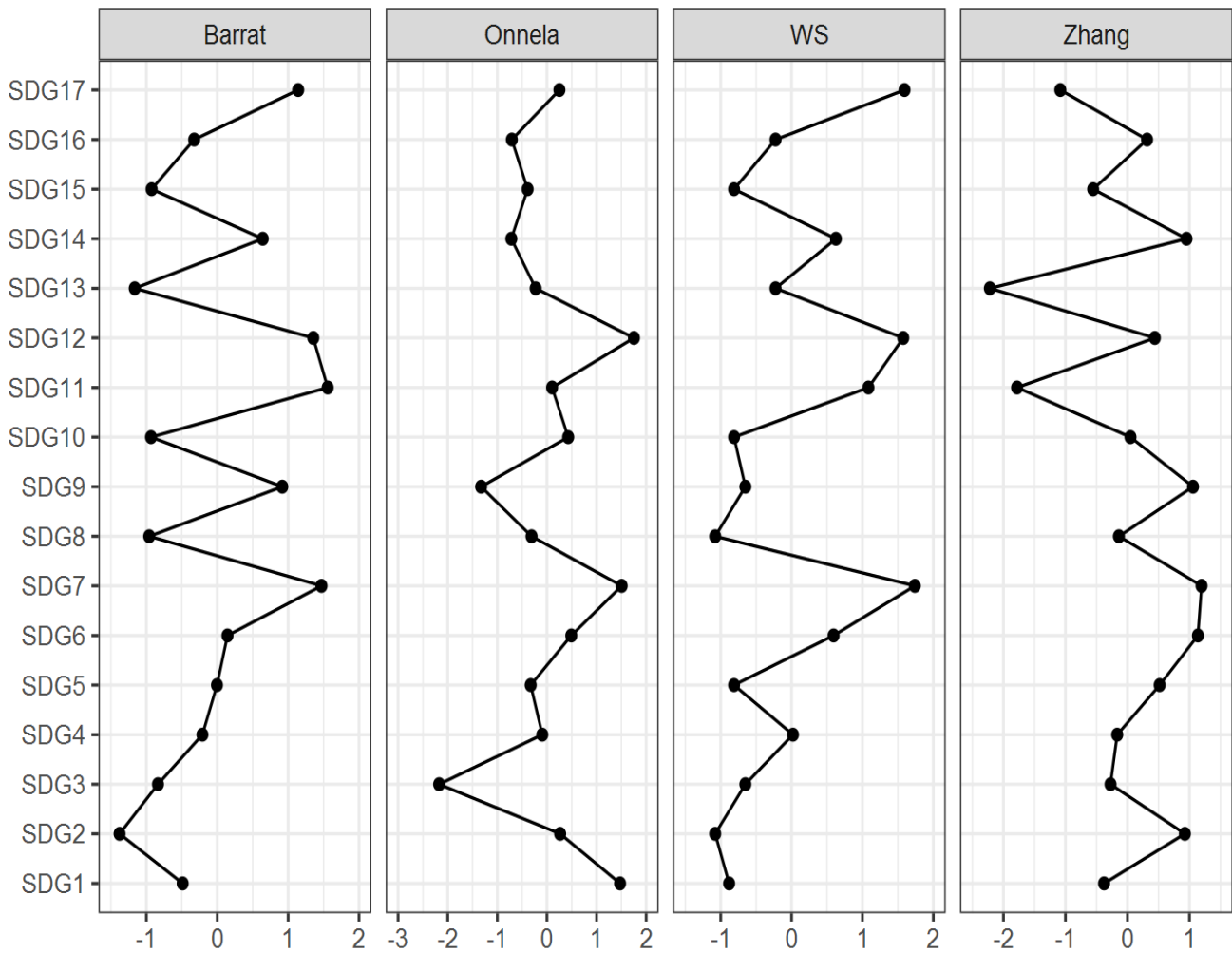


Figure 2. Clustering plot

The structure of the qualifications of judges concerning the dissemination of the SDGs suggests; that a) the most radical notes refer to SDGs 4, 11, 12, and 16, b) the notes rated as moderate refer to SDGs 1, 2, 3, 6, 7, 13, 14 and 15, c) the SDG 8, alluding to work and economic development, was qualified as neutral, d) SDGs 5, 9, 10 and 17 were assumed to be confusing.

In addition, negative relationships can be seen between the evaluations of the SDGs to the positive relationships. It is also observed that the neural network begins with a radical evaluation of SDG 12 and culminates with a moderate evaluation of SDG 15. In other words, it is a complex, controversial, ambivalent, heterogeneous, and diverse structure, all of which indicate that the SDGs disseminated in the press and qualified by judges through press releases are general, ambiguous, and unstructured objectives (see Table 3). It means then that this diversified representation of the SDGs is prone to polarization rather than governance.

Table 3. Weights matrix

Variable	Network																
	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG1	SDG1	SDG1	SDG1	SDG1	SDG1	SDG1	SDG1
SDG1	0.000	0.183	0.062	-0.136	-0.215	0.364	0.197	0.366	-0.016	0.26	0.105	0.001	0.028	0.01	-0.24	0.425	-0.209
SDG2	0.183	0.000	-0.301	0.222	-0.008	0.45	-0.262	0.061	-0.211	-0.076	-0.202	0.016	-0.15	0.061	0.019	0.116	-0.203
SDG3	0.062	-0.301	0.000	0.013	0.023	-0.058	0.222	0.169	0.328	0.262	0.562	0.096	0.062	-0.008	0.207	0.195	0.158
SDG4	-0.136	0.222	0.013	0.000	-0.056	0.113	-0.287	-0.526	-0.121	0.441	0.451	-0.333	0.662	0.65	-0.057	0.63	0.782
SDG5	-0.215	-0.008	0.023	-0.056	0.000	-0.708	0.737	0.12	0.212	-0.553	0.174	0.367	0.314	-0.402	0.549	-0.345	0.183
SDG6	0.364	0.45	-0.058	0.113	-0.708	0.000	-0.638	0.128	-0.124	0.637	-0.13	-0.078	-0.153	0.528	-0.291	0.452	-0.094
SDG7	0.197	-0.262	0.222	-0.287	0.737	-0.638	0.000	0.414	0.326	-0.458	0.076	0.54	0.075	-0.43	0.163	-0.326	-0.111
SDG8	0.366	0.061	0.169	-0.526	0.12	0.128	0.414	0.000	0.354	-0.02	-0.219	0.652	-0.328	-0.151	0.173	-0.251	-0.498
SDG9	-0.016	-0.211	0.328	-0.121	0.212	-0.124	0.326	0.354	0.000	0.22	0.33	0.558	-0.088	-0.085	0.469	-0.075	0.007
SDG10	0.26	-0.076	0.262	0.441	-0.553	0.637	-0.458	-0.02	0.22	0.000	0.416	-0.046	0.25	0.705	-0.139	0.636	0.431
SDG11	0.105	-0.202	0.562	0.451	0.174	-0.13	0.076	-0.219	0.33	0.416	0.000	-0.05	0.564	0.095	0.361	0.575	0.597
SDG12	0.001	0.016	0.096	-0.333	0.367	-0.078	0.54	0.652	0.558	-0.046	-0.05	0.000	-0.336	-0.251	0.1	-0.423	-0.321
SDG13	0.028	-0.15	0.062	0.662	0.314	-0.153	0.075	-0.328	-0.088	0.25	0.564	-0.336	0.000	0.469	0.262	0.62	0.877
SDG14	0.01	0.061	-0.008	0.65	-0.402	0.528	-0.43	-0.151	-0.085	0.705	0.095	-0.251	0.469	0.000	-0.184	0.642	0.531
SDG15	-0.24	0.019	0.207	-0.057	0.549	-0.291	0.163	0.173	0.469	-0.139	0.361	0.1	0.262	-0.184	0.000	-0.081	0.265
SDG16	0.425	0.116	0.195	0.63	-0.345	0.452	-0.326	-0.251	-0.075	0.636	0.575	-0.423	0.62	0.642	-0.081	0.000	0.544
SDG17	-0.209	-0.203	0.158	0.782	0.183	-0.094	-0.111	-0.498	0.007	0.431	0.597	-0.321	0.877	0.531	0.265	0.544	0.000

In summary, the analysis of neural networks identifies the SDGs in three blocks of input, processing, and output of information that inevitably mean polarization, either due to their complexity or their controversy (Figure 3). The parties involved, according to press releases, register opposing positions regarding health, well-being, and industrialization. Consequently, the consensus on justice and social and environmental responsibility is diluted.

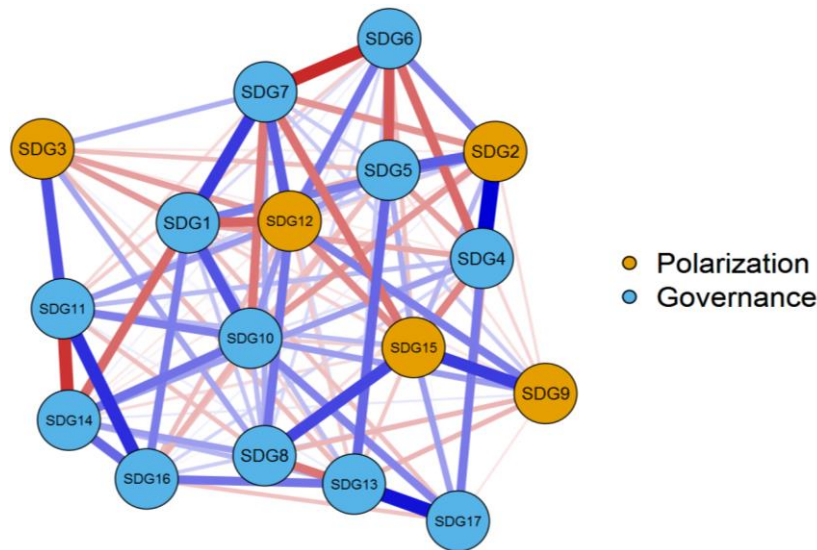


Figure 3. Network

#### 4. Conclusions

The contribution of this work to the state of the art lies in the establishment of a neural network that revealed the learning of the print media in the dissemination of the SDGs. This process began with the dissemination of responsible production and consumption, which was qualified by the judges as a radical position and culminated with the promotion of ecosystems qualified as a moderate note. In addition, the parameters of centrality, grouping, and structuring suggest that the null hypothesis regarding the significant differences between the dissemination structure of the SDGs concerning the evaluations of the judges is not rejected, mainly about SDGs 2, 3, 9, 12, and 15. Such findings indicate that the SDGs are a structure close to polarization rather than governance due to their heterogeneous dimensions and negative relationships. The results of the study can be used to build communication policies of the SDGs to be able to homogenize the positions towards them and anticipate polarization scenarios that inhibit their reach. It is recommended to build a communication policy for the SDGs evaluated as moderate so that the press emphasizes the advantages over local problems.

This study aimed to understand how the media promotes awareness about the Sustainable Development Goals (SDGs) through the evaluation of judges. The findings suggest that the majority of SDGs are disseminated moderately, but when compared to other positions such as radical, neutral, or confused, it becomes clear that the dissemination of SDGs is asymmetric and polarizing. Therefore, it is recommended to expand the study to a regional level to compare the results. Additionally, it is important to highlight the SDGs related to moderate positions to reduce confusion and polarization. The dissemination of news regarding moderate positions can increase cooperation and governance while reducing polarization, which is more likely to occur in news scenarios where radical positions are prevalent and negative relationships between nodes exist. In summary, the SDGs identified with moderate positions can promote discussion, agreement, and shared responsibility.

The work has political implications that can be summarized as follows:

- 1) The assessment of public policies aimed at governance should prioritize the reduction of polarization in SDGs 2, 3, 9, 12, and 15. It is also important to design public policies aligned with SDGs 1, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, and 17 to ensure governability and attain effective governance.
- 2) Governance policies should be redesigned to align with the 17 SDGs.



The study's results have several implications for the classroom. Firstly, it highlights the need for the formation of intellectual capital based on Sustainable Development Goals (SDGs) 1, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, and 17. Secondly, it emphasizes the importance of knowledge management using didactic sequences that can effectively reduce polarization in SDGs 2, 3, 9, 12, and 15. Lastly, the study suggests that the design of didactic sequences promoting governance and reducing polarization can be highly beneficial.

### Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

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### Author contribution

The contribution of CGL was the conception and design of the study; and analysis and interpretation of results. JEC, JMS, and TJHG were data collection and preparation of the draft. All authors approved the final version of the manuscript.

### References

- [1] C. García Lirios, J. M. Bustos Aguayo, y F. R. Sandoval Vázquez, «La agenda y encuadre de los problemas hídricos en la Ciudad de México en la prensa de 2019 a 2022», *Anu.conflicte soc*, n.º 13, p. e-40712, dic. 2022.
- [2] C. García-Lirios, J. Carreón Guillén, J. Hernández Valdés, S. Mejía Rubio, E. García Estrada, y J. F. Rosas Ferrusca, «Identidad sociopolítica delictiva en México», *Cuad. Hispanoam. Psicol*, vol. 14, n.º 1, pp. 5–16, ene. 2016.
- [3] J. Carreón Guillén, J. Hernández Valdés, C. García Lirios, B. L. Rivera Varela, y M. de L. Morales Flores, «Análisis de notas de prensa en torno al encuadre sociopolítico de tarifas hídricas», *Revista OBETS*, vol. 9, n.º 1, pp. 73–94, Jun. 2014.
- [4] J. Carreón Guillén, J. Hernández Valdés, y C. García Lirios, «Prueba empírica de un modelo de establecimiento de agenda», *Acta Universitaria*, vol. 24, n.º 3, pp. 50–62, Jul. 2014.
- [5] C. García Lirios, J. Carreón Guillén, y J. A. Aguilar Fuentes, «Activismo ante el establecimiento de la agenda», *Realidades*, vol. 4, n.º 2, pp. 127–159, Mar. 2017.
- [6] M. de los Ángeles Delgado Carrilo, C. García Lirios, y S. Mejía Rubio, «Especificación de un modelo para el estudio de la migración consensuada», *Revista Ehquidad*, n.º 9, pp. 33–49, ene. 2018.
- [7] M. Amemiya Ramírez, J. M. Bustos Aguayo, y C. García Lirios, «Confiabilidad y validez de un instrumento que mide el establecimiento de agenda hídrica local», *Realidades*, vol. 8, n.º 1, pp. 45–54, Aug. 2018.
- [8] J. Carreón Guillén, J. Hernández Valdés, M. de L. Morales Flores, y C. García Lirios, «Hacia la construcción de una esfera civil de seguridad e identidad pública», *Eleuthera*, vol. 9, pp. 99–115, Jul. 2013.
- [9] R. Z. Azagra & C. G. Ortega. “The topics of Spanish political leaders on Twitter. Analysis of the two electoral campaigns of 2015”. *ICONO 14, Magazine of communication and emerging technologies*, vol. 16, num. 1, p. 136-159. 2018
- [10] O. Bhandari, S. Subramaniam, M. J. Bourke, A. Alkandari, P. W. Y. Chiu, J. F. Brown & A. Repici, “Recovery of endoscopy services in the era of COVID-19: recommendations from an international Delphi consensus”. *Gut*, vol. 69, num. 11, p. 1915-1924. 2020

- [11] L. M. Gomez & C. Garcia Torres. "Twitter". *Colombian Journal of Anesthesiology*, vol. 38 num. 4, p. 539-540. 2010
- [12] J. Guallar & P. Traver. "Content curation in Twitter threads. Taxonomy and examples". *ThinkEPI Yearbook*, vol. 14, num. 1, p. 1-10 2020
- [13] F. Guerrero-Solé, L. Mas-Manchón & T. Aira. "The impact of the extreme right on Twitter during the 2019 Spanish elections". *Cuadernos. info*, vol. 51, num. 1, p. 223-245. 2022
- [14] T. T. Ho, K. D. Tran & Y. Huang. "FedSGDCOVID: Federated SGD COVID-19 detection under local differential privacy using chest X-ray images and symptom information". *Sensors*, vol. 22, num. 10, p. 3728. 2022
- [15] J. V. Lazarus, D. Romero, C. J. Kopka, S. A. Karim, I. J. Abu-Raddad, G. Almeida & A. El-Mohandes. "A multinational Delphi consensus to end the COVID-19 public health threat". *Nature*, vol. 611, num. 7935, p. 332-345. 2022
- [16] L. Montero Corrales. "Facebook and Twitter: a tour of the main lines of research". *Reflections Magazine*, vol. 97, num. 1, p. 39-52. 2018
- [17] D. Munblit, T. Nicholson, A. Akrami, C. Apfelbacher, J. Chen, W. De Groote & J. S. Ortiz. "A core outcome set for post-COVID-19 condition in adults for use in clinical practice and research: an international Delphi consensus study". *The Lancet Respiratory Medicine*. vol. 10, num. 7, p. 715-724, 2022
- [18] M. Nurek, C. Rayner, A. Freyer, S. Taylor, L. Järte, N. MacDermott & B. C. Delaney. "Recommendations for the recognition, diagnosis, and management of long COVID: a Delphi study". *British Journal of General Practice*, vol. 71, num. 712, p. e815-e825. 2021
- [19] R. Recuero, G. Zago & M. T. Bastos. "O Speech two# ProtestosBR: analysis of Twitter content". *Galaxia (São Paulo)*, vol. 14, num. 1, p. 199-216. 2014
- [20] J. B. Soriano, S. Murthy, J. C. Marshall, P. Relan & J. V. Diaz. "A clinical case definition of post-COVID-19 condition by a Delphi consensus". *The Lancet Infectious Diseases*, Vol. 22, num. 4, p. e102-e107. 2022
- [21] J. Carreón-Guillén, J. M. Bustos-Aguayo, F. R. Sandoval-Vázquez M. Juárez-Nájera, y C. García-Lirios, «Gobernanza en la era COVID -19: Expectativas sobre los servicios de agua», *Fi*, vol. 14, n.º 2, pp. 68–80, Jul. 2022.
- [22] J. C. Guillén, J. H. Valdés, and C. G. Lirios, "Diferencias perceptuales ante el riesgo a las aglomeraciones en el transporte público y concesionado", *Rev. DELOS*, vol. 7, no. 21, Dec. 2022.
- [23] J. Carreón Guillén, "Governance of Anti-COVID-19 Policies in A University in Central Mexico", *International Journal of Social Science and Humanities Studies*, vol. 1, no. 4, pp. 26–35, Jul. 2022.
- [24] J. Carreón Guillén, A. Blanes Ugalde, y C. García Lirios, «Redes de violencia en torno a la gobernanza de la seguridad pública», *100cs*, vol. 4, n.º 2, pp. 60-65, abr. 2018.
- [25] J. Carreón-Guillén, J. M. Bustos-Aguayo, y C. García-Lirios, «Modelo factorial exploratorio de la gobernanza ecocéntrica en la era COVID-19», *AJAYU*, vol. 21, n.º 1, pp. 74–90, Mar. 2023.
- [26] M. L. Q. Soto, "Adherence model to cervical cancer treatment in the Covid-19 era", *Baghdad Sci. J.*, vol. 20, no. 4(SI), pp. 1559–1569, Aug. 2023.
- [27] C. García Lirios, Francisco Espinoza Morales, and Javier Carreón Guillén, "Corporate reputation and intellectual capital formation", *sslej*, vol. 7, no. 07, pp. 135–142, Jul. 2022.
- [28] J. M. Bustos-Aguayo, "Modelling Sustainable Entrepreneurship in The Covid-19 Era", *jstard*, vol. 3, no. 2, pp. 23–34, Dec. 2021.
- [29] J. C. Guillén, J. M. B. Aguayo, F. R. S. Vázquez, and C. G. Lirios, "Ecocentric governance: Sustainability between the availability of resources and needs", *Int. J. Edu. Inno. Res.*, vol. 1, no. 1, pp. 52–63, Apr. 2022.