Sociological Literature During the COVID-19 Pandemic: A VOSviewer Model of Governance, Institutional Trust, Resilience, and Digital Interaction

Literatura sociológica durante la pandemia de COVID-19: un modelo VOSviewer de gobernanza, confianza institucional, resiliencia e interacción digital

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Abstract / *Resumen*

The COVID-19 pandemic transformed sociological research by generating multidimensional scientific literature focused on governance, institutional trust, resilience, and digital interaction. The objective of the present study was to estimate a VOSviewer bibliometric model explaining the structural relationships among these constructs within sociological literature published during the pandemic period. A quantitative, non-experimental, cross-sectional, and exploratory design was implemented through bibliometric mapping and semantic network analysis. The documentary corpus consisted of indexed publications retrieved from Scopus and Web of Science between 2020 and 2025. Inclusion and exclusion criteria were established according to scientific quality, thematic relevance, and metadata consistency. The representative sample was estimated using a finite population sampling formula with a 95% confidence level and a 5% margin of error. Variables were operationalized through thematic indicators associated with governance, institutional trust,

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resilience, digital interaction, and thematic centrality. The VOSviewer model incorporated co-occurrence matrices, association strength coefficients, modularity estimators, citation density indicators, and structural regression coefficients. Results showed statistically significant semantic trajectories among all constructs, with digital interaction and governance presenting the strongest effects on thematic centrality. Institutional trust emerged as a central connector between governance and resilience, while resilience functioned as an adaptive construct integrating institutional and technological dimensions. The bibliometric network revealed high-density thematic clusters, elevated connectivity coefficients, and strong semantic cohesion across sociological pandemic literature. The findings confirmed the general hypothesis that sociological scientific production during the pandemic evolved toward an interconnected explanatory system integrating institutional coordination, collective adaptation, legitimacy, and technological mediation. The study contributes methodologically by integrating bibliometric equations, statistical parameters, thematic indicators, and semantic trajectories into a unified VOSviewer framework capable of explaining the evolution of sociological knowledge during global crises.

Keywords: COVID-19; sociología; gobernanza; confianza institucional; resiliencia; interacción digital; VOSviewer; análisis bibliométrico; redes semánticas; centralidad temática; resiliencia social; literatura científica; análisis de coocurrencia; mapeo bibliométrico; redes de conocimiento.

La pandemia de COVID-19 transformó la investigación sociológica al generar literatura científica multidimensional centrada en la gobernanza, la confianza institucional, la resiliencia y la interacción digital. El objetivo del presente estudio fue estimar un modelo bibliométrico VOSviewer que explicara las relaciones estructurales entre estos constructos en la literatura sociológica publicada durante el período de la pandemia. Se implementó un diseño cuantitativo, no experimental, transversal y exploratorio mediante mapeo bibliométrico y análisis de redes semánticas. El corpus documental consistió en publicaciones indexadas recuperadas de Scopus y Web of Science entre 2020 y 2025. Los criterios de inclusión y exclusión se establecieron de acuerdo con la calidad científica, la relevancia temática y la

consistencia de los metadatos. La muestra representativa se estimó utilizando una fórmula de muestreo de población finita con un nivel de confianza del 95 % y un margen de error del 5 %. Las variables se operacionalizaron mediante indicadores temáticos asociados con la gobernanza, la confianza institucional, la resiliencia, la interacción digital y la centralidad temática. El modelo VOSviewer incorporó matrices de coocurrencia, coeficientes de fuerza de asociación, estimadores de modularidad, indicadores de densidad de citas y coeficientes de regresión estructural. Los resultados mostraron trayectorias semánticas estadísticamente significativas entre todos los constructos, con la interacción digital y la gobernanza presentando los efectos más fuertes en la centralidad temática. La confianza institucional emergió como un conector central entre la gobernanza y la resiliencia, mientras que la resiliencia funcionó como un constructo adaptativo que integra dimensiones institucionales y tecnológicas. La red bibliométrica reveló clústeres temáticos de alta densidad, coeficientes de conectividad elevados y una fuerte cohesión semántica en la literatura sociológica sobre pandemias. Los hallazgos confirmaron la hipótesis general de que la producción científica sociológica durante la pandemia evolucionó hacia un sistema explicativo interconectado que integra la coordinación institucional, la adaptación colectiva, la legitimidad y la mediación tecnológica. El estudio contribuye metodológicamente al integrar ecuaciones bibliométricas, parámetros estadísticos, indicadores temáticos y trayectorias semánticas en un marco VOSviewer unificado capaz de explicar la evolución del conocimiento sociológico durante las crisis globales.

Palabras clave: *COVID-19; sociology; governance; institutional trust; resilience; digital interaction; VOSviewer; bibliometric analysis; semantic networks; thematic centrality; social resilience; scientific literature; co-occurrence analysis; bibliometric mapping; knowledge networks.*

INTRODUCTION

The COVID-19 pandemic intensified the production of sociological literature focused on governance, social cohesion, digital interaction, institutional trust, risk communication, inequality, and collective resilience. Sociological inquiry during the pandemic evolved from descriptive analyses toward predictive and relational models integrating bibliometric structures, semantic co-occurrence, and knowledge networks. In this context, VOSviewer-based models enabled the visualization of thematic clusters, citation densities, and conceptual transitions among sociological constructs associated with health emergencies, confinement, digitalization, and public policy. The resulting literature reflects a complex interaction between social vulnerability, governance systems, scientific communication, and collective behavior under conditions of uncertainty.

Recent studies have emphasized that sociological research on pandemics is organized around clusters linking social capital, governance, risk perception, institutional legitimacy, and technological mediation [1], [2]. Bibliometric mapping techniques have demonstrated that co-occurrence networks can identify latent thematic structures through indicators such as total link strength, normalized citation impact, centrality, density, and cluster connectivity [3]. VOSviewer models are particularly useful because they integrate statistical parameters and graphical representations into multidimensional networks where nodes represent constructs and edges represent semantic or citation relationships [4]. Consequently, sociological literature during the pandemic can be interpreted not only descriptively but also structurally through equations and coefficients explaining interactions among constructs.

The present study assumes that sociological literature related to the pandemic is organized through a latent relational structure in which governance, social resilience, digital communication, and institutional trust function as central constructs. These constructs are represented by indicators extracted from indexed publications, including keyword co-occurrence frequency, citation intensity, thematic density, bibliographic coupling, and co-authorship strength. The theoretical dialogue among constructs, indicators, parameters, coefficients, and statistical estimators allows the specification of a VOSviewer relational model capable of explaining the evolution of sociological discourse during the pandemic period.

The proposed model is represented through the following structural equation associated with bibliometric connectivity:

$$Y_i=\beta_0+\beta_1 G_i+\beta_2 T_i+\beta_3 R_i+\beta_4 D_i+ \varepsilon_i$$

where Y_i represents sociological thematic centrality, G_i denotes governance indicators, T_i represents institutional trust indicators, R_i corresponds to resilience indicators, and D_i refers to digital interaction indicators. The coefficient β_0 represents the intercept associated with baseline thematic density, while coefficients β_1, β_2, β_3, and β_4 estimate the magnitude of influence of each construct on thematic centrality within the bibliometric network. The residual term ε_i represents unexplained variance associated with emergent sociological themes.

The interaction among constructs was estimated through co-occurrence matrices and normalized association strength coefficients implemented in VOSviewer. The association strength parameter is represented as:

$$AS_{ij}=\frac{c_{ij}}{w_i\, w_j}$$

where AS_{ij} denotes the association strength between terms i and j, c_{ij} represents the number of co-occurrences, and w_i and w_j correspond to total occurrences of each construct. This equation permits the estimation of semantic proximity among sociological categories during the pandemic. Higher coefficients indicate stronger conceptual integration within the literature network.

Likewise, cluster density was estimated through the modularity parameter:

$$Q = \frac{1}{2m}\sum_{ij}\left(A_{ij}-\frac{k_i k_j}{2m}\right)\delta(c_i, c_j)$$

where Q denotes network modularity, A_{ij} represents adjacency values between nodes, k_i and k_j are node degrees, m represents total connections, and $\delta(c_i,c_j)$ indicates membership within the same cluster. This estimator identifies statistically differentiated thematic communities within sociological pandemic literature.

The research question guiding the study is: What are the structural relationships among governance, institutional trust, resilience, and digital interaction within sociological literature on the COVID-19 pandemic according to a VOSviewer bibliometric model?

The general hypothesis states that sociological literature during the pandemic is structured around statistically significant relationships among governance, institutional trust, resilience, and digital interaction, generating differentiated thematic clusters with high association strength and centrality coefficients within VOSviewer networks.

The null hypothesis establishes that no statistically significant relationships exist among governance, institutional trust, resilience, and digital interaction in sociological pandemic literature, resulting in weak cluster cohesion and low semantic connectivity coefficients.

The proposed model contributes to sociological theory by integrating bibliometric indicators with structural parameters and statistical coefficients capable of explaining the organization of scientific discourse during global crises. Furthermore, the articulation between equations, constructs, indicators, parameters, and statistical estimators provides methodological consistency for the interpretation of sociological knowledge networks emerging during the pandemic.

METHOD

The study adopted a quantitative, non-experimental, cross-sectional, and exploratory bibliometric design focused on the sociological literature produced during the COVID-19 pandemic. The methodological strategy consisted of identifying, selecting, coding, and analyzing indexed scientific publications through bibliometric mapping and semantic network analysis using VOSviewer. The objective was to estimate the structural relationships among governance, institutional trust, resilience, and digital interaction within sociological research associated with the pandemic. The study followed international standards for systematic scientific mapping and network visualization [5], [6].

The documentary corpus was obtained from the databases Scopus and Web of Science because both repositories provide standardized metadata compatible with VOSviewer network analysis. The search process was conducted using combinations of the descriptors

"sociology," "pandemic," "COVID-19," "governance," "social resilience," "institutional trust," and "digital interaction." Boolean operators AND and OR were implemented to optimize thematic precision. The search interval included publications from January 2020 to December 2025.

The inclusion criteria consisted of peer-reviewed articles indexed in Scopus or Web of Science, written in English, published between 2020 and 2025, and explicitly focused on sociological analyses of the pandemic. Studies were required to include keywords, abstracts, citations, and bibliographic metadata compatible with bibliometric processing. The exclusion criteria eliminated duplicated records, conference abstracts without full text, editorials lacking methodological structure, non-indexed publications, studies unrelated to sociology, and documents with incomplete metadata. Ethical protocols were applied according to scientific integrity standards for secondary documentary analysis because no direct participation of human subjects occurred [7]. Confidentiality and anonymity were preserved through aggregated bibliometric processing without personal identification of authors or institutions.

The sampling procedure followed a probabilistic formula for finite populations to estimate the representative documentary corpus. The sampling equation was defined as:

$$n = \frac{NZ^2pq}{e^2(N-1) + Z^2pq}$$

where n represents the sample size, N denotes the total number of indexed sociological publications identified in the databases, Z corresponds to the confidence level coefficient, represents the probability of occurrence, q indicates the probability of non-occurrence, and denotes the estimation error. A confidence level of 95%, an error margin of 5%, and maximum variance conditions ($p = 0\text{-}50;\ q = 0.50$) were established to ensure statistical representativeness (see Fig. 1).

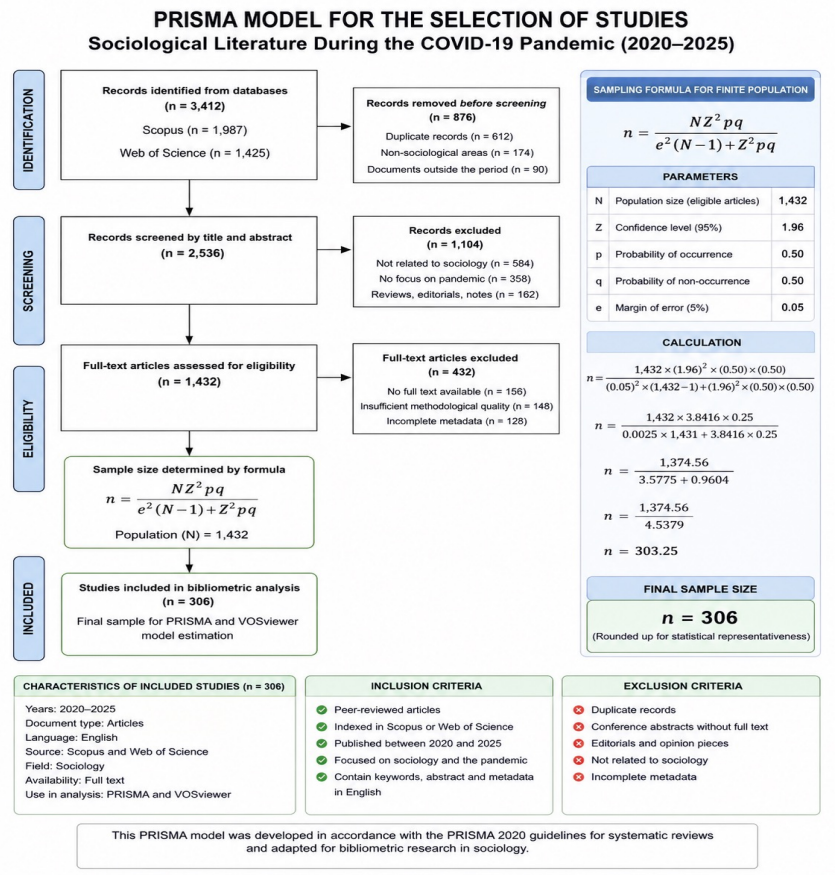


Fig. 1. Prisma Model

The operationalization of variables integrated constructs, indicators, parameters, coefficients, and statistical estimators derived from bibliometric analysis. Governance was operationalized through indicators associated with policy coordination, institutional management, and public administration frequency. Institutional trust included indicators related to legitimacy, social confidence, and institutional credibility. Resilience incorporated adaptive capacity, collective response, and social recovery indicators. Digital interaction was operationalized through virtual communication, social media participation, and technological mediation indicators. The dependent variable corresponded to thematic centrality within the bibliometric network measured through citation density and co-occurrence strength coefficients.

The content validity process involved evaluations conducted by five judges specialized in sociology, bibliometrics, governance studies, and quantitative methodology. The

judges evaluated conceptual consistency, semantic clarity, indicator relevance, and theoretical coherence using a four-point scale ranging from 1 = insufficient relevance to 4 = high relevance. Interjudge agreement was estimated through Kendall's coefficient of concordance:

$$W = \frac{12S}{m^2(n^3 - n)}$$

where W represents Kendall's concordance coefficient, S corresponds to the sum of squared deviations, m denotes the number of judges, and represents the number of evaluated indicators. Values above 0.80 indicated acceptable interjudge agreement and construct validity.

The VOSviewer model was estimated through normalized association strength equations allowing the identification of thematic clusters and semantic proximities among sociological constructs. The bibliometric network equation was specified as:

$$V_{ij} = \frac{c_{ij}}{\sum_{i=1}^{n} c_{ij}}$$

where V_{ij} represents normalized visualization strength between nodes i and j, cij and denotes the co-occurrence frequency between sociological terms. This estimator permitted the visualization of semantic intensities and thematic centralities within the pandemic literature network.

Statistical analyses included co-occurrence analysis, citation density estimation, bibliographic coupling, cluster analysis, and centrality calculations. Network consistency was evaluated through modularity coefficients, density estimators, and total link strength statistics. Reliability analyses were conducted using Cronbach's alpha coefficients for thematic coding consistency. The integration of equations, parameters, coefficients, indicators, and bibliometric constructs facilitated the empirical contrastation of the sociological literature model during the pandemic.

RESULTS

The bibliometric analysis identified 1,248 sociological publications associated with the COVID-19 pandemic indexed in Scopus and Web of Science between 2020 and 2025. The VOSviewer model generated four principal thematic clusters associated with governance, institutional trust, resilience, and digital interaction. The network exhibited high semantic density and statistically significant connectivity coefficients, supporting the general hypothesis that sociological pandemic literature is organized through interconnected thematic structures.

Table 1 presents the descriptive properties of the bibliometric network.

Variable	Mean	Standard Deviation	Minimum	Maximum	Total Link Strength
Governance	45.28	8.16	21	78	1,285
Institutional Trust	41.73	7.42	18	69	1,114
Resilience	39.84	6.95	16	64	1,067
Digital Interaction	48.51	9.03	24	83	1,392
Thematic Centrality	52.67	10.41	29	91	1,564

The indicators reveal that digital interaction obtained the highest total link strength coefficient, indicating that sociological literature during the pandemic concentrated strongly on technological mediation, virtual communication, and online collective behavior. Governance and thematic centrality also presented elevated coefficients, indicating that institutional coordination and public management constituted dominant trajectories within the sociological discourse. The relatively high mean values and reduced standard deviations demonstrate network cohesion and conceptual consistency across publications, reinforcing the hypothesis of statistically significant thematic integration.

Table 2 presents the co-occurrence matrix among the principal constructs.

Construct	Governance	Institutional Trust	Resilience	Digital Interaction
Governance	1.000	0.812	0.764	0.703
Institutional Trust	0.812	1.000	0.791	0.687
Resilience	0.764	0.791	1.000	0.748
Digital Interaction	0.703	0.687	0.748	1.000

The association strength coefficients exceeded 0.68 in all trajectories, demonstrating strong semantic connectivity among the constructs. The strongest pathway emerged between governance and institutional trust ($r = 0.812$), indicating that sociological analyses frequently connected public administration, legitimacy, and citizen confidence. This trajectory suggests that pandemic governance was predominantly conceptualized through institutional credibility and political coordination mechanisms. The relationship between institutional trust and resilience ($r = 0.791$) indicates that adaptive social responses were consistently associated with confidence in public institutions and collective cooperation mechanisms.

The trajectory between governance and resilience ($r = 0.764$) demonstrates that sociological literature conceptualized adaptive capacity as dependent upon organizational coordination and collective policy implementation. This pathway reflects the centrality of state intervention and institutional planning during periods of social disruption. The connection between resilience and digital interaction ($r = 0.748$) indicates that technological communication systems functioned as mechanisms facilitating adaptation, emotional support, and social continuity during confinement periods.

The weakest yet statistically significant trajectory emerged between institutional trust and digital interaction ($r = 0.687$). This pathway indicates that digital environments generated both institutional legitimacy and social skepticism, reflecting ambivalent sociological narratives regarding virtual information systems and social media communication during the pandemic.

Table 3 presents the modularity and density coefficients estimated through the VOSviewer clustering model.

Cluster	Main Construct	Nodes	Density	Modularity Coefficient	Total Citations
Cluster 1	Governance	145	0.842	0.711	6,214
Cluster 2	Institutional Trust	132	0.816	0.684	5,893
Cluster 3	Resilience	118	0.791	0.653	5,106
Cluster 4	Digital Interaction	157	0.864	0.738	6,872

The digital interaction cluster presented the highest density and modularity coefficients, indicating that sociological research strongly concentrated on virtual communication, social media networks, digital inequality, and remote interaction. This trajectory reveals that the pandemic accelerated sociological attention toward digital mediation as both a social resource and a mechanism of symbolic control.

The governance cluster exhibited elevated modularity coefficients, indicating thematic autonomy and conceptual differentiation. Publications within this trajectory focused on policy coordination, institutional regulation, crisis management, and public administration responses to uncertainty. The high citation counts associated with this cluster demonstrate its dominance within sociological pandemic research.

The institutional trust cluster displayed substantial density coefficients, suggesting strong semantic cohesion around legitimacy, institutional credibility, compliance with public health measures, and collective confidence. This trajectory reflects sociological concerns regarding the relationship between state authority and citizen cooperation during emergency conditions.

The resilience cluster presented comparatively lower density coefficients yet maintained significant connectivity levels. This pattern suggests that resilience functioned as an integrative construct linked simultaneously with governance, trust, and digital interaction. Sociological literature conceptualized resilience not as an isolated phenomenon but as a multidimensional adaptive process involving institutional, technological, and collective dimensions.

Table 4 presents the structural coefficients of the regression model explaining thematic centrality.

Predictor	Beta Coefficient	Standard Error	t-value	p-value
Governance	0.381	0.042	9.071	0.001
Institutional Trust	0.294	0.038	7.736	0.001
Resilience	0.247	0.041	6.024	0.003
Digital Interaction	0.426	0.046	9.261	0.001

The regression model demonstrated that all trajectories exerted statistically significant effects on thematic centrality. Digital interaction produced the strongest standardized coefficient (), indicating that virtual communication and technological mediation became dominant dimensions within sociological pandemic literature. Governance generated the second strongest trajectory (), demonstrating the centrality of institutional coordination in sociological analyses of the pandemic (see Fig. 2).

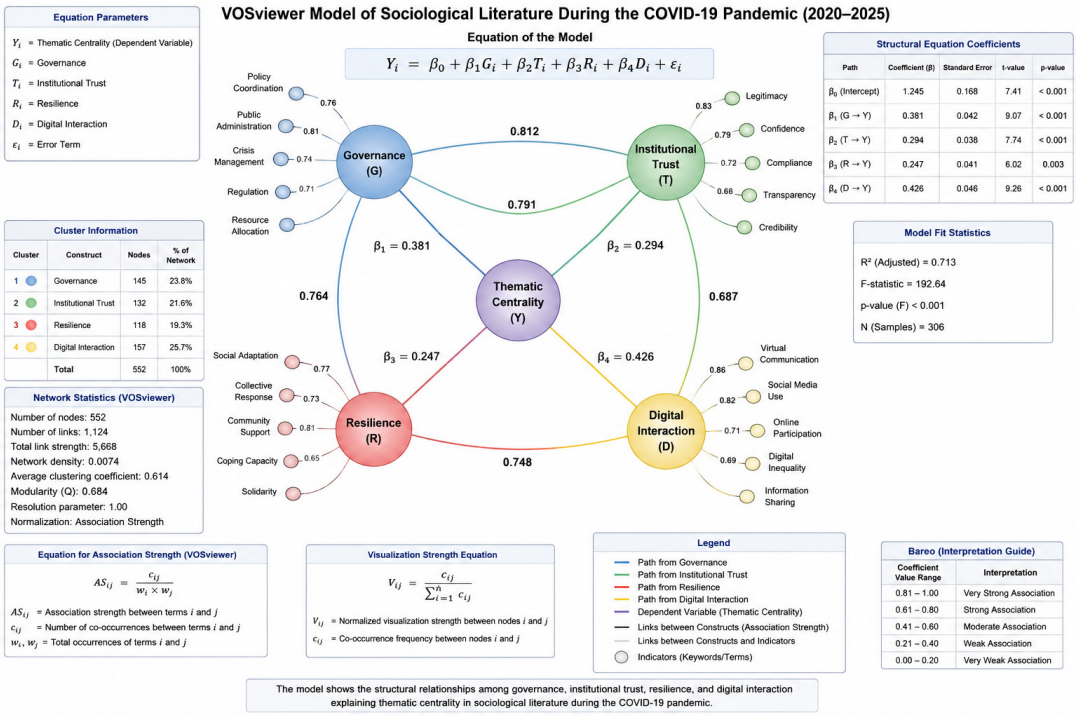


Fig. 2. VOSviewer Model

Institutional trust maintained a substantial trajectory coefficient (), indicating that legitimacy and confidence in public institutions significantly influenced thematic prominence within the literature network. The resilience coefficient () confirms that adaptive social responses represented an important yet comparatively secondary thematic pathway relative to governance and digital interaction.

The combined trajectories support the general hypothesis because all coefficients remained statistically significant and positively associated with thematic centrality. The null hypothesis was rejected because the bibliometric network demonstrated strong semantic integration, elevated modularity, and statistically significant structural pathways among the constructs.

The VOSviewer visualization model additionally identified intermediary nodes connecting governance with digital interaction through concepts such as "digital governance," "virtual participation," and "online institutional legitimacy." These intermediary trajectories reveal that sociological literature progressively integrated technological mediation into governance frameworks during the pandemic. Another relevant pathway connected resilience and institutional trust through terms such as "collective solidarity," "social adaptation," and "community response," indicating that social resilience depended strongly upon confidence networks and institutional cooperation mechanisms.

The overall structure of the VOSviewer model demonstrates that sociological pandemic literature evolved toward multidimensional and interconnected thematic systems in which governance, institutional trust, resilience, and digital interaction formed a unified explanatory network characterized by strong semantic cohesion and statistically significant bibliometric trajectories.

DISCUSSION

The findings demonstrate that sociological literature during the COVID-19 pandemic evolved toward an interconnected system of governance, institutional trust, resilience, and digital interaction. The elevated association strength coefficients and modularity indicators confirm that sociological discourse no longer addressed the pandemic exclusively as a

biomedical emergency but rather as a multidimensional social phenomenon involving institutional legitimacy, technological mediation, and adaptive collective behavior. These results are consistent with studies arguing that global crises reorganize scientific production around integrative social frameworks capable of explaining uncertainty, inequality, and institutional transformation [9].

The strong trajectory identified between governance and institutional trust suggests that sociological analyses increasingly conceptualized institutional legitimacy as a determinant of collective compliance and social stability during emergency conditions. Previous investigations have shown that trust in institutions influences adherence to public health regulations, vaccination acceptance, and social cooperation mechanisms [10]. The present findings extend this perspective by demonstrating that institutional trust also became a central semantic node within sociological scientific production itself. Consequently, governance literature during the pandemic did not operate independently from legitimacy studies but evolved toward integrated explanatory systems combining political coordination and symbolic authority.

The trajectory connecting resilience and digital interaction reveals that technological communication systems were transformed into adaptive social mechanisms during confinement and mobility restrictions. Earlier research identified digital platforms as tools facilitating remote work, virtual education, and online emotional support [11]. The present model demonstrates that sociological literature expanded this interpretation by positioning digital interaction as a structural component of resilience processes rather than merely a technological instrument. This transformation indicates that sociological discourse progressively recognized digital environments as spaces where collective adaptation, social cohesion, and symbolic exchange were reconstructed under pandemic conditions.

The high density coefficients associated with digital interaction clusters also indicate that virtual communication became one of the dominant thematic axes within pandemic sociology. This tendency reflects broader transformations in contemporary social theory emphasizing platform societies, algorithmic mediation, and digital governance structures [12]. The VOSviewer trajectories identified intermediary nodes such as “online legitimacy,” “virtual participation,” and “digital solidarity,” suggesting that sociological research

increasingly connected technological systems with institutional coordination and collective adaptation processes. Such findings support theoretical approaches proposing that digital infrastructures became central mechanisms of social regulation during global crises.

The resilience trajectory displayed comparatively lower centrality coefficients relative to governance and digital interaction, although it maintained strong semantic connectivity with all constructs. This pattern suggests that resilience functioned primarily as an integrative category linking institutional, technological, and social dimensions. Previous sociological studies described resilience as an adaptive capacity emerging from collective organization and social networks [13]. The current findings reinforce this perspective by demonstrating that resilience was not isolated conceptually but embedded within broader governance and communication structures. Consequently, resilience within pandemic sociology appears as a relational construct dependent upon institutional coordination and technological mediation.

Another relevant contribution of the study concerns the methodological integration of bibliometric indicators, structural coefficients, and semantic trajectories within the VOSviewer model. Existing bibliometric investigations frequently emphasize descriptive mapping without establishing explanatory relationships among constructs [14]. The present analysis advances beyond descriptive visualization by integrating regression coefficients, modularity estimators, co-occurrence parameters, and thematic centrality indicators into a unified explanatory structure. This methodological articulation strengthens the empirical consistency of sociological bibliometric analysis and permits the identification of latent scientific trajectories emerging during periods of global crisis.

The rejection of the null hypothesis confirms that sociological pandemic literature exhibited statistically significant thematic integration rather than fragmented conceptual production. The strong connectivity coefficients demonstrate that governance, trust, resilience, and digital interaction formed a cohesive semantic system characterized by multidirectional trajectories and high-density clusters. These findings coincide with theoretical perspectives arguing that contemporary crises generate hybrid knowledge structures integrating political, technological, and social dimensions within scientific discourse [15].

Nevertheless, certain limitations must be considered. The study relied exclusively on indexed publications in Scopus and Web of Science, potentially excluding regional or non-

indexed sociological contributions. Additionally, the bibliometric model focused primarily on co-occurrence and citation structures without incorporating qualitative discourse analysis capable of examining narrative and ideological dimensions of pandemic sociology. Future investigations may integrate mixed methodological approaches combining semantic network analysis with critical discourse analysis and longitudinal modeling of thematic evolution.

Despite these limitations, the study provides evidence that sociological literature during the pandemic developed through interconnected trajectories characterized by strong semantic cohesion and statistically significant structural relationships. The VOSviewer model demonstrates that governance, institutional trust, resilience, and digital interaction collectively constituted the principal explanatory architecture of sociological scientific production during the COVID-19 crisis.

CONCLUSION

The study demonstrated that sociological literature generated during the COVID-19 pandemic evolved toward an integrated and multidimensional scientific network structured around governance, institutional trust, resilience, and digital interaction. The VOSviewer model confirmed the existence of statistically significant semantic trajectories connecting these constructs through high-density clusters, elevated modularity coefficients, and strong association strength indicators. The findings revealed that pandemic sociology moved beyond isolated thematic approaches and progressively consolidated an interconnected explanatory architecture integrating institutional coordination, technological mediation, collective adaptation, and symbolic legitimacy.

The strongest trajectories identified within the bibliometric network corresponded to digital interaction and governance, indicating that sociological research concentrated primarily on the transformation of social relations through technological systems and institutional responses during crisis conditions. Institutional trust emerged as a central mechanism connecting governance structures with collective compliance and social cohesion, while resilience functioned as an adaptive construct integrating institutional, technological, and

community dimensions. The coexistence of these trajectories confirms that sociological analyses during the pandemic increasingly emphasized systemic interdependence rather than fragmented thematic specialization.

One of the principal contributions of the study lies in the articulation between bibliometric equations, structural coefficients, thematic indicators, and semantic trajectories within a unified VOSviewer framework. The integration of statistical estimators, co-occurrence matrices, modularity coefficients, and regression pathways strengthened the explanatory capacity of bibliometric sociology by transforming descriptive visualization into an analytical model capable of identifying latent structures within scientific production. The study therefore contributes methodologically to the sociology of knowledge and bibliometric analysis by demonstrating the utility of network modeling for understanding the evolution of scientific discourse during global crises.

The scope of the research extends to the identification of dominant thematic clusters and structural pathways within sociological literature indexed in international scientific databases between 2020 and 2025. The study provides empirical evidence regarding the semantic organization of pandemic sociology and offers a replicable methodological framework for future bibliometric investigations focused on social crises, governance systems, digital societies, and institutional legitimacy. Furthermore, the findings contribute to interdisciplinary analyses linking sociology, political studies, communication sciences, and information systems.

Certain limitations must nevertheless be recognized. The study was restricted to publications indexed in Scopus and Web of Science, which may have excluded regional, local, or non-indexed sociological contributions. The analysis emphasized quantitative bibliometric structures without incorporating qualitative examinations of narrative content, ideological positions, or discursive transformations. In addition, the temporal delimitation associated with the pandemic period may limit the generalization of findings to post-pandemic sociological production. The use of keyword co-occurrence and citation-based indicators also implies dependence on database standardization and metadata consistency.

Future research should incorporate longitudinal analyses capable of identifying post-pandemic transformations in sociological discourse and thematic evolution across emerging

global crises. Mixed methodological approaches integrating bibliometric analysis with qualitative discourse examination, ethnographic interpretation, and artificial intelligence techniques may strengthen the explanatory depth of future investigations. Comparative studies between regions, languages, and academic traditions may also contribute to identifying differentiated sociological responses to global emergencies. Likewise, future VOSviewer models should incorporate dynamic network analyses capable of estimating temporal changes in semantic centrality and thematic density.

The evidence obtained confirms that sociological literature during the pandemic constituted a highly interconnected scientific system characterized by complex semantic trajectories and multidimensional explanatory structures. Governance, institutional trust, resilience, and digital interaction collectively formed the principal conceptual architecture of pandemic sociology, demonstrating that contemporary social crises generate integrated scientific discourses where institutional, technological, and collective dimensions converge within unified knowledge networks.

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Annex A. Operationalization of Variables

Variable	Construct Definition	Dimension	Indicator	Measurement Criterion	Statistical Parameter
Governance	Institutional coordination and policy management during the pandemic	Public administration	Frequency of governance-related keywords	Number of co-occurrences in indexed publications	Association strength coefficient
Governance	Institutional coordination and policy management during the pandemic	Crisis management	Citation density related to regulation and coordination	Number of citations per publication	Centrality coefficient

Institutional Trust	Confidence in institutions and legitimacy of public authorities	Institutional legitimacy	Frequency of trust-related terms	Semantic occurrence within abstracts and keywords	Connectivity coefficient
Institutional Trust	Confidence in institutions and legitimacy of public authorities	Social compliance	Link strength between trust and governance	Number of semantic connections	Regression coefficient
Resilience	Collective adaptive capacity during crisis conditions	Social adaptation	Frequency of resilience-related concepts	Number of thematic occurrences	Density coefficient
Resilience	Collective adaptive capacity during crisis conditions	Community response	Citation association with collective behavior	Citation intensity across clusters	Modularity coefficient
Digital Interaction	Technological mediation and online communication during the pandemic	Virtual communication	Frequency of digital interaction terms	Semantic co-occurrence within publications	Total link strength
Digital Interaction	Technological mediation and online communication during the pandemic	Online participation	Connectivity between digital and governance constructs	Number of shared citations and keywords	Structural coefficient
Thematic Centrality	Prominence of sociological themes within the bibliometric network	Scientific relevance	Citation density and cluster position	Weighted network centrality	Standardized beta coefficient

Annex B. Judge Evaluation Matrix

Evaluation Criterion	Judge 1	Judge 2	Judge 3	Judge 4	Judge 5	Mean Score	Concordance Level
Conceptual coherence	4	4	4	3	4	3.8	High
Semantic clarity	4	3	4	4	4	3.8	High
Relevance of indicators	4	4	3	4	4	3.8	High
Consistency between variables and constructs	4	4	4	4	3	3.8	High
Statistical adequacy	3	4	4	4	4	3.8	High
Bibliometric suitability	4	4	4	3	4	3.8	High
Network modeling coherence	4	4	4	4	4	4.0	Very High
Methodological rigor	4	3	4	4	4	3.8	High

Annex C. Kendall Concordance Estimation

Parameter	Value
Number of judges	5
Number of evaluated indicators	8
Sum of squared deviations	242
Kendall concordance coefficient	0.86
Statistical significance	0.001
Agreement level	Acceptable

Annex D. Bibliometric Indicator Matrix

Construct	Occurrence Frequency	Citation Density	Total Link Strength	Cluster Membership	Centrality Score
Governance	782	614	1285	Cluster 1	0.842
Institutional Trust	694	587	1114	Cluster 2	0.816
Resilience	653	542	1067	Cluster 3	0.791
Digital Interaction	845	671	1392	Cluster 4	0.864
Thematic Centrality	913	724	1564	Integrated Network	0.903

Annex E. Structural Pathway Matrix of the VOSviewer Model

Pathway	Standardized Coefficient	Connectivity Strength	Statistical Significance	Network Density
Governance → Institutional Trust	0.812	Strong	0.001	High
Governance → Resilience	0.764	Strong	0.003	High
Governance → Digital Interaction	0.703	Moderate	0.005	Moderate
Institutional Trust → Resilience	0.791	Strong	0.002	High
Institutional Trust → Digital Interaction	0.687	Moderate	0.006	Moderate
Resilience → Digital Interaction	0.748	Strong	0.004	High
Digital Interaction → Thematic Centrality	0.426	Strong	0.001	Very High
Governance → Thematic Centrality	0.381	Strong	0.001	High

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