

# A new opportunity for network science: Digital humanities

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to be best in  
point of view.  
**Translation**  
another language;  
language foreign to  
written communication  
right



What are Digital Humanities?



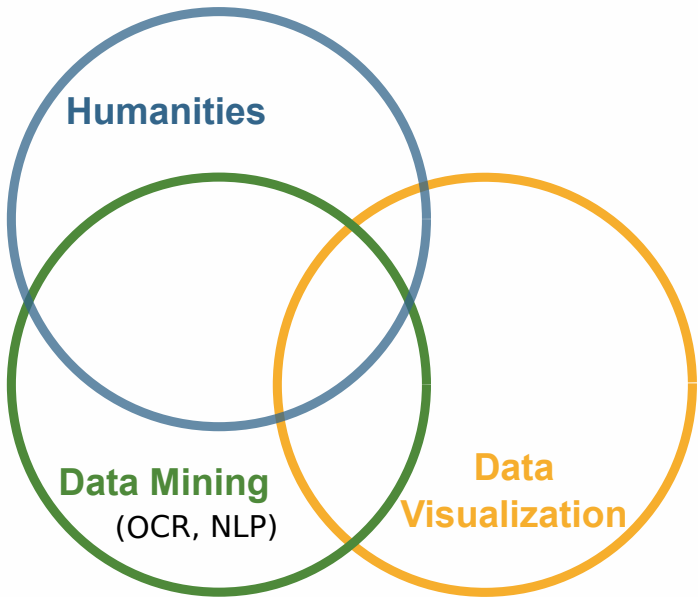
**Humanities**



**Humanities**

A Venn diagram consisting of two overlapping circles. The top circle is blue and labeled 'Humanities'. The bottom circle is green and labeled 'Data Mining (OCR, NLP)'. The two circles overlap in the center.

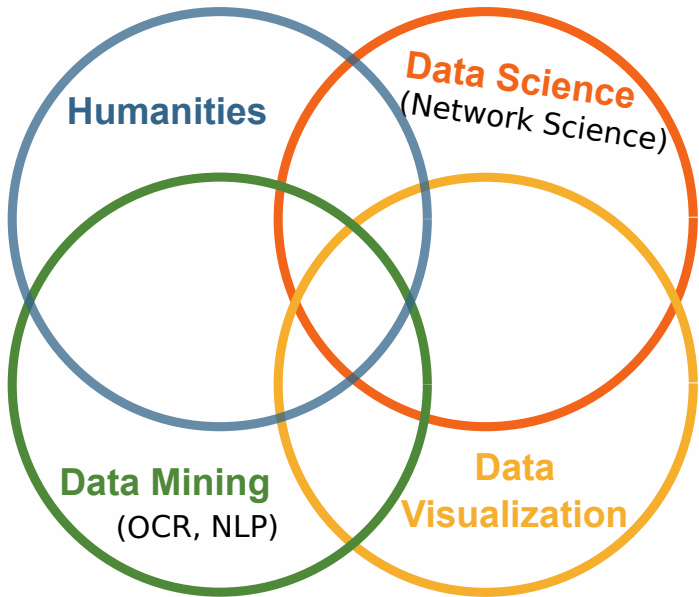
**Data Mining**  
(OCR, NLP)



**Humanities**

**Data Mining**  
(OCR, NLP)

**Data  
Visualization**



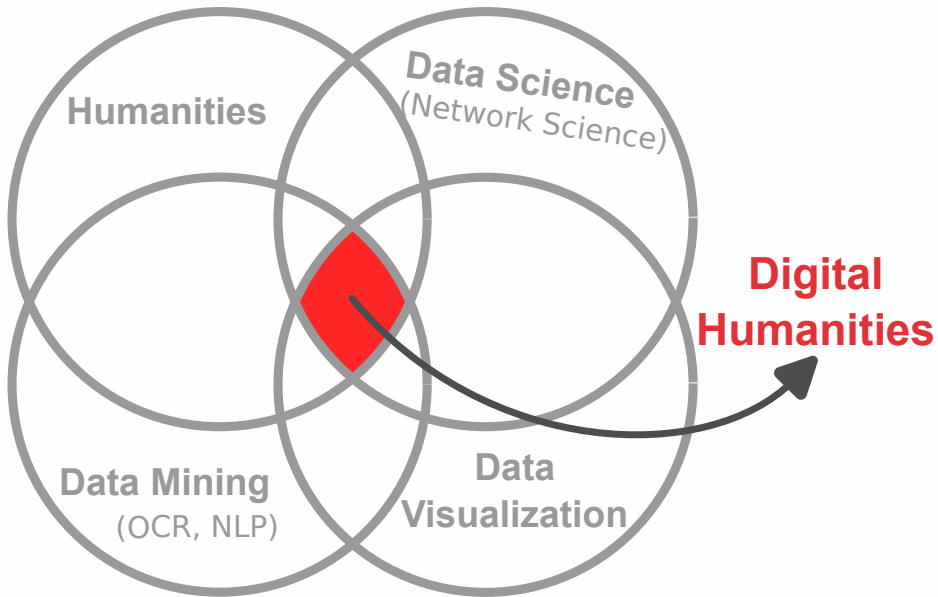
**Humanities**

**Data Science**  
(Network Science)

**Data Mining**  
(OCR, NLP)

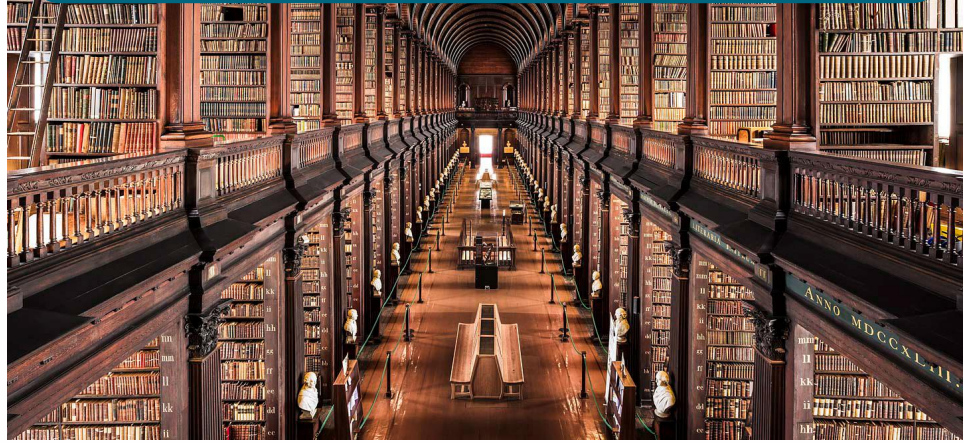
**Data Visualization**







How networks can help us in addressing research questions *relevant for scholars working in art and humanities?*



- Translation flows in Ibero-American periodicals.

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- Women marginalization in Ibero-American film culture.

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- Women marginalization in Ibero-American film culture.
- Geopolitics of intellectual cooperation during the interwar period.

to be best in any  
point of view.

# Translation

Translation flows in  
Ibero-American periodicals

written commu

## Dataset

- A collection of  $\approx 31,500$  contributions (records) published in 42 modernist periodicals during the first half of the XX<sup>th</sup> century.

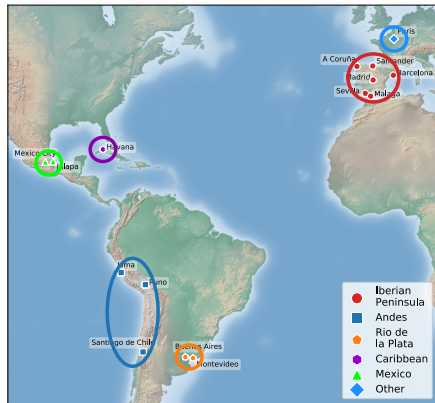




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- We select only **translated contributions** (*i.e.*, 981 records).

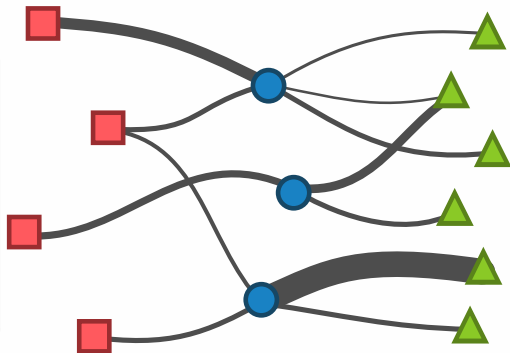
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- We group periodicals into regions (Iberian peninsula, Andes, Rio de la Plata, etc.)
- We select only **translated contributions** (*i.e.*, 981 records).
- For each record, we consider its **publication's region**, **original language**, and the **author's country of origin**.

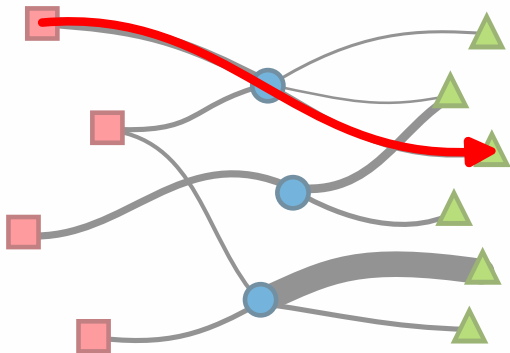
# Methods

- We build a tri-partite *weighted* network whose nodes are:
  - **countries of origin,**
  - **languages,**
  - **regions.**

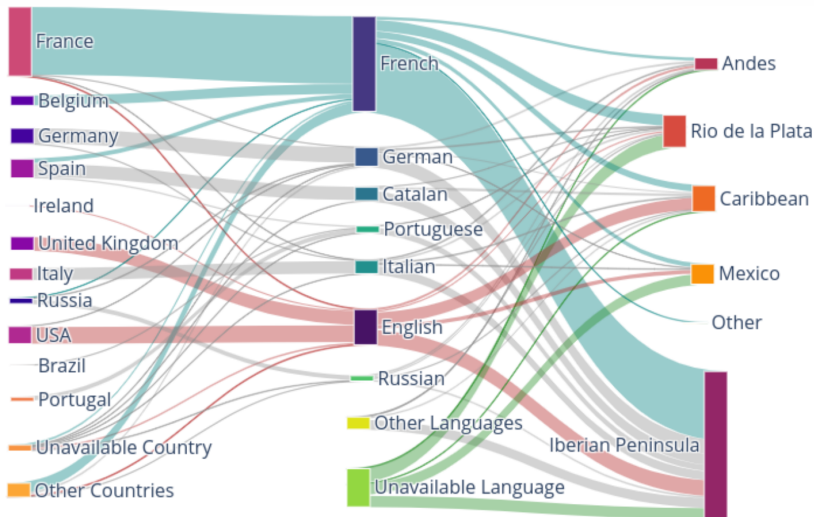


# Methods

- We build a tri-partite *weighted* network whose nodes are:
  - countries of origin,
  - languages,
  - regions.
- We analyze the network to study the **flows of translation** (*i.e.*, who is translating what).

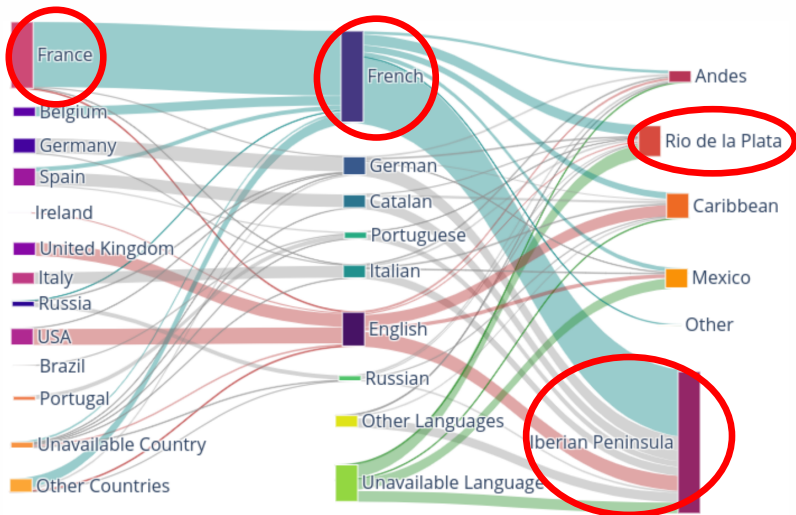


# Results



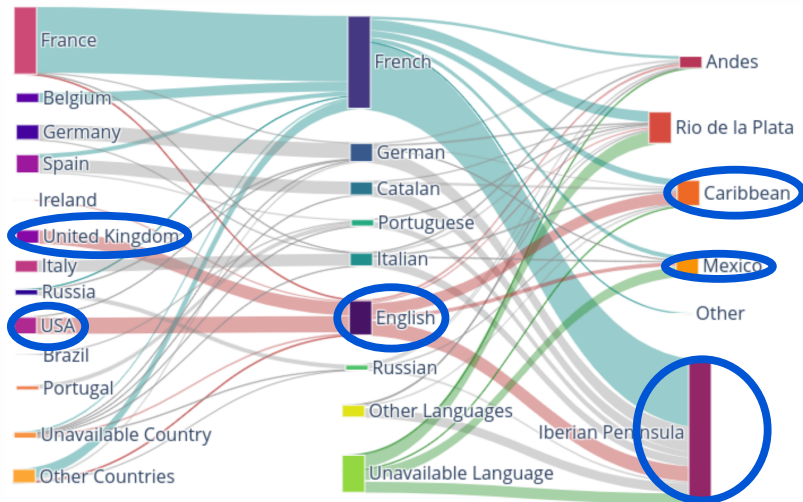
• D. Roig-Sanz *et al.* in Humanities and Big Data in Ibero-America: Theory, methodology and practical applications, De Gruyter (2024) DOI: 10.1515/9783110753523-011.

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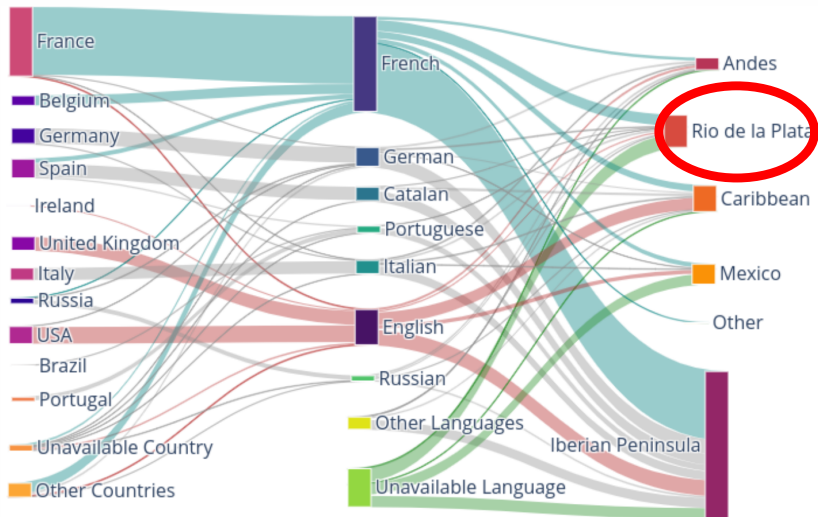
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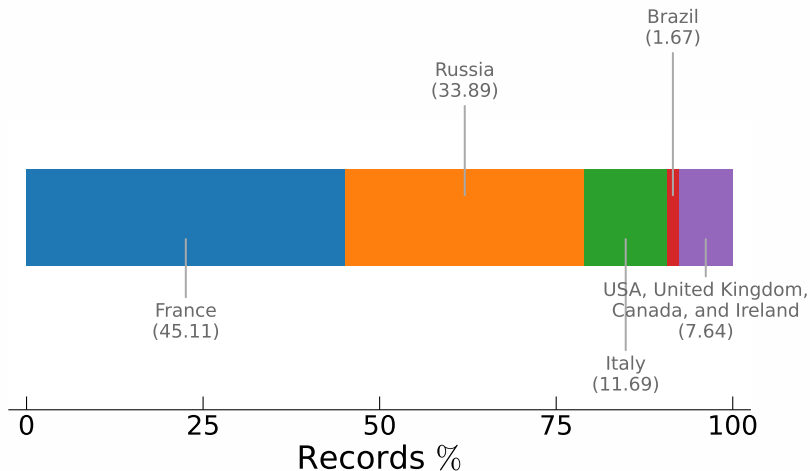


# Results



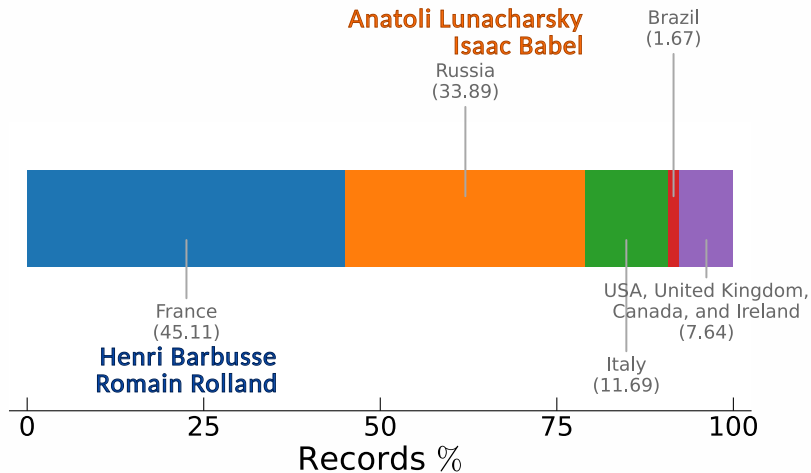
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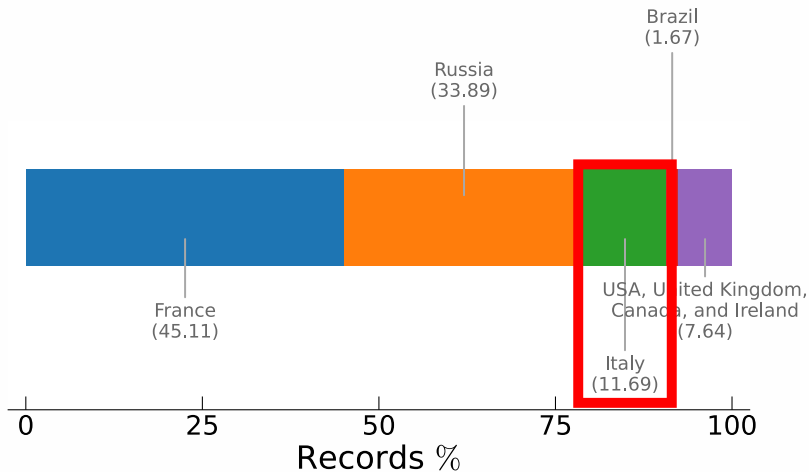
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**Women marginalization  
in Ibero-American film culture**



- Attendees at a screening in a private film club at Fernando Pereda e Isabel Gilbert house in 1938 in Montevideo (Uruguay). Source: <https://tinyurl.com/26s4m83y>



How **central** (especially in a *diffusion context*) were women in the field of film culture?

**Manually collected** (*follow the actor*) relationships between people **associated with film culture** during the first half of XX<sup>th</sup> century based on:

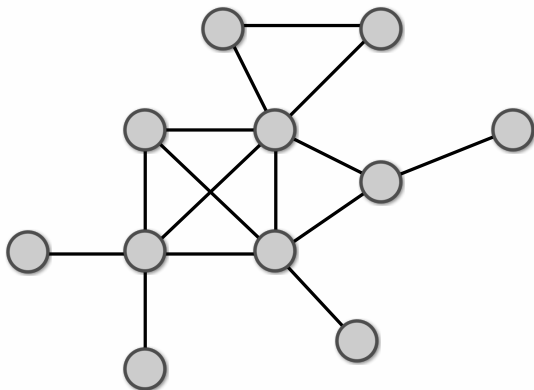
- participation to events (*e.g.*, projections),
- involvement in collective bodies (*e.g.*, a cineclub),
- editorial relationships (*e.g.*, publication in a specialized periodical),
- personal relationships (*e.g.*, friendship),
- epistolary correspondence.

Translating into an unweighted network with  $N = 1367$  nodes (women and men).



## Methods ( $k$ -core decomposition)

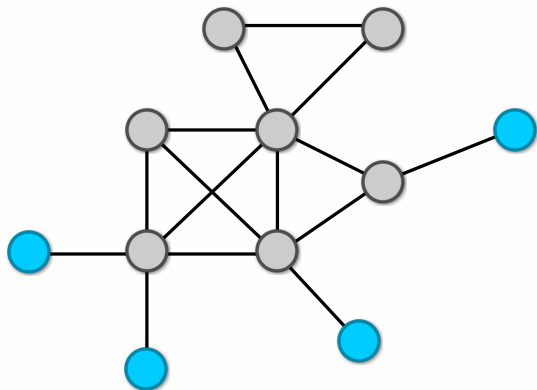
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- S. B. Seidman, *Social Networks*, **5**, 269–287, (1983). DOI: [10.1016/0378-8733\(83\)90028-X](https://doi.org/10.1016/0378-8733(83)90028-X)
- M. Kitsak *et al.*, *Nature Physics*, **6**, 888–893, (2010). DOI: [10.1038/nphys1746](https://doi.org/10.1038/nphys1746)

## Methods ( $k$ -core decomposition)


  $k$ -shell 1 ( $k_s = 1$ )

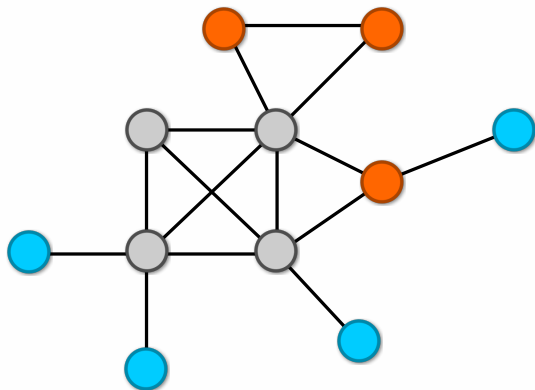


- S. B. Seidman, *Social Networks*, **5**, 269–287, (1983). DOI: [10.1016/0378-8733\(83\)90028-X](https://doi.org/10.1016/0378-8733(83)90028-X)
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## Methods ( $k$ -core decomposition)

  $k$ -shell 1 ( $k_s = 1$ )

  $k$ -shell 2 ( $k_s = 2$ )



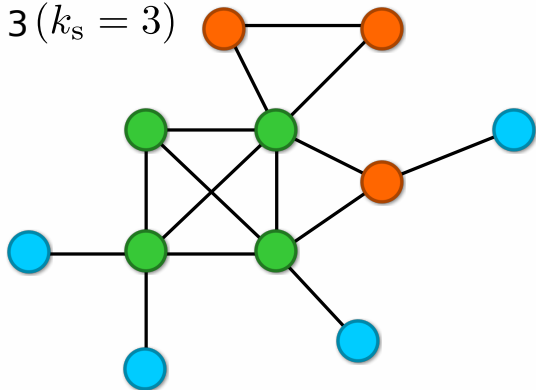
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  $k$ -shell 2 ( $k_s = 2$ )

  $k$ -shell 3 ( $k_s = 3$ )

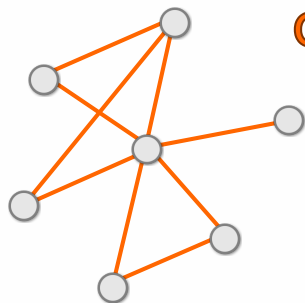


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## Methods ( $k$ -core decomposition)

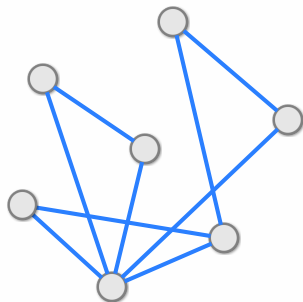
$$f_W(k_s) = \frac{N_W(k_s)}{N(k_s)},$$

## Methods ( $k$ -core decomposition)



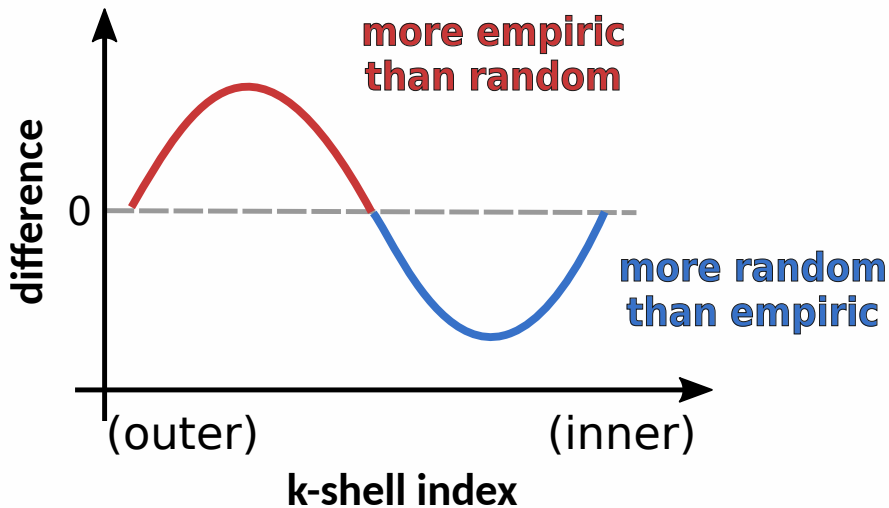
Original  
network

Randomized  
(shuffled)  
counterpart



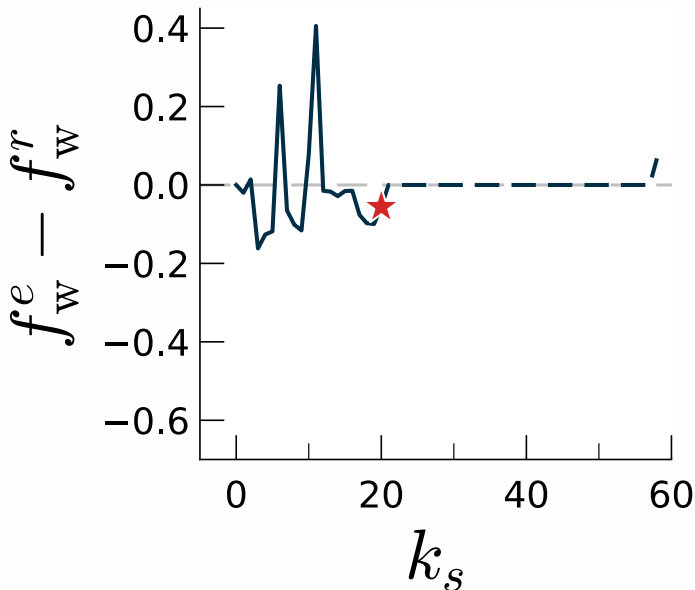
- B. K. Fosdick, *et al.*, SIAM Review, **60**, 315–355, (2018). DOI: [10.1137/16M1087175](https://doi.org/10.1137/16M1087175)

## Results

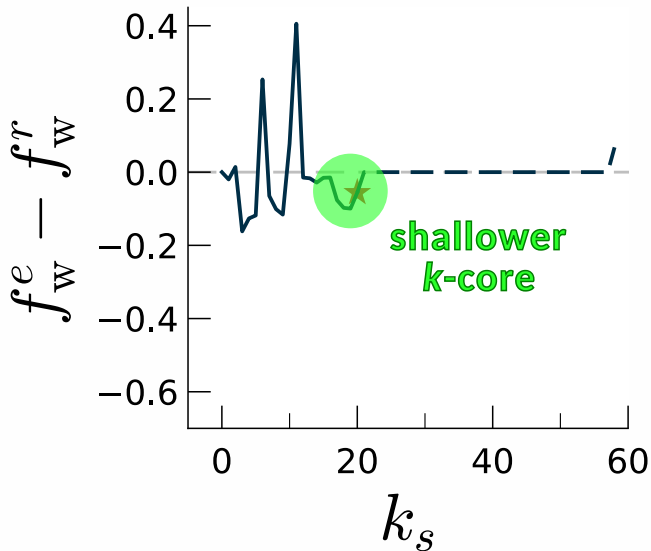




## Results

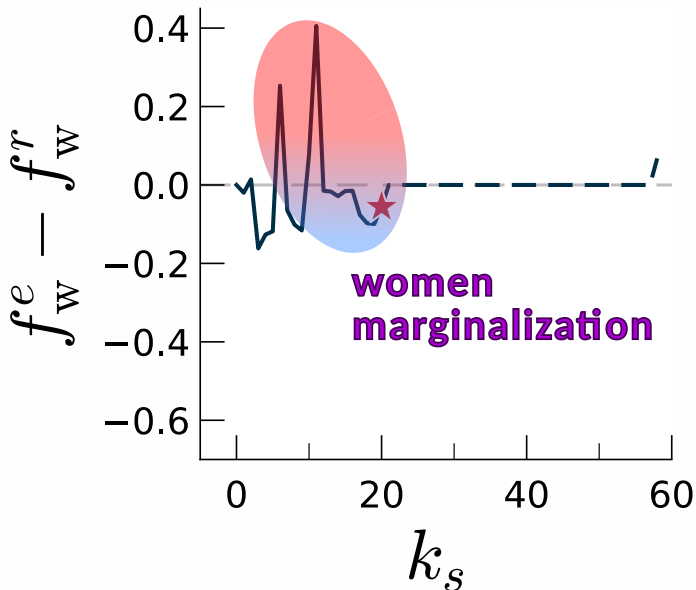


## Results



- I. Malvestio, *et al.* Sci. Rep. **10**, 14702, (2020). DOI: [10.1038/s41598-020-71426-8](https://doi.org/10.1038/s41598-020-71426-8)
- S. Osat, *et al.* Phys. Rev. Research **2**, 023176, (2020). DOI: [10.1103/PhysRevResearch.2.023176](https://doi.org/10.1103/PhysRevResearch.2.023176)

## Results



# Geopolitics of intellectual cooperation during the interwar period





# ALL QUIET ON THE WESTERN FRONT

*Directed by* LEWIS MILESTONE • *a* CARL LAEMMLE de Production • *Story by* ERICH MARIA REMARQUE  
*Adaptation and Dialogue by* MAXWELL ANDERSON and GEORGE ABBOTT

A UNIVERSAL PICTURE

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*Directed by LEWIS MILESTONE • a CARL LAEMMLE Jr. Production • Story Adaptation and Dialogue by MAXWELL ANDERSON and GUY CRIBB*

**A UNIVERSAL PICTURE**

**Supporters of a League of Nations**

ALBANY, N. Y., Dec. 27.—The following are the names of the supporters of a League of Nations who have been elected to the Albany League of Nations Club:

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**Victory Democracy Peace**  
Make them secure by a

# LEAGUE OF NATIONS

**CHRISTMAS** this year dawned on a world groping from war toward peace. The world hopes and prays that peace may be established on justice and safeguarded against future wars. The army of occupation that sleeps till the Judgment Day in the graves of France will have fought and died in vain unless such a **PEACE** is framed. Our Soldiers and Sailors, returning from **VICTORY**, will have fought and suffered in vain if that **VICTORY** is not made secure. All the peoples of the free nations will have given in vain billions of their wealth and millions of their own flesh and blood if **DEMOCRACY** is not established forever.

**The only Practical Way**

These things which the whole world hopes for can be gained only by the creation, right at the Peace Table, of a **LEAGUE OF NATIONS**. President Wilson has declared for such a League and he has not said and he never meant to say that it was not the only way to establish and secure the League. It is the only way to establish and secure the League.

**A LEAGUE OF NATIONS** is necessary to do the things which nations can accomplish alone. Victory and Peace will be of little avail if not followed by a League of Nations. It is the only way to establish and secure the League.

**The New Alliance**  
We propose to carry out of the Old World a dozen or more Republics based upon the principle of Self-Determination. We propose to carry out of the Old World a dozen or more Republics based upon the principle of Self-Determination.

**Germany's Collapse**  
Germany has proved her weakness for advanced civilization. We propose to carry out of the Old World a dozen or more Republics based upon the principle of Self-Determination.

**Economic Questions**  
Action on the sea and action on raw materials are two of the international questions.

**It will be possible for the Peace Congress to establish a League of Nations.**

**Without a League, Peace cannot be permanent.**

**Without a League, Peace cannot be permanent.**

**History Program**  
The League of Nations is a new program of peace. It is the only way to establish and secure the League.

**Four Responsibility**  
The League of Nations is a new program of peace. It is the only way to establish and secure the League.

**League to Enforce Peace**  
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**Four Christian Essentials**  
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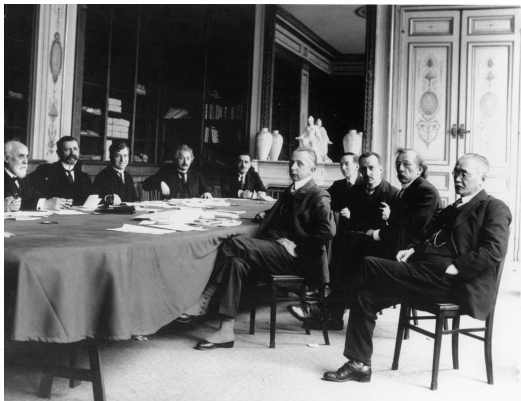
**Support this platform for discussion and endorsement by your Church, Club, Lodge, and any other organization. It has been approved by thousands of leading Americans**

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- Founded in 1922.
- Based in Geneva.
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- Ancestor of UNESCO.

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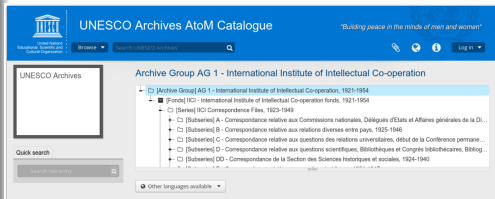




What was the *role* played by countries in the web of global intellectual cooperation?

# The data: UNESCO's archives

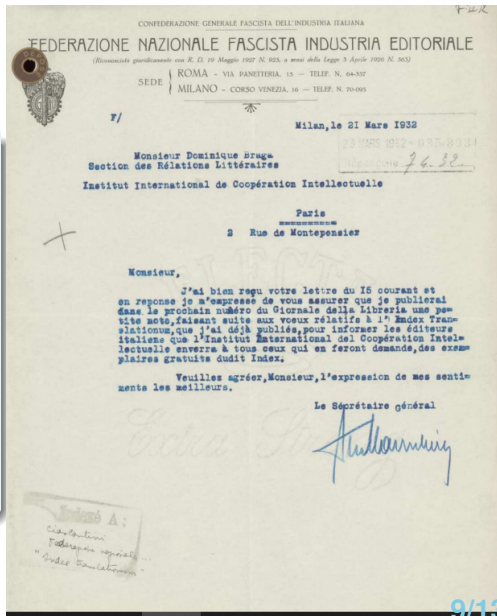
- 1 Scanned documents of one folder (folder A: *internal affairs*) of the IIIC's archive.



<https://atom.archives.unesco.org/iiic>

# The data: UNESCO's archives

- 1 Scanned documents of one folder (folder A: *internal affairs*) of the IIC's archive.
- 2 Over the 59,820 documents available in folder A, we extract 4,265 typewritten letters with an **origin** and **destination** locations.

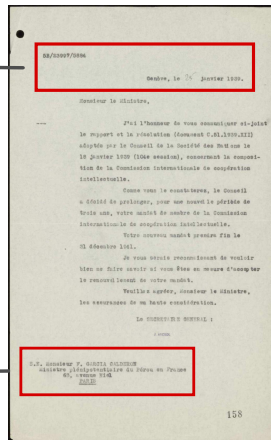


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Origin  
Country  
(Switzerland)

Destination  
Country  
(France)





## Method: Network cartography in a nutshell



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- A technique to **assign roles to nodes** by studying their connectivity pattern.

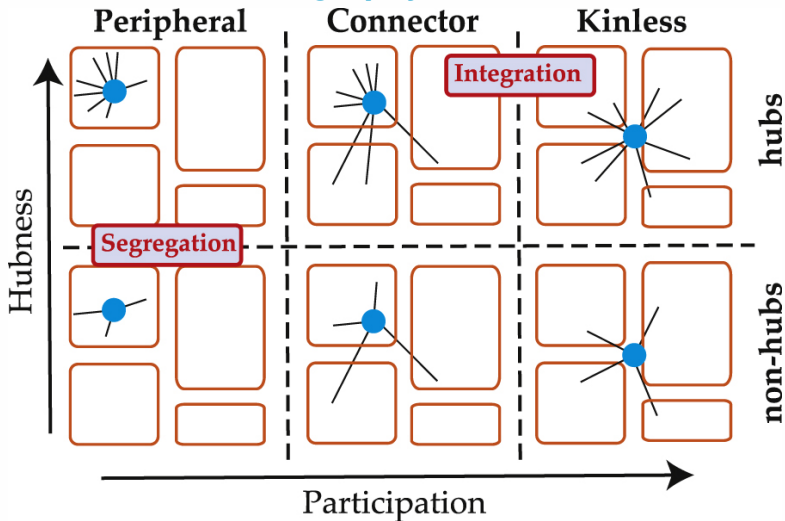
- R. Guimerá, and L. A. N. Amaral, "*Functional cartography of complex metabolic networks*". Nature, **433**, 895, (2005). DOI: [10.1038/nature03288](https://doi.org/10.1038/nature03288)

## Method: Network cartography in a nutshell

- A technique to **assign roles to nodes** by studying their connectivity pattern.
- **It requires a partition of the network into groups** (*i.e.*, the results *depend* on the partitioning criterion).

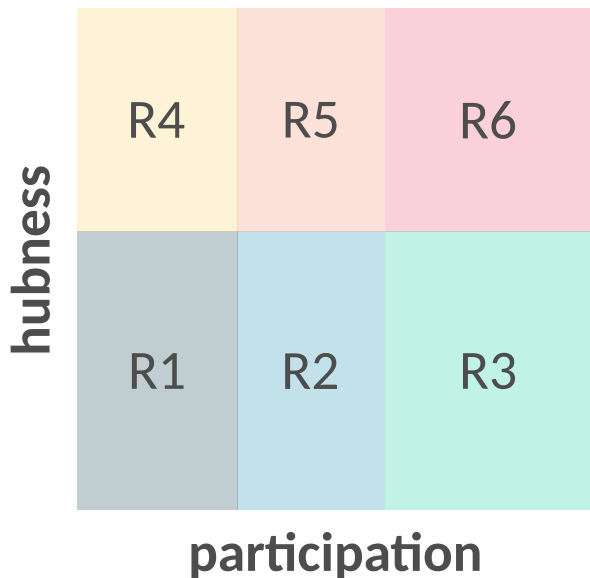
• R. Guimerá, and L. A. N. Amaral, “*Functional cartography of complex metabolic networks*”. *Nature*, **433**, 895, (2005). DOI: [10.1038/nature03288](https://doi.org/10.1038/nature03288)

## Method: Network cartography in a nutshell



- F. Klimm, et al. "Individual node's contribution to the mesoscale of complex networks". *New Journal of Physics*, **16**, 125006, (2014). DOI: 10.1088/1367-2630/16/12/125006

## Method: Network cartography in a nutshell



# Results

## Results

$N_{\text{comms}}$	15
$Q$	0.242

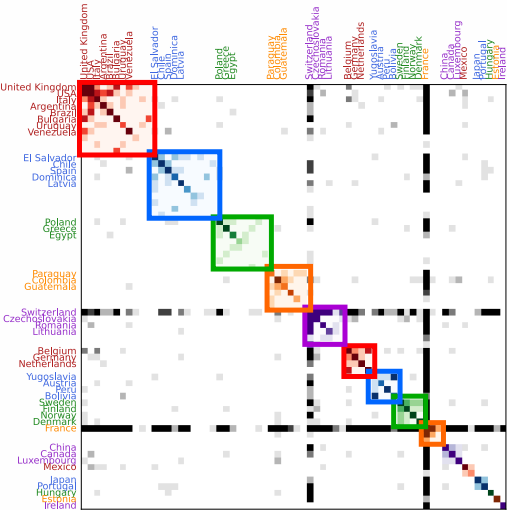
- V. A. Traag, et al. "From Louvain to Leiden: guaranteeing well-connected communities". Sci. Rep., **9**, 5233, (2019). DOI: [10.1038/s41598-019-41695-z](https://doi.org/10.1038/s41598-019-41695-z)

# Results

$N_{\text{comms}}$   
 $Q$

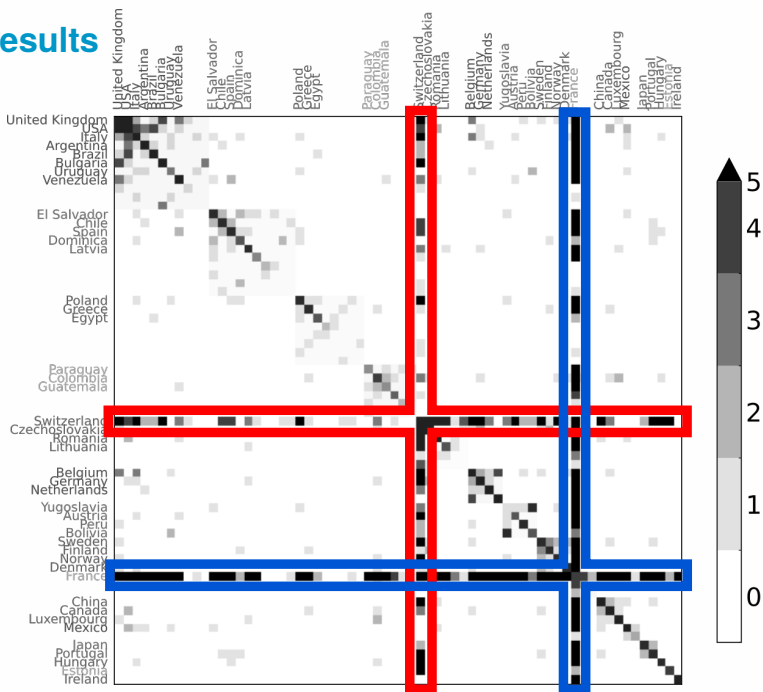
15

0.242



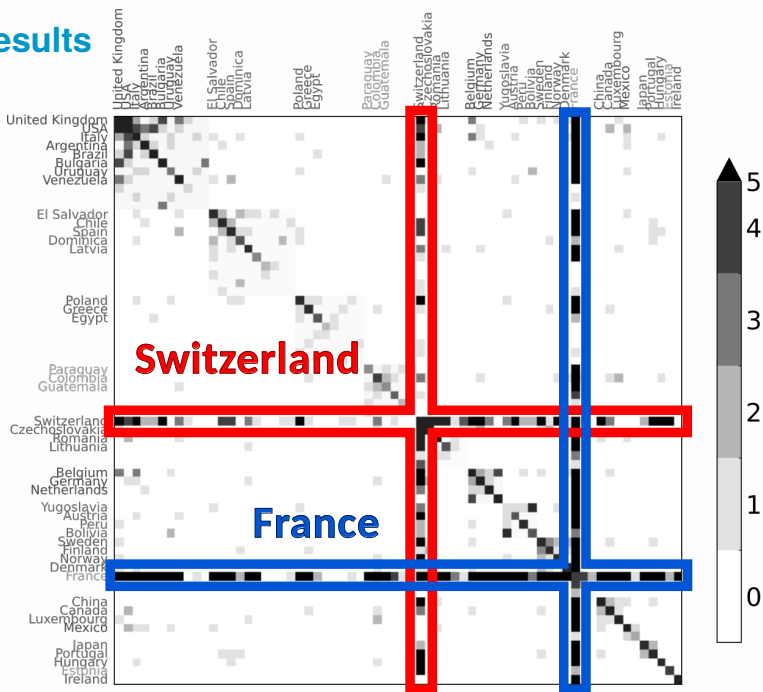
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# Results





# Results



Was there intellectual cooperation  
**beyond** that *with* (and *between*)  
France and Switzerland?

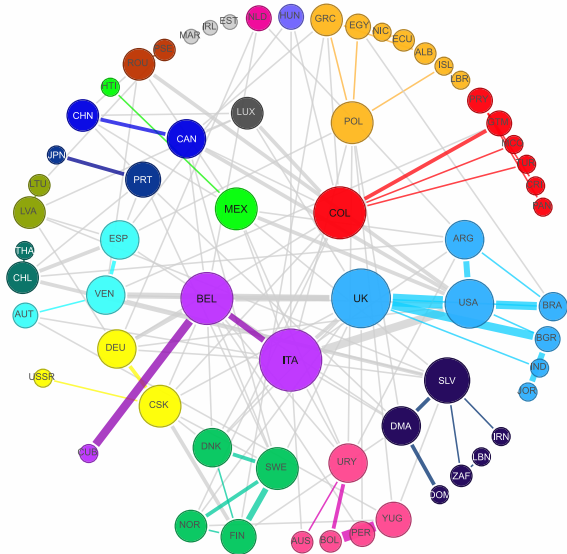
# Results

$N_{\text{comms}}$

21

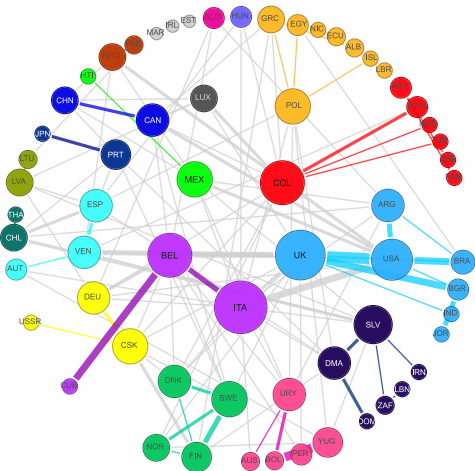
$Q$

0.787



• R. Rodríguez-Casañ *et al.*, “Studying the geographical organisation of the International Institute of Intellectual Cooperation via network cartography.” SocArXiv:x7a3s (2024). DOI: [10.31235/osf.io/x7a3s](https://doi.org/10.31235/osf.io/x7a3s)

# Results



**C1** Poland, Greece, Albania, Nicaragua, Ecuador, Iceland, Egypt, and Liberia.

**C2** United Kingdom, United States of America, Argentina, Brazil, Bulgaria, India, and Jordan.

**C3** Colombia, Paraguay, Guatemala, Monaco, Turkey, Costa Rica, and Panama.

**C6** Sweden, Denmark, Norway, and Finland.

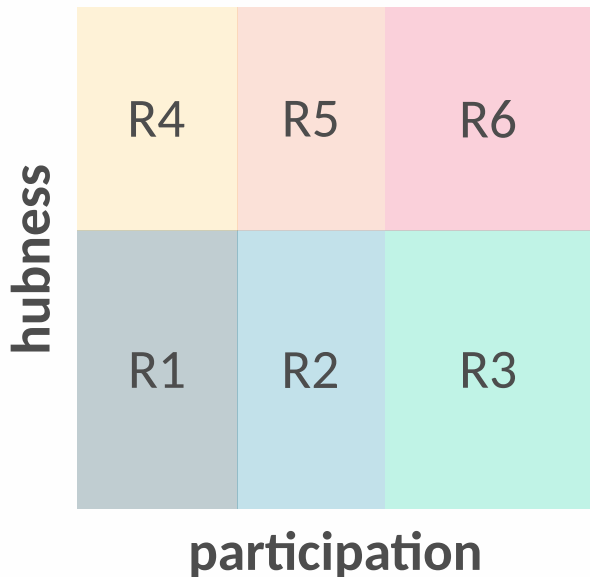
**C7** Spain, Austria, and Venezuela.

**C8** Germany, Czechoslovakia, and USSR.

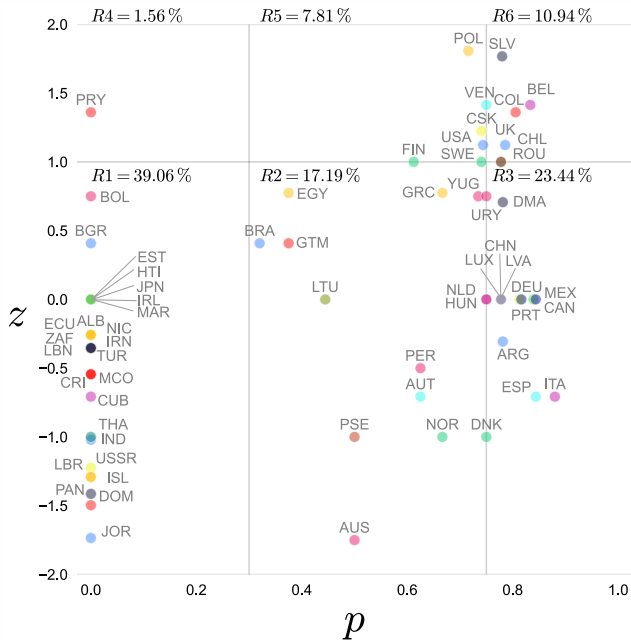
**C9** Belgium, Italy, and Cuba.

**Others** All other countries.

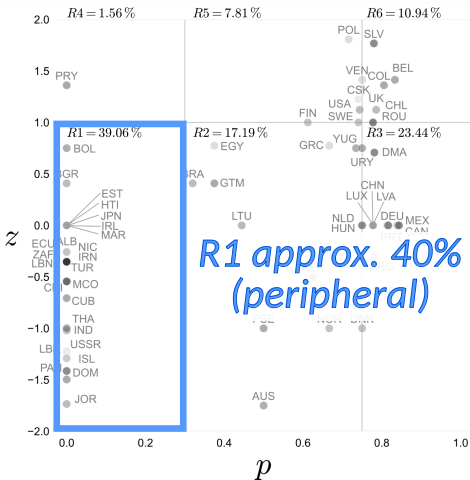
## Results



# Results



# Results

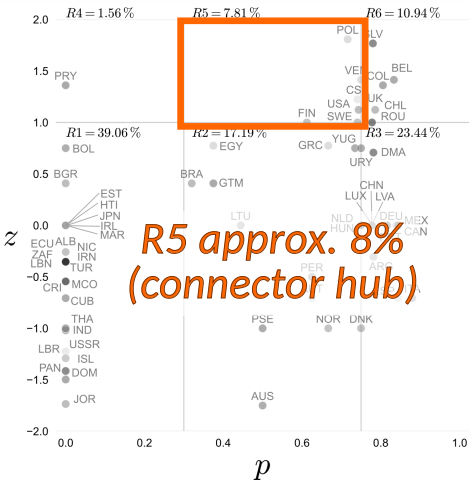


R1

Estonia, Iceland, Monaco, **USSR**, Ireland, Bulgaria, Albania, Turkey, Morocco, Nicaragua, Cuba, Panama, Costa Rica, Haiti, Ecuador, Bolivia, Dominican Republic, Iran, Jordan, Lebanon, South Africa, Liberia, **India**, **Japan**, Thailand.

- R. Rodríguez-Casañ et al., "Studying the geographical organisation of the International Institute of Intellectual Cooperation via network cartography." SocArXiv:x7a3s (2024). DOI: 10.31235/osf.io/x7a3s

# Results

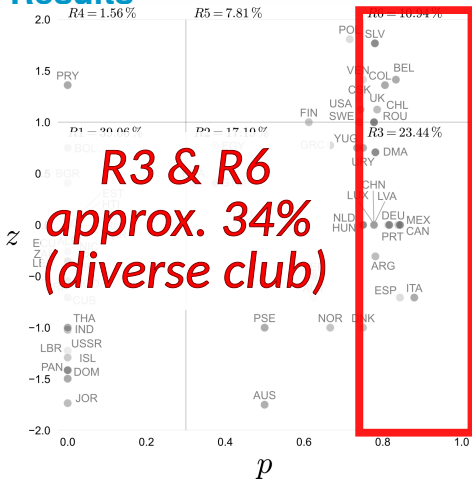


**R5** United States of America, Sweden, Finland, Czechoslovakia, Poland.

- R. Rodríguez-Casañ et al., "Studying the geographical organisation of the International Institute of Intellectual Cooperation via network cartography." SocArXiv:x7a3s (2024). DOI: 10.31235/osf.io/x7a3s



# Results



R6

**Belgium, United Kingdom,**  
Romania, Chile, **Colombia,**  
El Salvador, Venezuela.

R3

**Italy, Spain, Portugal, Germany,**  
Hungary, Netherlands,  
Luxembourg, **Denmark,** Latvia,  
**China,** Canada, Mexico,  
**Argentina,** Uruguay, Dominica.

• R. Rodríguez-Casañ *et al.*, "Studying the geographical organisation of the International Institute of Intellectual Cooperation via network cartography." SocArXiv:x7a3s (2024). DOI: [10.31235/osf.io/x7a3s](https://doi.org/10.31235/osf.io/x7a3s)

• M. A. Bertolero, *et al.* "The diverse club." Nat. Comms. **8**, 1277, (2017).

DOI: [10.1038/s41467-017-01189-w](https://doi.org/10.1038/s41467-017-01189-w)

# Conclusions

## Take Home Messages

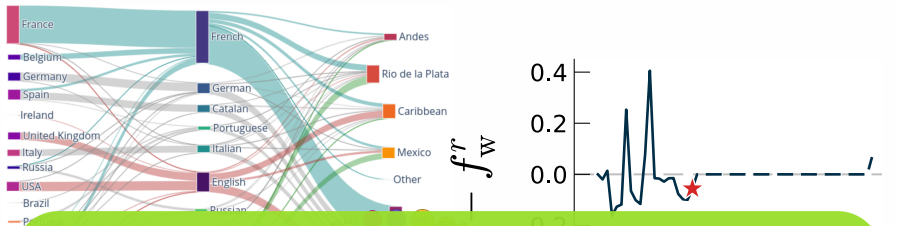


**Digital humanities** *ARE an opportunity* for Network science

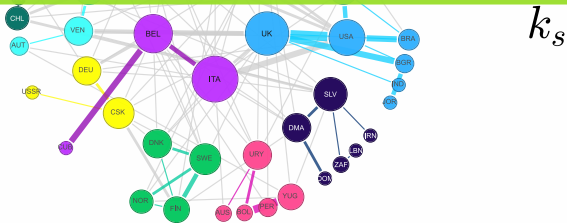
to be best  
point of view  
**Translation**  
another language;  
language foreign to  
written communication  
rights



# Take Home Messages



The use of quantitative methods allows for the discovery of *non orthogonal* but *non trivial* features



# Take Home Messages



All that glitters is not gold: we have to deal with **biased**, **unstructured**, **incomplete**, and **noisy** data.



Comision de Asesoramiento Internacional  
Caracas, 15 de Agosto 1953

Respecto a lo que se refiere a la Comision de Asesoramiento Internacional, en el informe de la Comision de Asesoramiento Internacional...

Quince años de esta Comision  
Los estudios de la Comision de Asesoramiento Internacional se centran en el estudio de las condiciones económicas, de desarrollo de las actividades industriales y de la difusion de la cultura...

Guatemala - Argentina  
Desde el 1 de mayo de 1948 hasta el 1 de mayo de 1953, la Comision de Asesoramiento Internacional ha estado trabajando en el estudio de las condiciones económicas y de desarrollo de las actividades industriales y de la difusion de la cultura...

BOLETIN TITIKAKA

A. J. FERRELLI

BOLETIN TITIKAKA

BOLETIN TITIKAKA

## Take Home Messages

*The value of computation is not merely to accelerate literary research or expand its scale; on the contrary, ideas drawn from computer science have given literary scholars new questions, and have encouraged us to frame existing questions in a more explicitly theorized way.*

*At bottom, distant readers are not arguing against close reading. They're just pointing to a blank space on our map of the past — where questions about large samples or long timelines might be located — in order to say “none of us really know what's in there yet.”*

*A confession of ignorance [...] calls for a different genre of response. [...] it would be better to judge it simply by asking whether the blind spot it identified is turning out to contain anything interesting.*

T. Underwood, "A Genealogy of Distant Reading." *Dig. Hum. Quart.*, 11, 1-12 (2017)

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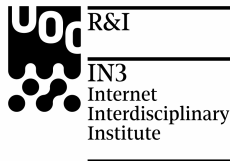
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**Rubén  
Rodríguez Casañ**



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## Global Translation Flows in Ibero-American Periodicals: A Network Science Perspective

From the book *Humanities and Big Data in Ibero-America*

Diana Reig-Sanz, Alessio Cardillo and Verónica Huff

<https://doi.org/10.1515/9783110753523-011>

DOI: 10.1515/9783110753523-011

DOI: 10.48550/arXiv.2307.13137

Open Dataset

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Physics > Physics and Society

(Submitted on 24 Jul 2023 (v1), last revised 13 Nov 2023 (this version, v2))

**Quantifying Women's Marginalisation in Ibero-American Film Culture During the First Half of the Twentieth Century: A Network-Science Proposal**

Ainamar Clariana-Rodagut, Alessio Cardillo

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Ainamar Clariana-Rodagut, Alessio Cardillo, Verónica Huff, Diana Reig-Sanz, Javier Jorge Rodríguez, and Alessio Cardillo

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Open Dataset

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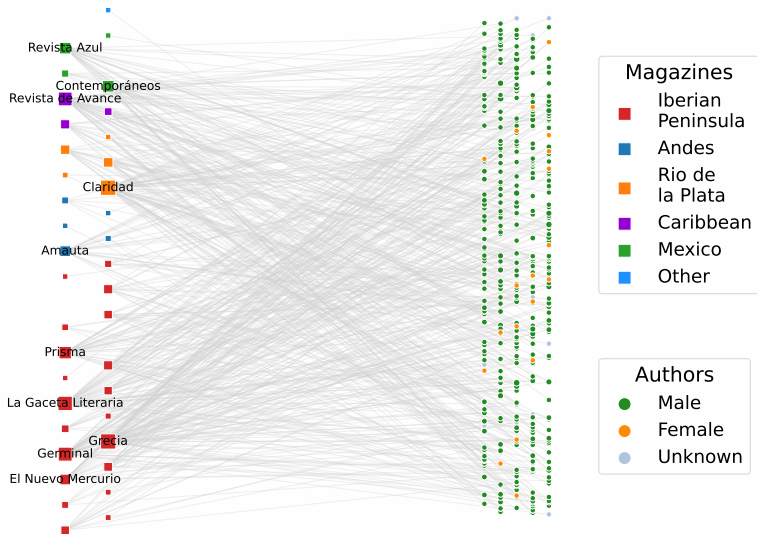
X @a\_cardillo

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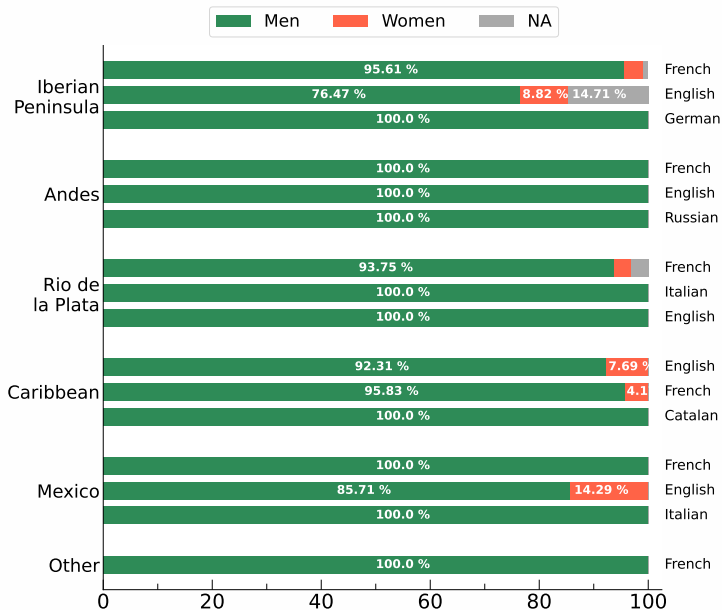


Extra content

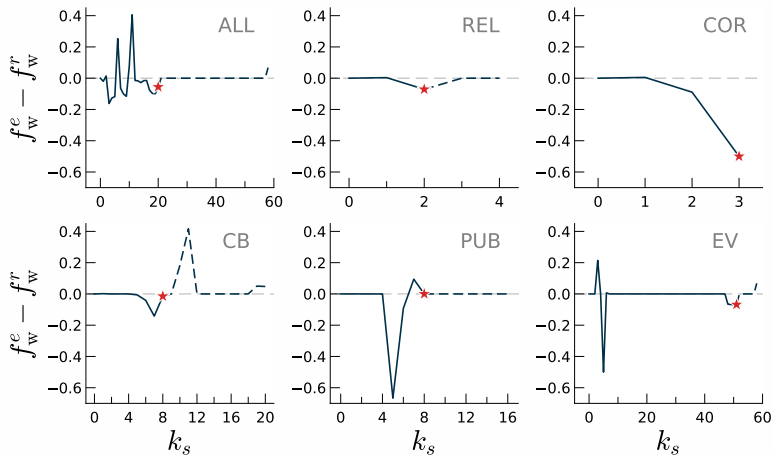
# Translations in Ibero-American Periodicals



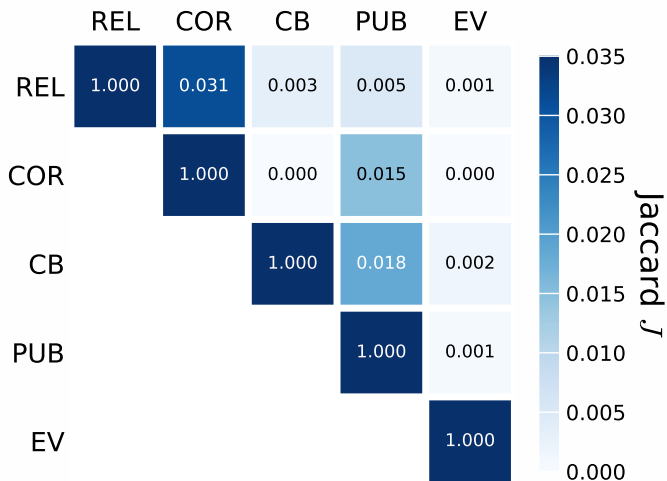
# Translations in Ibero-American Periodicals



# Women marginalization



## Women marginalization



# Cartography

within module degree  $\kappa$

$$\kappa_i = \sum_j a_{ij} \delta_{c_i, c_j}$$

hubness  $z$

$$z_i = \frac{\kappa_i - \overline{\kappa_{c_i}}}{\sigma_{\kappa_{c_i}}}$$

Participation coefficient  $p$

$$p_i = 1 - \sum_j^{N_c} \left( \frac{\kappa_i(c_j)}{k_i} \right)^2$$



## IIIC – Historical grouping

Group's name	Countries
EU western and USA	France, United Kingdom, Switzerland, Germany, Italy, Belgium, The Netherlands, Spain, and United States of America
EU central countries	Austria, Czechoslovakia, Hungary, and Poland
EU eastern countries	Albania, Bulgaria, Greece, Yugoslavia, and Romania
Baltic countries	Estonia, Latvia, and Lithuania
Nordic countries	Denmark, Finland, Norway, Iceland, and Sweden
Latin countries	Portugal, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Dominican Republic, Ecuador, Dominica, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Paraguay, El Salvador, Uruguay, and Venezuela
UK's Dominions	Australia, Canada, India, South Africa, and Ireland
Colonies	Egypt, Benin, French Guiana, Haiti, Turkey, Lebanon, Jordan, Morocco, and Palestine
Eastern countries	China, Japan, Cambodia, and Thailand
Middle East	Iran
Other countries	Luxembourg, Monaco, Liberia, and USSR

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DOI: [10.20375/0000-000d-1cff-6](https://doi.org/10.20375/0000-000d-1cff-6)



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