

Aprendizaje, Colaboración y Redes en la Ciencia Digital: Claves para Nuevos Tiempos

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¡GRACIAS!

**Es un honor hablar
para vosotras y vosotros.**



**Gracias por
vuestro tiempo.**



**Gracias por
vuestro trabajo.**

Tiempo para hablar, pensar y crear





«Todo el mundo tiene un artículo guardado en alguna parte en el que lleva años trabajando... La buena erudición requiere tiempo: tiempo para pensar, escribir, leer, investigar, analizar, editar y colaborar. La enseñanza y el servicio de alta calidad también requieren tiempo: tiempo para comprometerse, innovar, experimentar, organizar, evaluar e inspirar.»

Alison Mountz, Anne Bonds, Becky Mansfield, Jenna Loyd, Jennifer Hyndman, Margaret Walton-Roberts, Ranu Batsu, Risa Whitson, Roberta Hawkins, Trina Hamilton, & Winifred Curran. (2015). For slow scholarship: A feminist politics of resistance through collective action in the neoliberal university. *An International Journal for Critical Geographies*, 14(4), 1235-1259.

**Bibliografía usada
para la ponencia**



**Revisión de la
literatura:
Web of Science y
Scopus**

Empecemos por el principio...

Permitidme que me presente.





**Profesor e investigador en la
Facultad de Educación,
Economía y Tecnología de Ceuta.**



**UNIVERSIDAD
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Profesor titular del departamento de Didáctica de la Lengua y la Literatura.



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hasta 2024-2025**



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Salud Comunitaria**

**Escuela Andaluza de Salud Pública y
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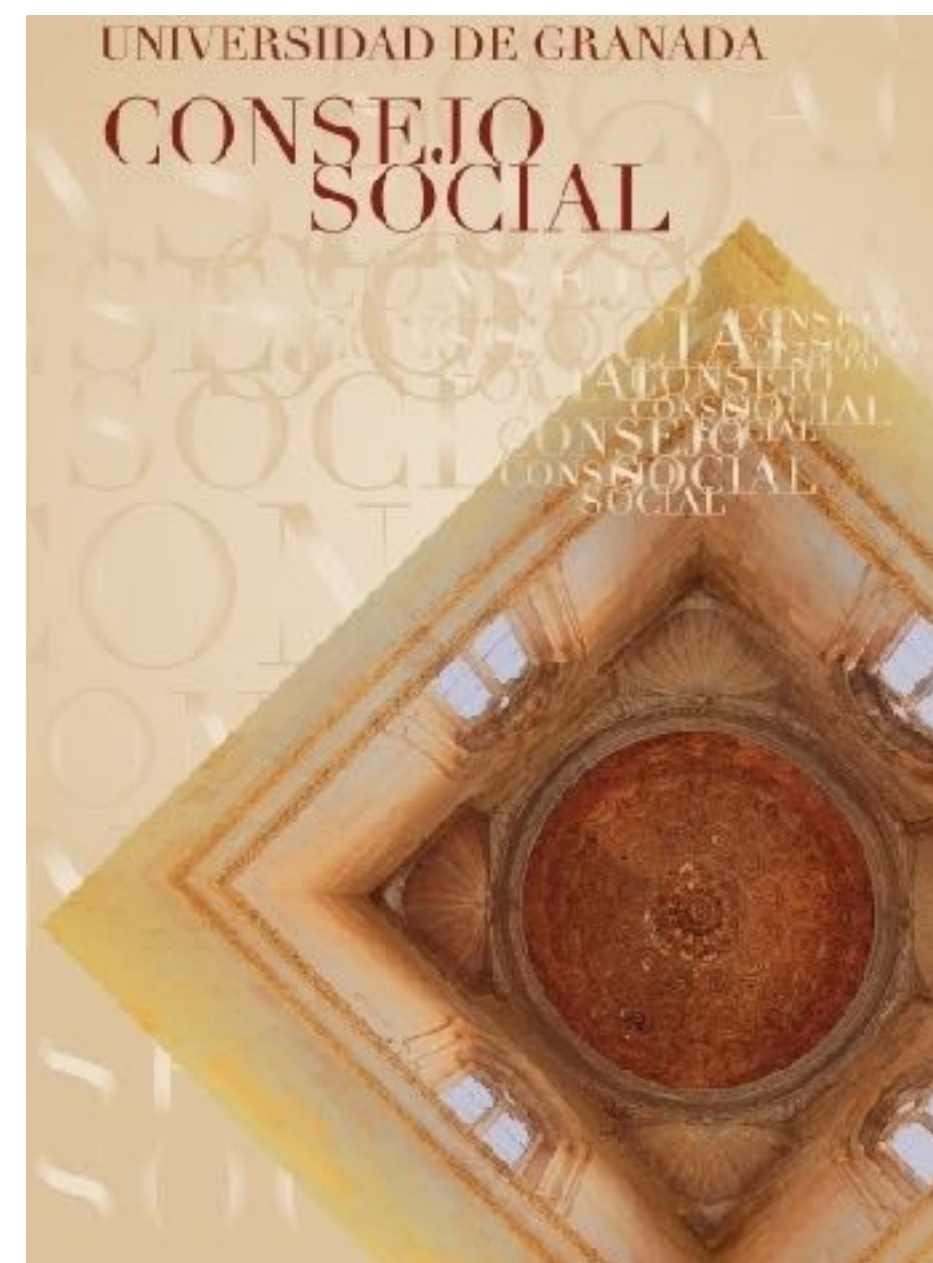
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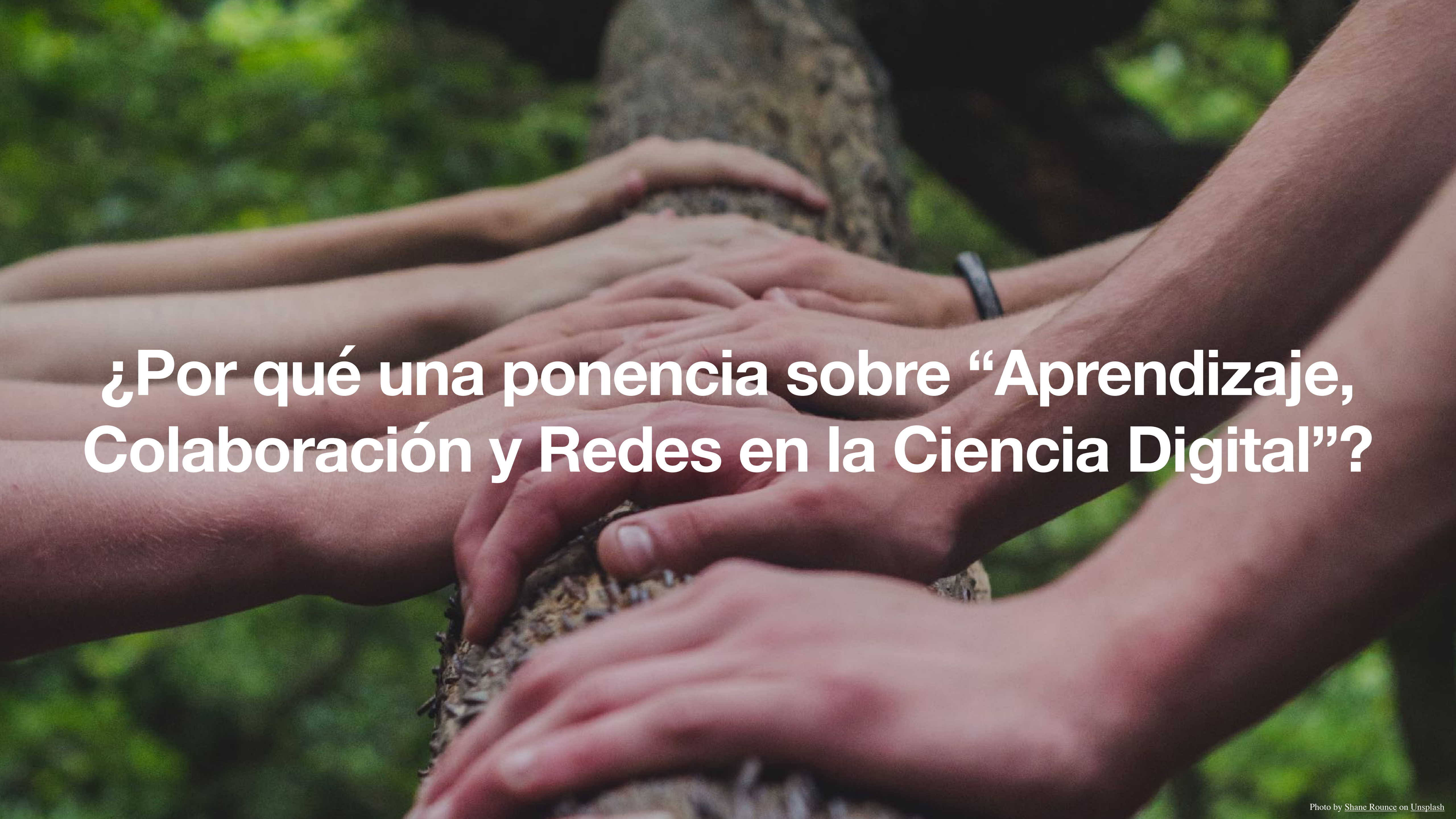


¿Y en la Red?

+43 k followers en 

Tengo un blog en
fernandotrujillo.es

**I Premio Universidad de Granada-Caja Rural
de Granada a la Comunicación e Innovación
en Medios Digitales**



¿Por qué una ponencia sobre “Aprendizaje, Colaboración y Redes en la Ciencia Digital”?



“Somos seres ultrasociales y no podemos vivir sin los otros, ni subsistir sin una cooperación constante con ellos; por otra parte, cuánto, cuántísimo nos cuesta hacer cosas juntos - quiero decir, hacer cosas significativas para transformar la realidad.”

Jorge Riechmann. 2013. Fracasar mejor (fragmentos, interrogantes, notas, protopoemas y reflexiones). Editorial Olifante.

**“Los problemas comunes sólo
pueden ser abordados desde
las formas de organización que
nosotros mismos creamos.”**

Marina Garcés. 2018.

Ciudad Princesa. Galaxia Gutenberg.

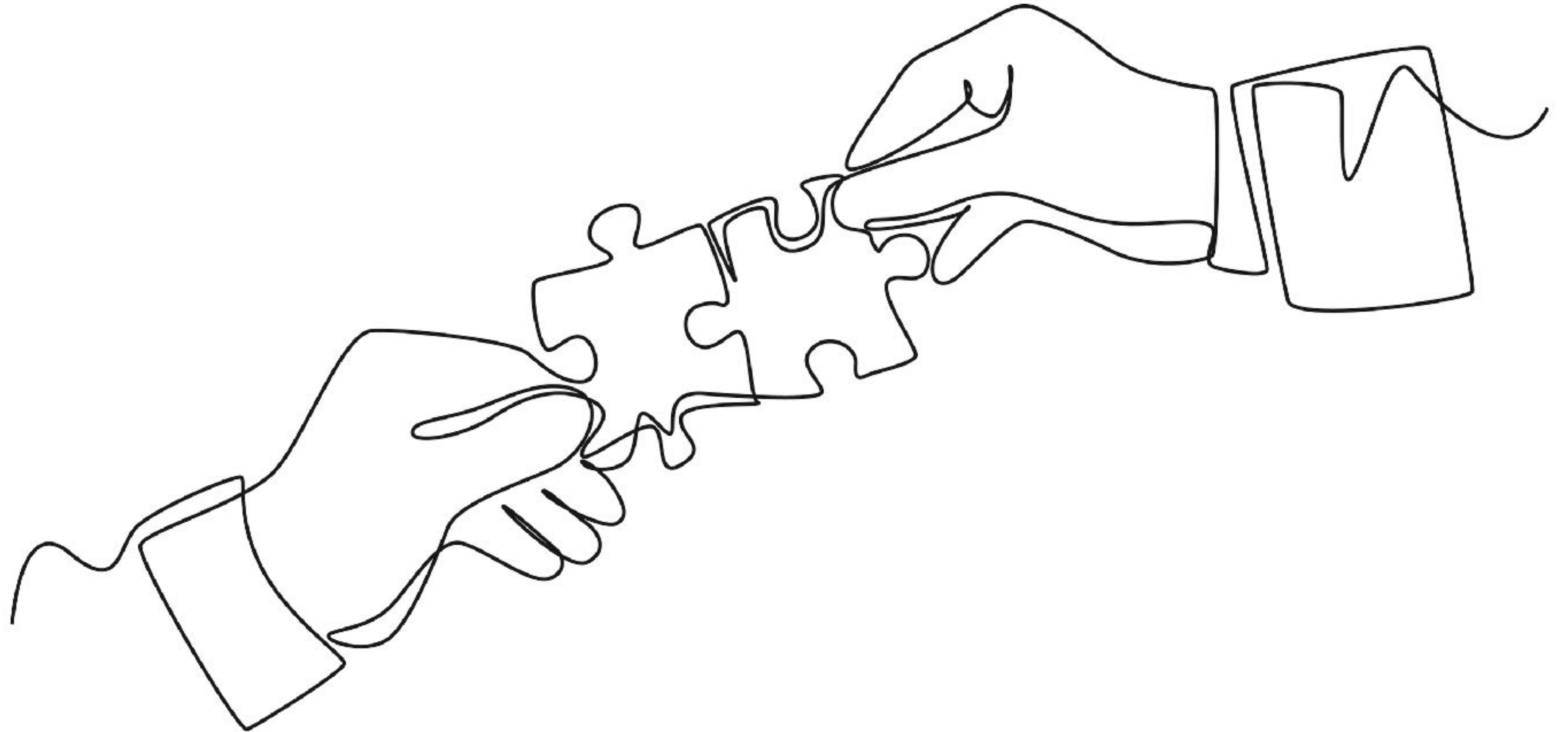
Breathe

“El desarrollo de la organización se basa en el desarrollo de las personas y en su capacidad para incorporar nuevas formas de hacer a la institución en las que trabajan.”

Joaquín Gairín, 2003. “Sentido y límites de las estrategias y procedimientos de intervención”. En Joaquín Gairín y Carme Armengol (eds.) Estrategias de Formación para el Cambio Organizacional. Madrid: CISS-Praxis, pg. 40.

Premisa:

**La colaboración científica es fundamental
para impulsar la investigación y abordar
preguntas complejas.**



**“Academic research is increasingly social...
The trend toward team science is robust and undisputed.”**



Erin Leahey. (2016). From Sole Investigator to Team Scientist: Trends in the Practice and Study of Research Collaboration. Annual Review of Sociology, 42, 81-100.

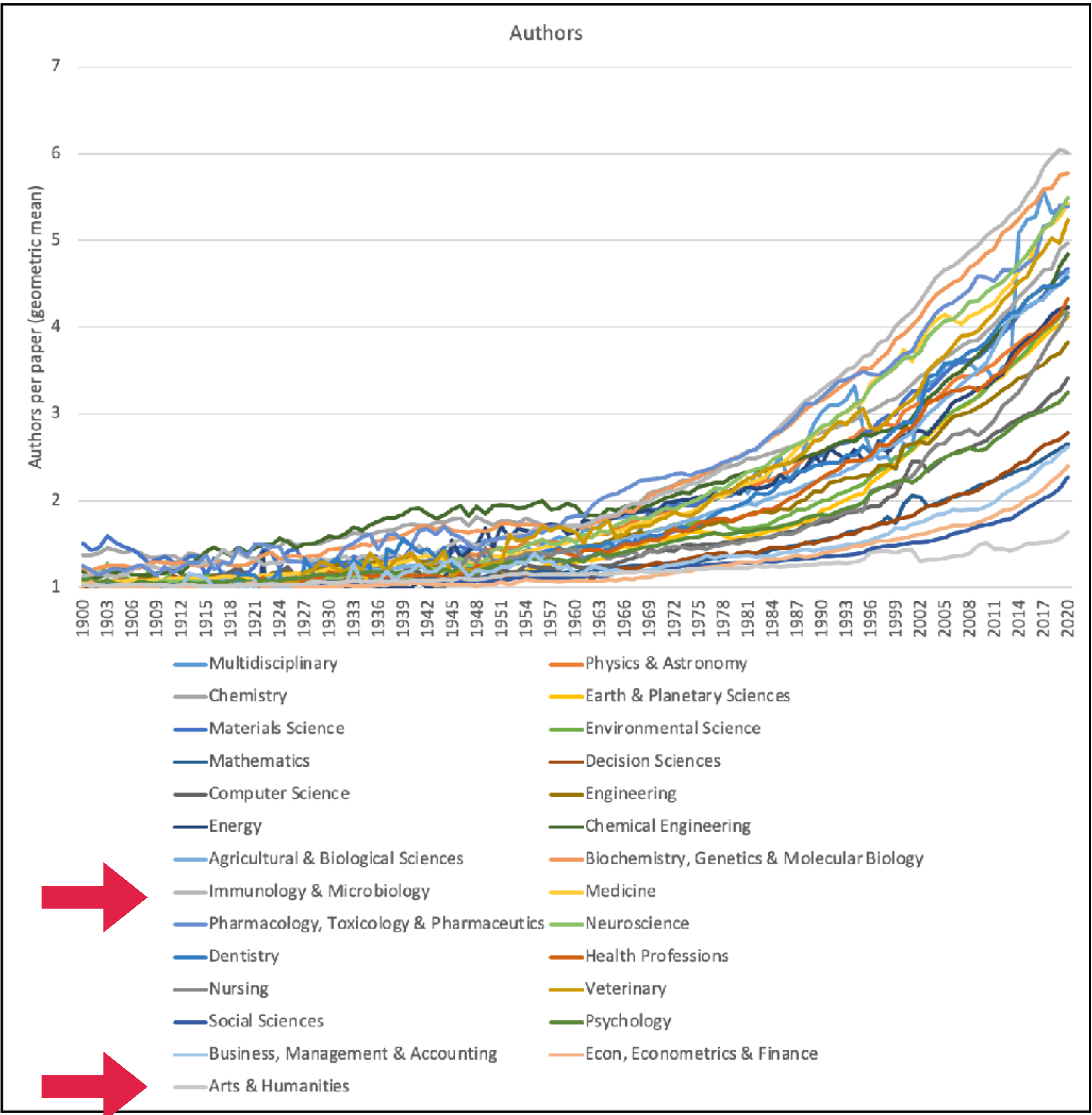
“Coauthorship has increased universally since 1900 in terms of broad and narrow fields, but with substantial differences between broad and narrow fields... Team size growth may be a fundamental part of modern academic research.”

“In all 27 broad Scopus fields, the average number of authors per article has increased over the past 121 years.”

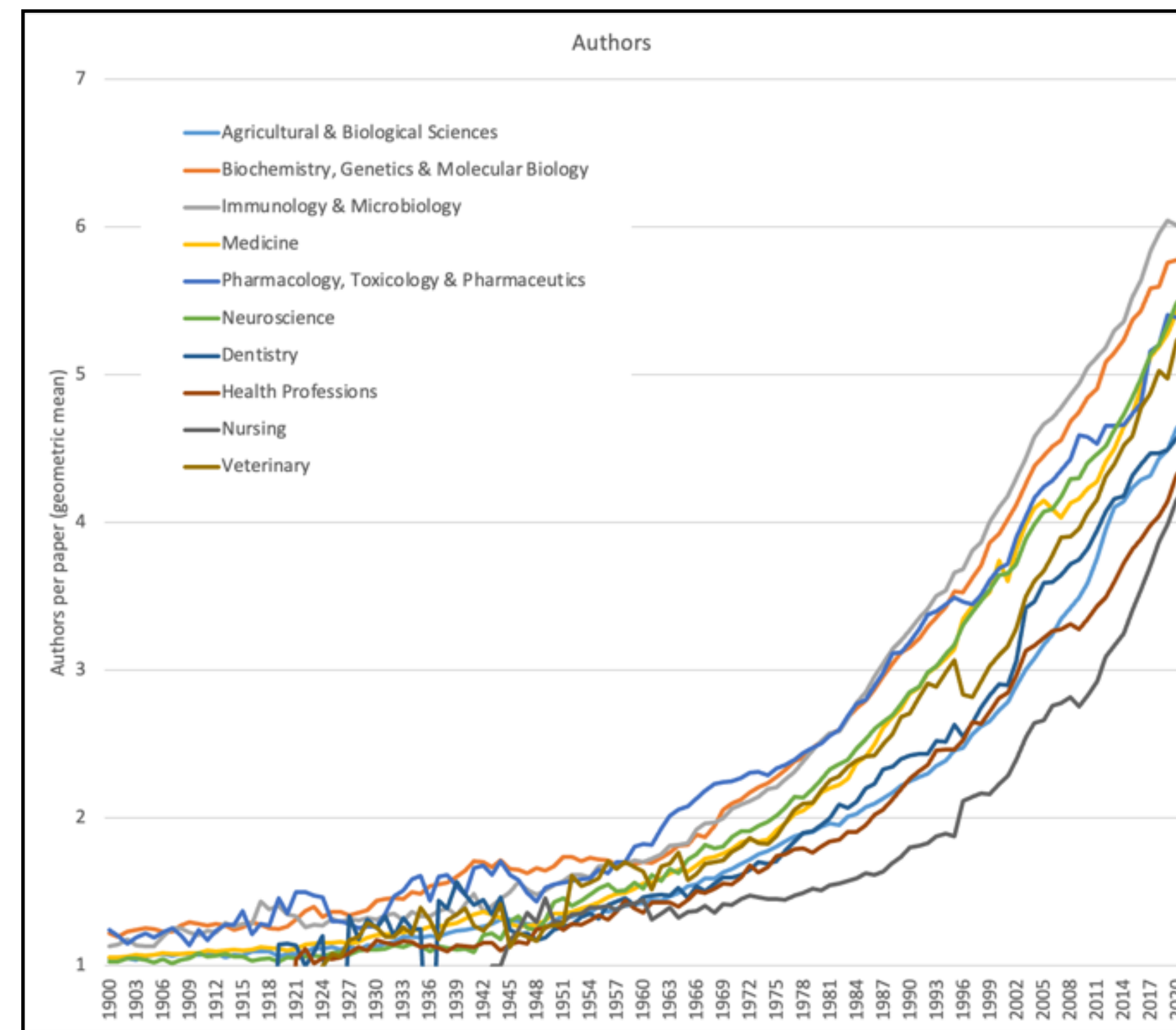
The largest difference is between the average of 6 authors per Immunology and Microbiology journal article in 2020 and 1.6 for Arts and Humanities.

N=80 millones de artículos de Scopus

Mike Thelwall, Nabeil Maflahi. (2022). Research coauthorship 1900-2020: Continuous, universal, and ongoing expansion. Quantitative Science Studies, 3 (2): 331-344. doi: https://doi.org/10.1162/qss_a_00188

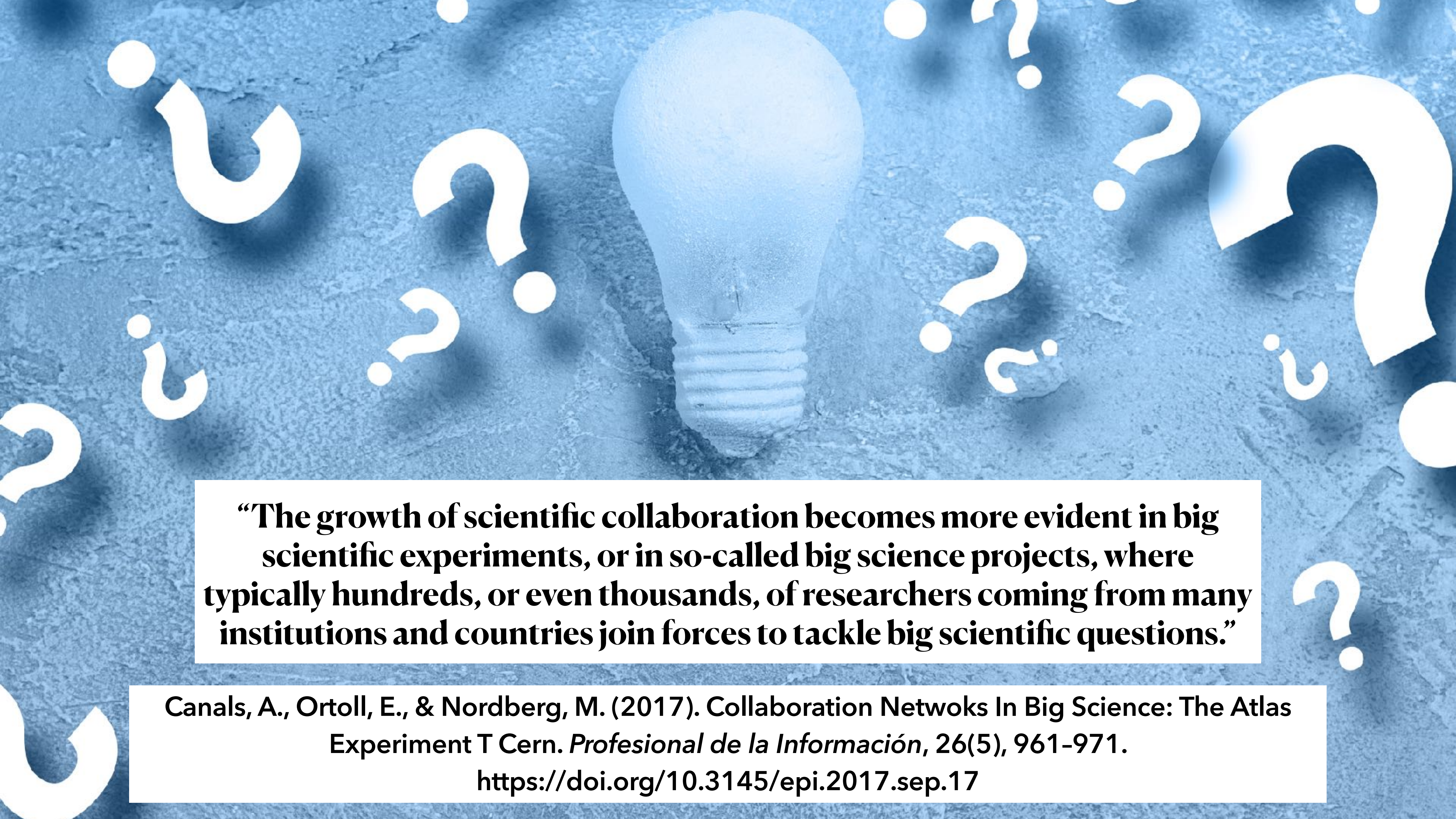


“By 2020, most broad fields had at least four authors per paper on average (geometric mean), including all multidisciplinary and natural science broad fields, the Energy and Chemical Engineering broad field, and all life science and health broad Scopus fields. In contrast, all social science and humanities broad fields had less than 3.5 authors per paper in 2020.”



“The increases in the average numbers of authors per paper suggest (...) that collaboration has also increased steadily.”



A conceptual image featuring a single, glowing lightbulb in the center, surrounded by numerous white question marks of various sizes. The background is a textured, mottled blue, suggesting a sky or a deep sea. The lightbulb is slightly out of focus, while the question marks are sharp and scattered around it, creating a sense of inquiry and intellectual pursuit.

“The growth of scientific collaboration becomes more evident in big scientific experiments, or in so-called big science projects, where typically hundreds, or even thousands, of researchers coming from many institutions and countries join forces to tackle big scientific questions.”

Canals, A., Ortoll, E., & Nordberg, M. (2017). Collaboration Networks In Big Science: The Atlas Experiment T Cern. *Profesional de la Información*, 26(5), 961-971.

<https://doi.org/10.3145/epi.2017.sep.17>

“There is evidence that collaboration increases productivity...

Collaborating increases grant activity

(number of submissions as well as number of awards and dollar amount)...

Collaborative teams produce more high-impact articles and garner more citations...

Some scholars have noted that collaboration brings legitimacy to an idea.”



Costes de la colaboración

Costes de comunicación.

Costes de coordinación y monitorización
del trabajo.

Costes administrativos.

Cuestiones relativas al crédito en co-
autoría y las relaciones de mentoría



Erin Leahey. (2016). From Sole Investigator to Team Scientist: Trends
in the Practice and Study of Research Collaboration.
Annual Review of Sociology, 42, 81-100.

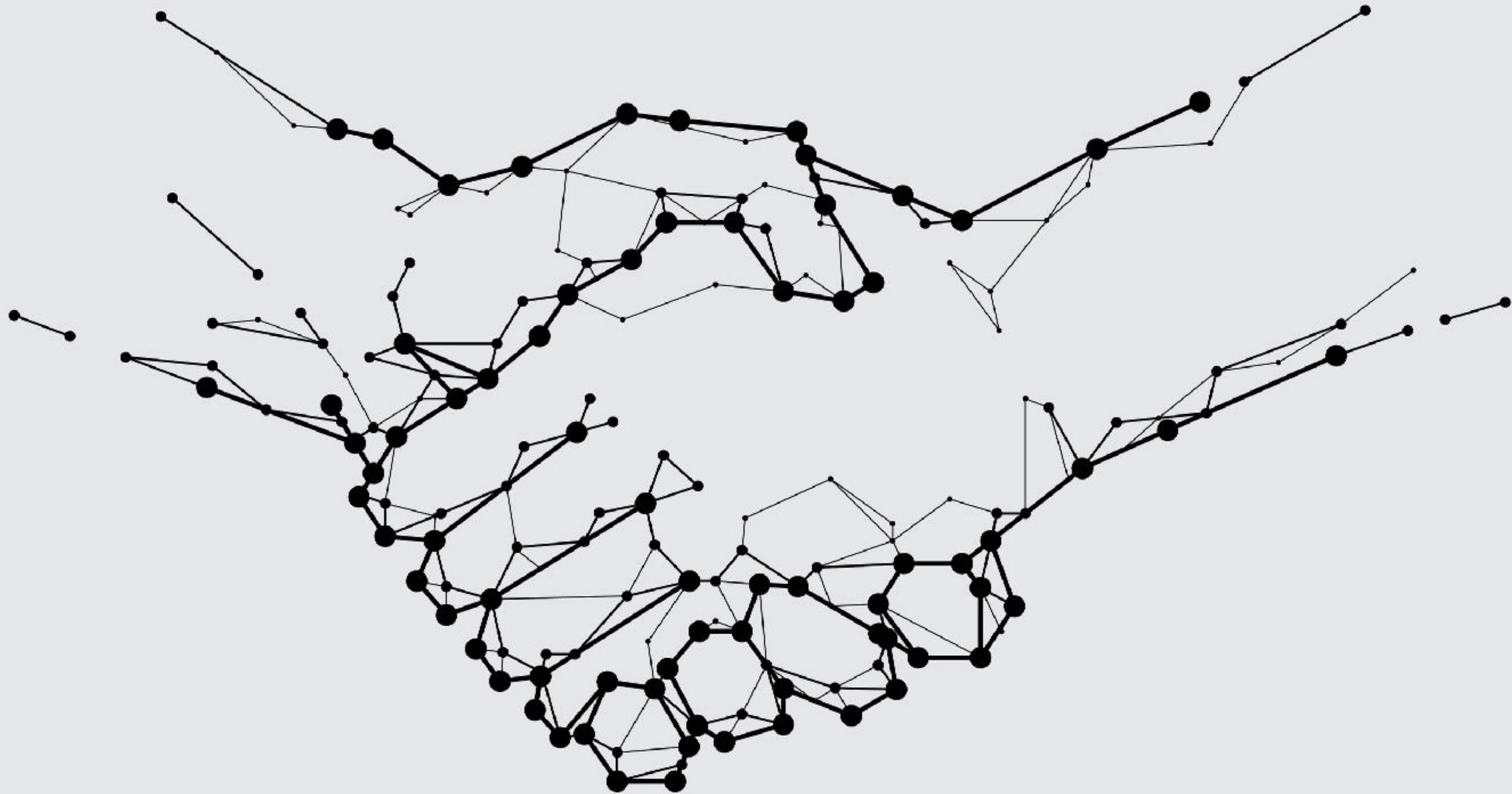


Team Science

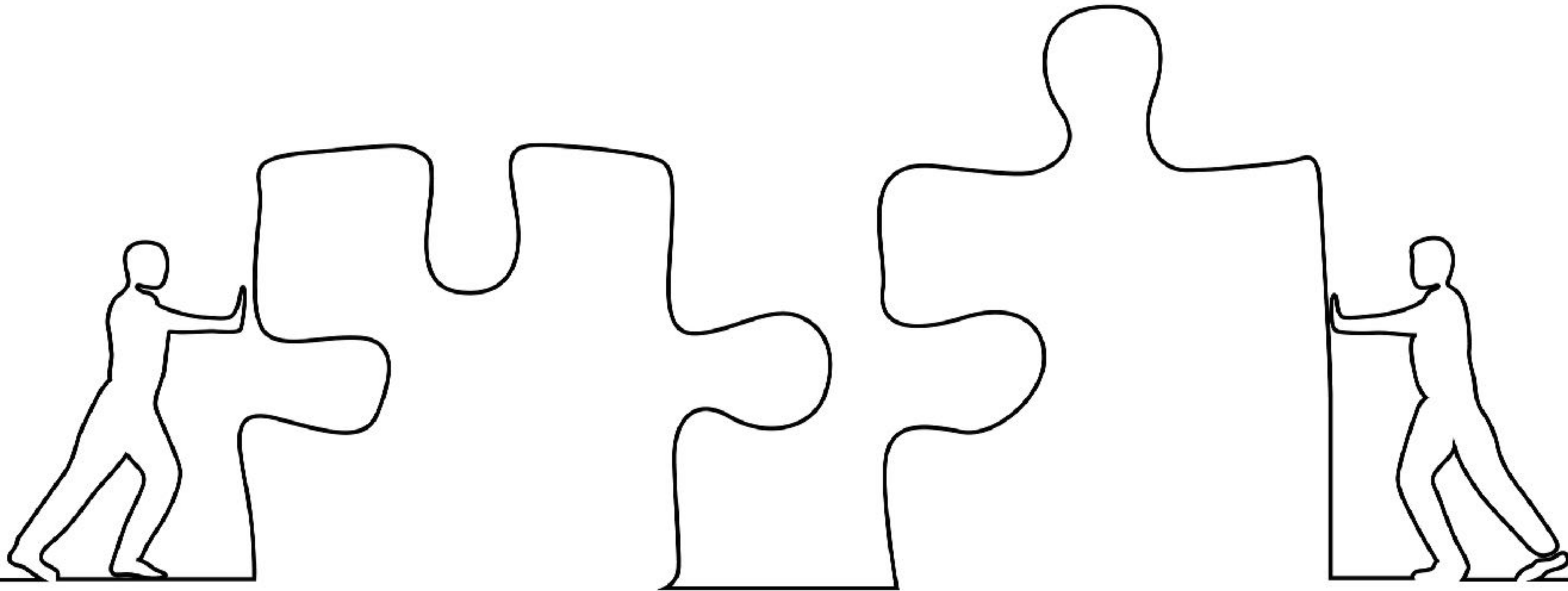


National Institutes
of Health

“Team science is a collaborative effort to address a scientific challenge that leverages the strengths and expertise of professionals, oftentimes trained in different fields.”

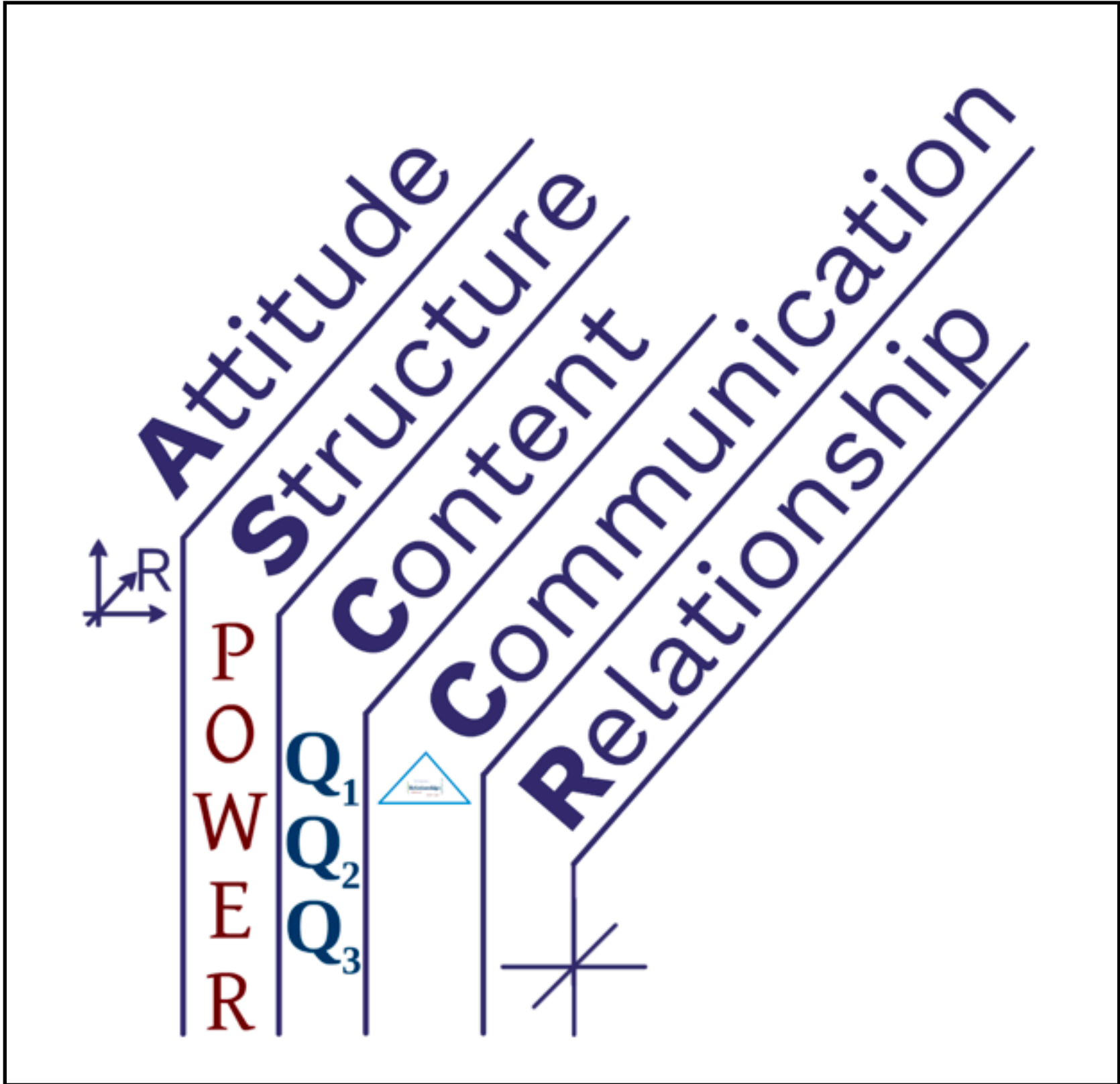


**“Research training is typically discipline specific (eg, epidemiology, pharmacy, medicine, nursing, etc) with some overlap in data collection, study design, and data analysis techniques.
Very little research training is team based or interprofessionally based.”**



Meg M. Little, St Hill, C. A., Ware, K. B., Swanoski, M. T., Chapman, S. A., Lutfiyya, M. N., & Cerra, F. B. (2017). Team Science as Interprofessional Collaborative Research Practice: A Systematic Review of the Science of Team Science Literature. *Journal of Investigative Medicine*, 65(1), 15-22. <https://doi.org/10.1136/jim-2016-000216>

El marco ASCCR para la colaboración



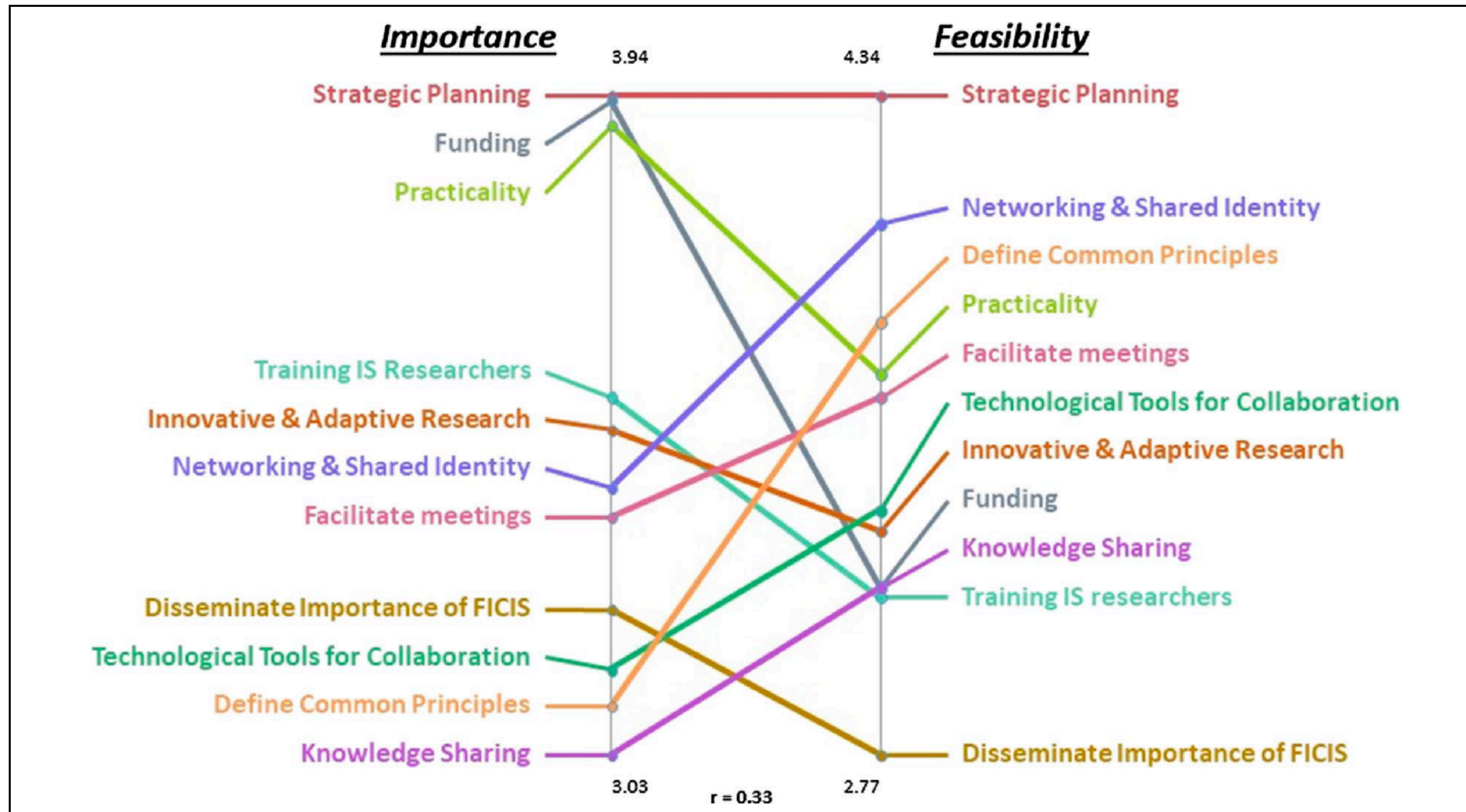
Structure	
Prepare	The collaborator has clearly prepared for the meeting as evidenced by some knowledge of the project and/or domain expert as well as practical preparation such as a shared notes document.
Opening	Meeting is opened with a friendly tone. Time is spent discussing everyone's wants for the meeting.
Work	Collaborator shapes the meeting in a way that specifically responds to the wants agreed upon during the opening conversation.
Ending	Time is reserved at the end of the meeting for summarizing outcomes and next steps.
Reflection	Collaborator allows space for and invites reflection regarding the meeting with the domain expert.
Communication ^a	
Questioning	Collaborator effectively uses questioning throughout the meeting to provide clarity for both self and the domain expert Asks "great" questions that both elicit useful information and strengthen the relationship.
Listening	The collaborator listens attentively throughout the meeting. When the collaborator speaks, it is in direct response to the previous comment by the domain expert.
Paraphrasing	Collaborator paraphrases regularly throughout the meeting to clarify both their own language and the language of the domain expert.
Summarizing	Collaborator summarizes regularly throughout the meeting to solidify discussion topics and decisions made.

Vance, E. A., & Smith, H. S. (2019). The ASCCR Frame for Learning Essential Collaboration Skills. *Journal of Statistics Education*, 27(3), 265-274. <https://doi.org/10.1080/10691898.2019.1687370>

Alzen, J. L., Trumble, I. M., Cho, K. J., & Vance, E. A. (2024). Training Interdisciplinary Data Science Collaborators: A Comparative Case Study. *Journal of Statistics and Data Science Education*, 32(1), 73-82. <https://doi.org/10.1080/26939169.2023.2191666>

Claves para la colaboración internacional

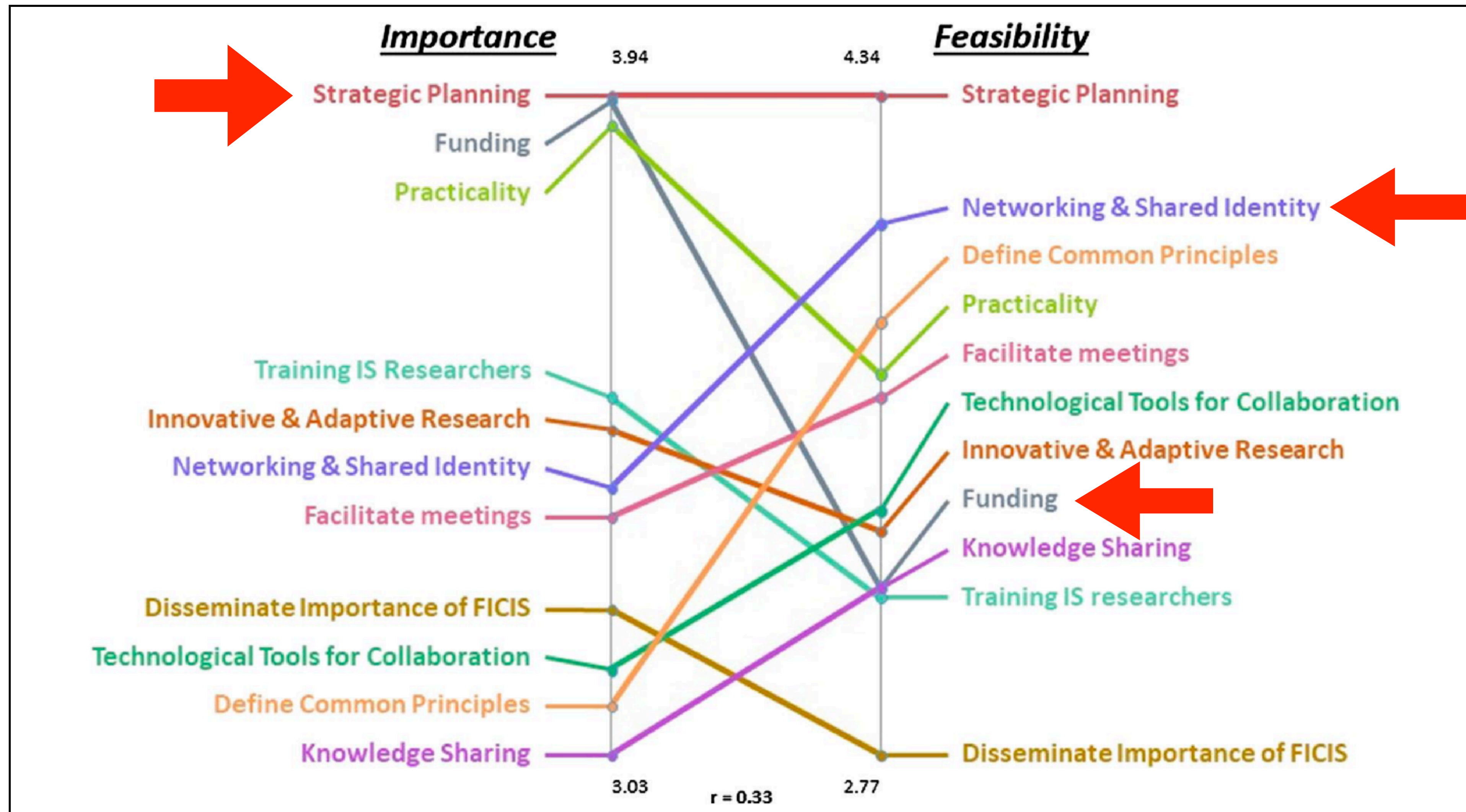
Aarons, G. A., Seijo, C., Green, A. E., Moullin, J. C., Hasson, H., Schwarz, U. von T., James, S., Ehrhart, M. G., Ducarroz, S., Sevdalis, N., & Willging, C. (2019). Fostering international collaboration in implementation science and research: A concept mapping exploratory study. BMC RESEARCH NOTES, 12(1). <https://doi.org/10.1186/s13104-019-4800-4>



“Implementation science (IS) aims to translate research findings into health and social care.”

Claves para la colaboración internacional

Aarons, G. A., Seijo, C., Green, A. E., Moullin, J. C., Hasson, H., Schwarz, U. von T., James, S., Ehrhart, M. G., Ducarroz, S., Sevdalis, N., & Willging, C. (2019). Fostering international collaboration in implementation science and research: A concept mapping exploratory study. BMC RESEARCH NOTES, 12(1). <https://doi.org/10.1186/s13104-019-4800-4>

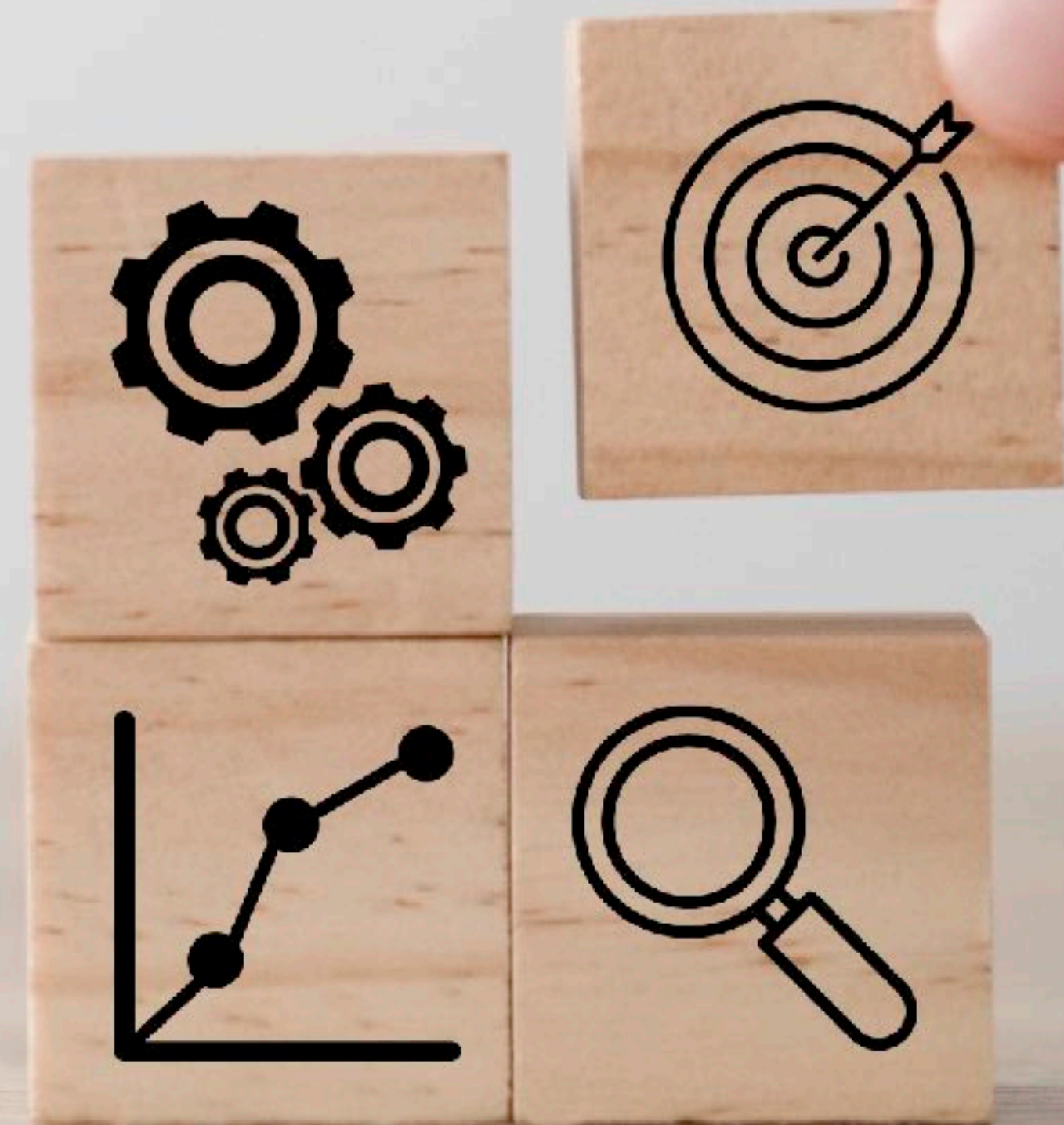


“Implementation science (IS) aims to translate research findings into health and social care.”

“Careful (strategic) planning, such as developing goals and principles for collaboration, is an essential and achievable first step in developing long-term collaborations.”



Necesitamos estrategias (a) para organizar y compartir el conocimiento de manera eficiente y (b) para la creación y gestión de redes digitales de aprendizaje e investigación.



Creación de “cultura de red” por parte de las instituciones y gobiernos.



La “European Universities Initiative” de la Comisión Europea

European Universities initiative

Transnational alliances of higher education institutions, paving the way towards the universities of the future.



The European Universities alliances are part of a flagship initiative of the European strategy for universities. They encompass 65 European Universities alliances with more than 570 higher education institutions of all types, from all across Europe.

Spain

there are **56** higher education institutions part of European Universities alliances.

University of Granada is part of the **Arqus** alliance

Universitat Rovira i Virgili is part of the **Aurora** alliance

University of Barcelona is part of the **CHARM-EU** alliance

IE University is part of the **CIVICA** alliance

Autonomous University of Madrid is part of the **CIVIS** alliance

University of Castilla-La Mancha is part of the **COLOURS** alliance

University of Salamanca is part of the **EC2U** alliance

Autonomous University of Barcelona is part of the **ECIU University** alliance

Jaume I University is part of the **EDUC** alliance

Polytechnic University of Madrid is part of the **EELISA** alliance

Ramon Llull University is part of the **ENGAGE.EU** alliance

Universitat Politècnica de Valencia is part of the **ENHANCE** alliance

University of the Basque Country is part of the **ENLIGHT** alliance

University of Las Palmas de Gran Canaria is part of the **ERUA** alliance

University of Extremadura is part of the **EU GREEN** alliance

Mondragon University is part of the **EU4DUAL** alliance

Catholic University of Valencia is part of the **EU-CONEXUS** alliance

University of Alcalá is part of the **EUGLOH** alliance

University Rey Juan Carlos is part of the **EULiST** alliance

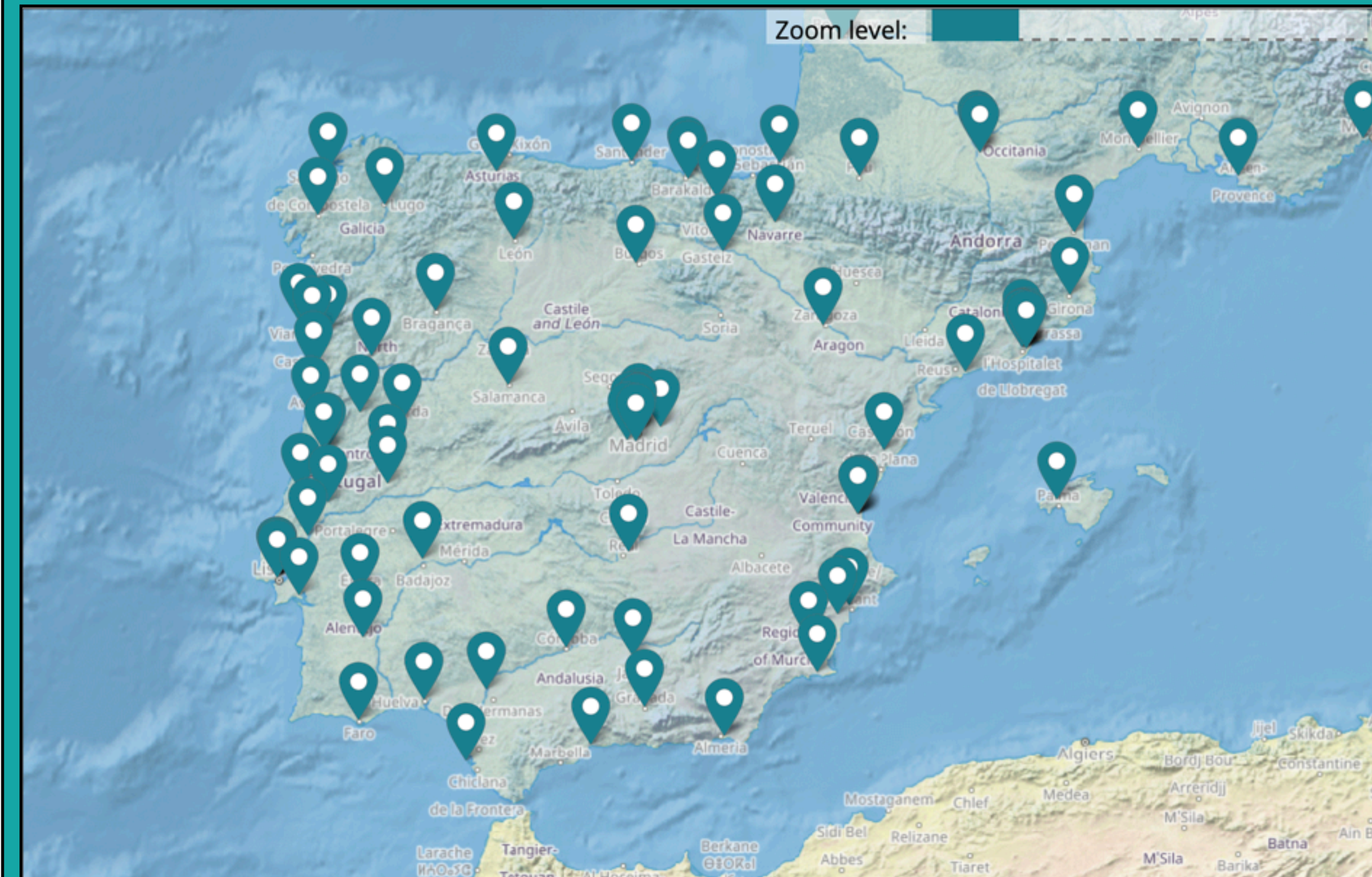
University of Cantabria is part of the **EUNICE** alliance

University of Murcia is part of the **EUniWell** alliance

University of Santiago de Compostela (Campus Lugo) is part of the **EUniWell** alliance

University of Santiago de Compostela (Campus Santiago de Compostela) is part of the **EUniWell** alliance

Comillas Pontifical University is part of the **EUPeace** alliance



<https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative>

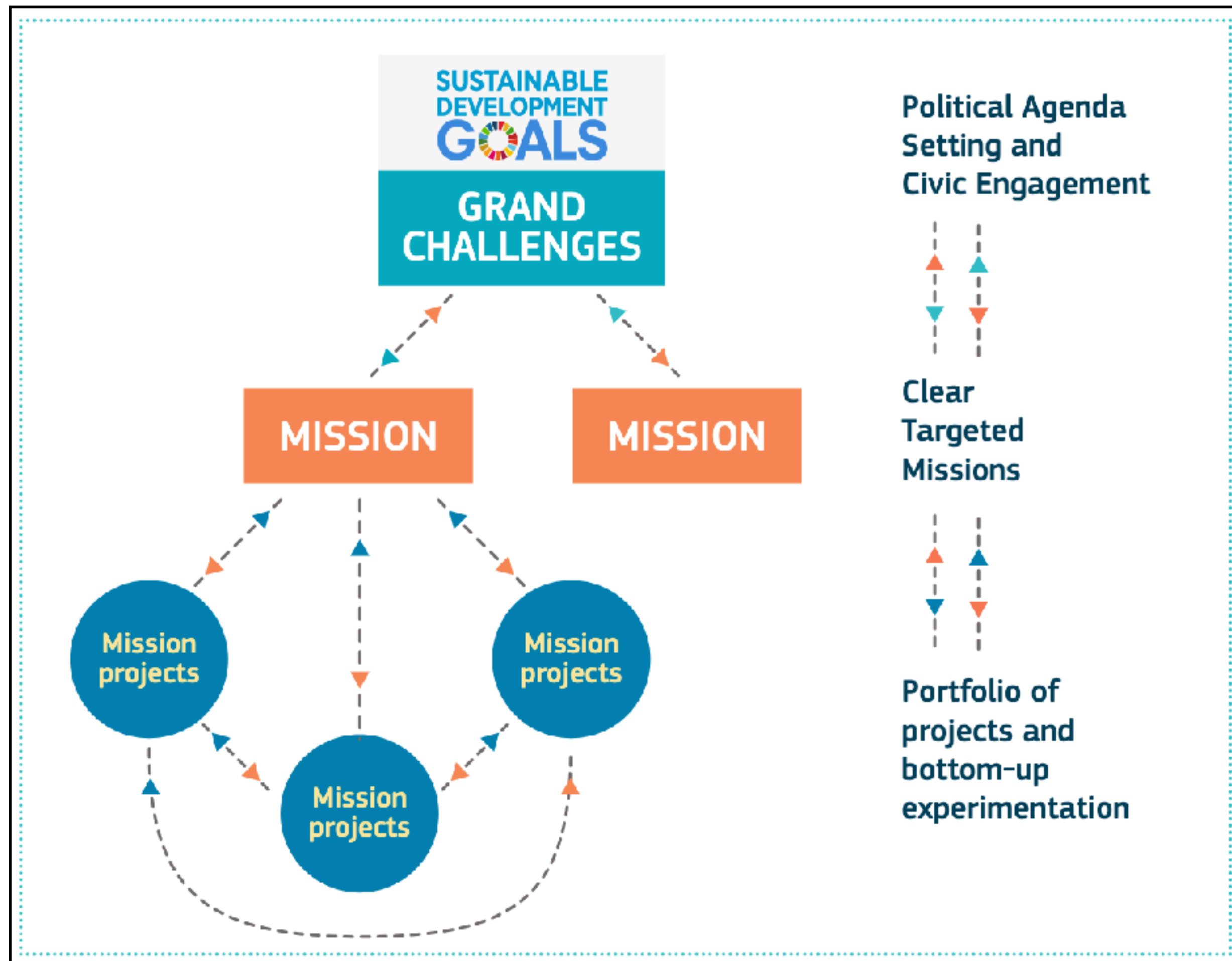
“One of the key elements for the alliances is the development of a common science agenda, which would ideally work as a joint research strategy to deepen scientific collaboration among the alliance partners, and would integrate a number of priority areas predefined by the EC to link different ecosystems.”

Llorca, J., Royuela, V., Evans, C., Diaz-Guilera, A., & Ramos, R. (2025). Fostering interdisciplinarity and collaboration: The role of challenge-driven research in European University Alliances through the CHARM-EU experience. *Humanities and Social Sciences Communications*, 12(1). <https://doi.org/10.1057/s41599-025-04410-0>



“The concept of “grand challenges” serves as an ideal framework for transnational institution building processes... This approach, assumed by the EU in its research policy orientations since 2007, addresses societal and other challenges with a multidisciplinary, cross-sectoral mindset, integrating education and research to prompt joint research strategic planning by creating learning networks that enable universities to share knowledge, align strategies, and engage in moral reflection.”

Llorca, J., Royuela, V., Evans, C., Diaz-Guilera, A., & Ramos, R. (2025). Fostering interdisciplinarity and collaboration: The role of challenge-driven research in European University Alliances through the CHARM-EU experience. *Humanities and Social Sciences Communications*, 12(1). <https://doi.org/10.1057/s41599-025-04410-0>

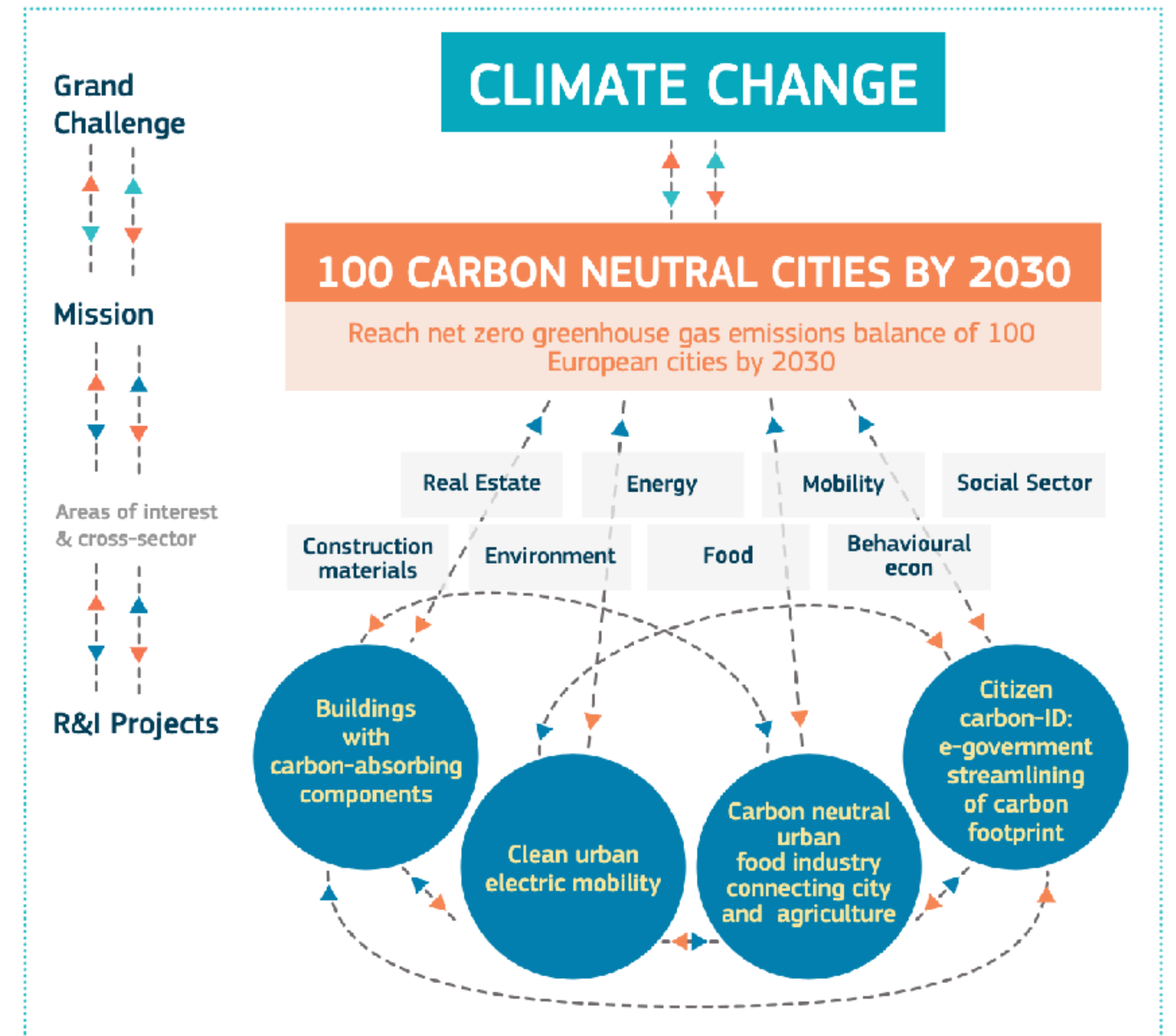


“Mission-oriented policies can be defined as systemic public policies that draw on frontier knowledge to attain specific goals or “big science” deployed to meet big problems”. Missions provide a solution, an opportunity, and an approach to address the numerous challenges that people face in their daily lives.”

European Commission: Directorate-General for Research and Innovation & Mazzucato, Mariana. (2018). Mission-oriented research & innovation in the European Union: a problem-solving approach to fuel innovation-led growth, Publications Office.

<https://data.europa.eu/doi/10.2777/360325>

“Missions should be framed in such a way as to spark activity across, and among, multiple scientific disciplines (including social sciences and humanities), across different industrial sectors (e.g. transport, nutrition, health, services), and different types of actors (public, private, third sector, civil society organisations).”

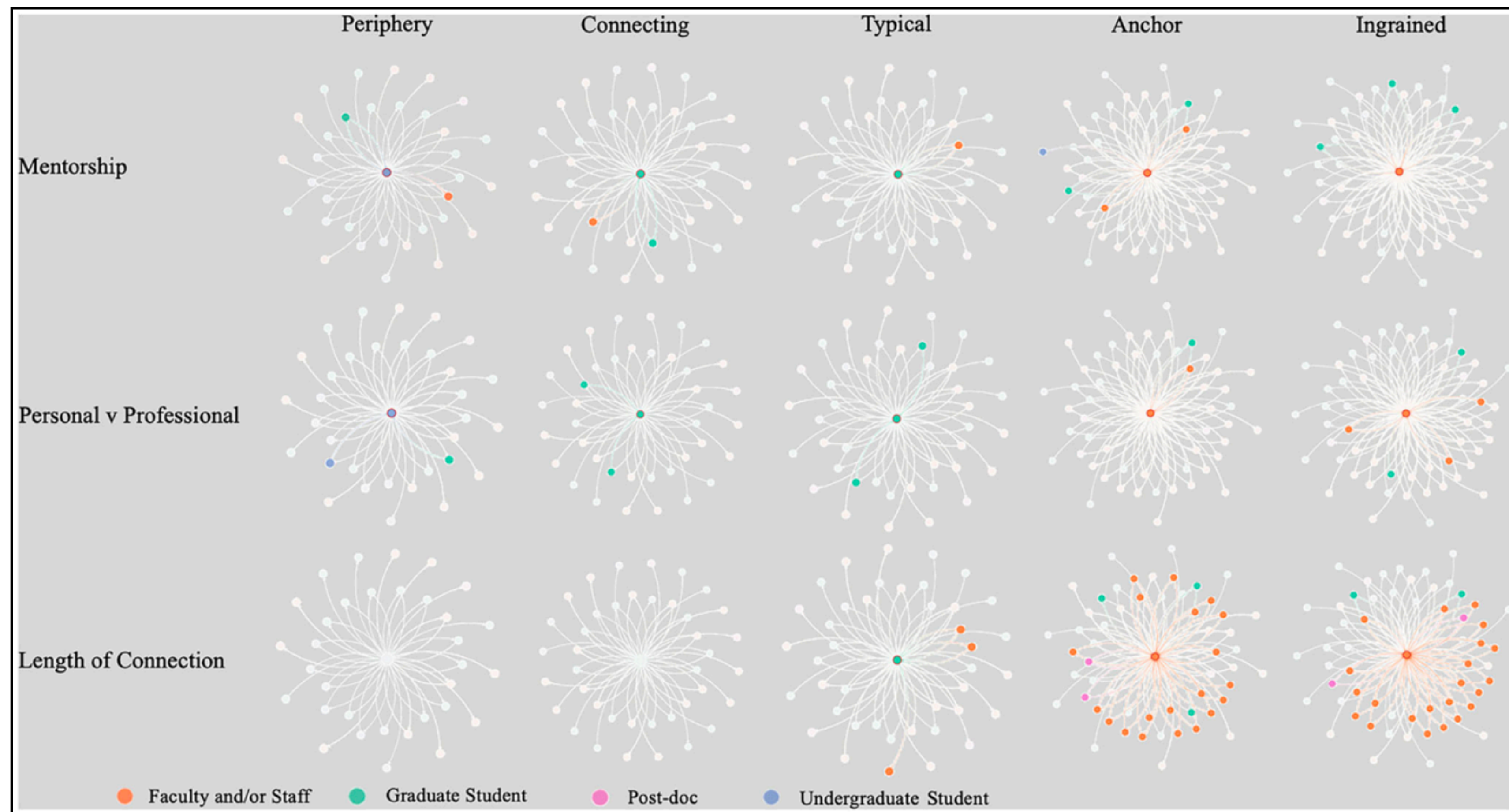


European Commission: Directorate-General for Research and Innovation & Mazzucato, Mariana. (2018). Mission-oriented research & innovation in the European Union : a problem-solving approach to fuel innovation-led growth, Publications Office.
<https://data.europa.eu/doi/10.2777/360325>

**“Only groups or communities qualify for construction and production of knowledge...
Consensus is achieved and recorded by communities.
We can therefore view knowledge-generating agents as communities and
subcommunities, rather than individuals.”**

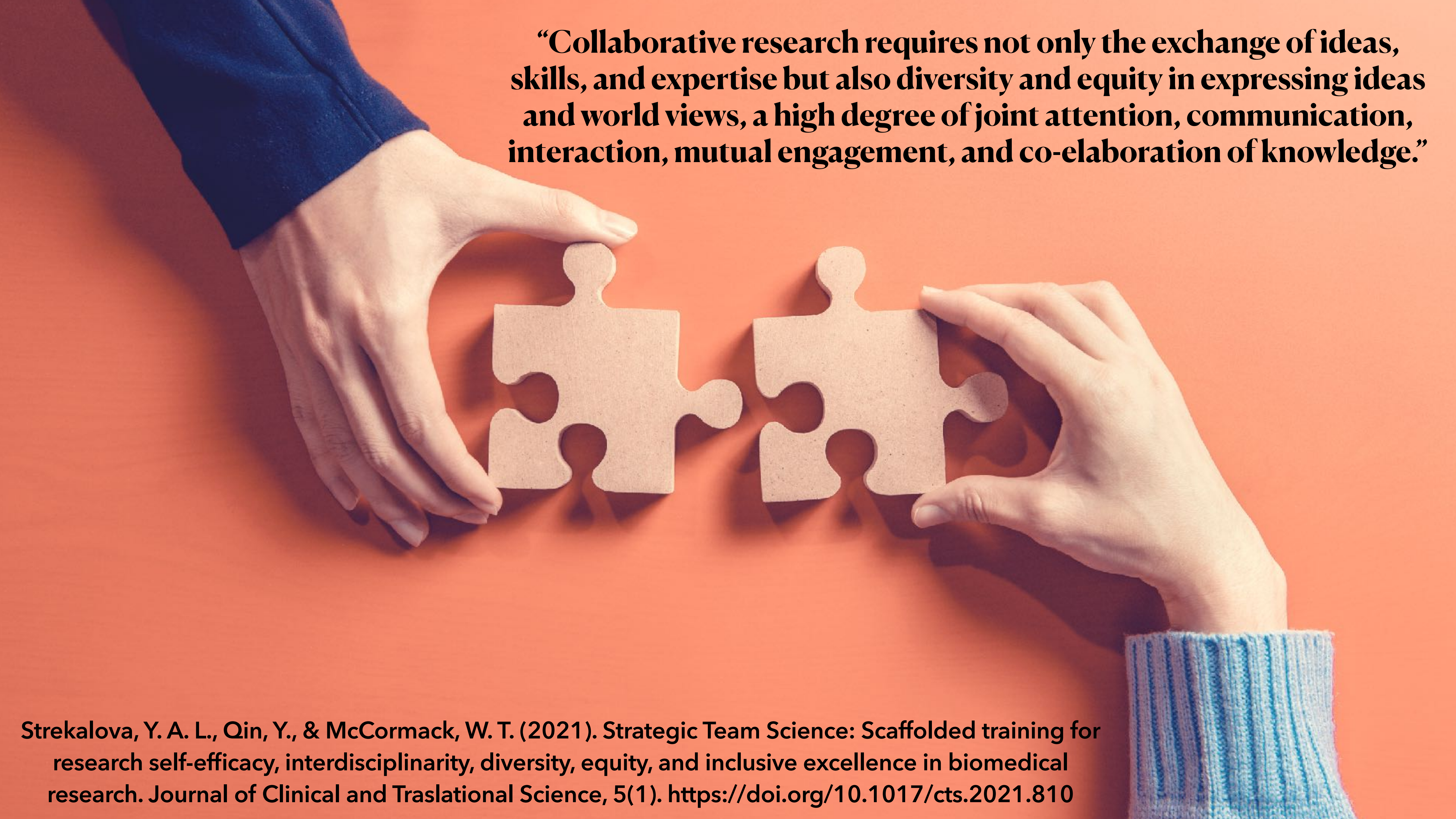


“The effectiveness of a transdisciplinary research team depends not only on its assemblage of scientific knowledge experts but also on its relational capacity to exchange and strengthen this expertise over time.”



La Comunidad de Práctica como marco de acción, reflexión y aprendizaje



A photograph showing two hands, one from a person wearing a dark blue long-sleeved shirt and the other from a person wearing a light blue ribbed sweater, holding two large, light brown cardboard puzzle pieces. The puzzle pieces are interlocking and are being held up against a solid orange background. The hands are positioned on either side of the puzzle pieces, with the fingers gently gripping the edges. The lighting is soft, casting gentle shadows on the orange surface.

“Collaborative research requires not only the exchange of ideas, skills, and expertise but also diversity and equity in expressing ideas and world views, a high degree of joint attention, communication, interaction, mutual engagement, and co-elaboration of knowledge.”

Strekalova, Y. A. L., Qin, Y., & McCormack, W. T. (2021). Strategic Team Science: Scaffolded training for research self-efficacy, interdisciplinarity, diversity, equity, and inclusive excellence in biomedical research. *Journal of Clinical and Translational Science*, 5(1). <https://doi.org/10.1017/cts.2021.810>

“Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor.”

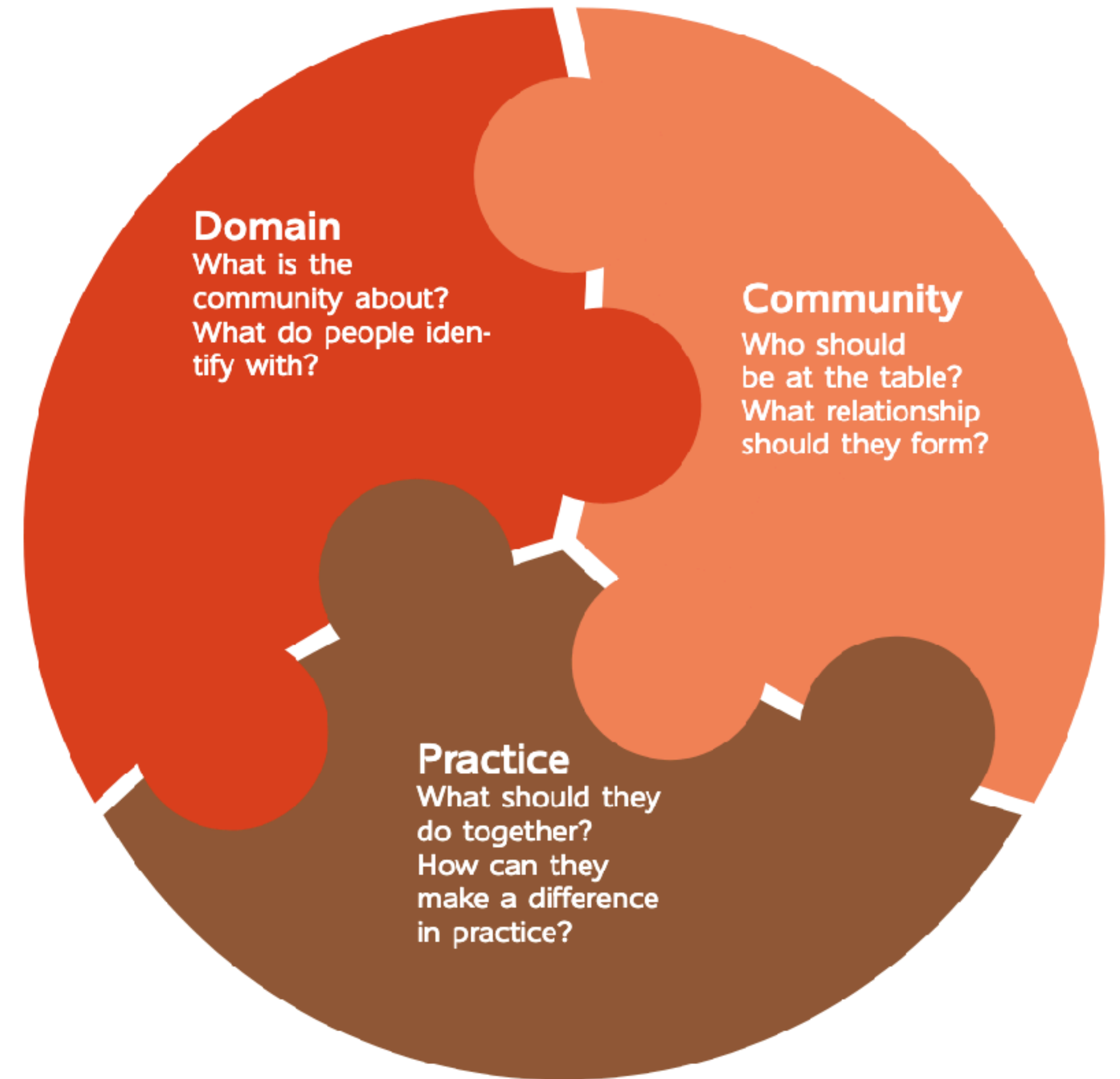


Figure 1.1

Structural elements of a community of practice

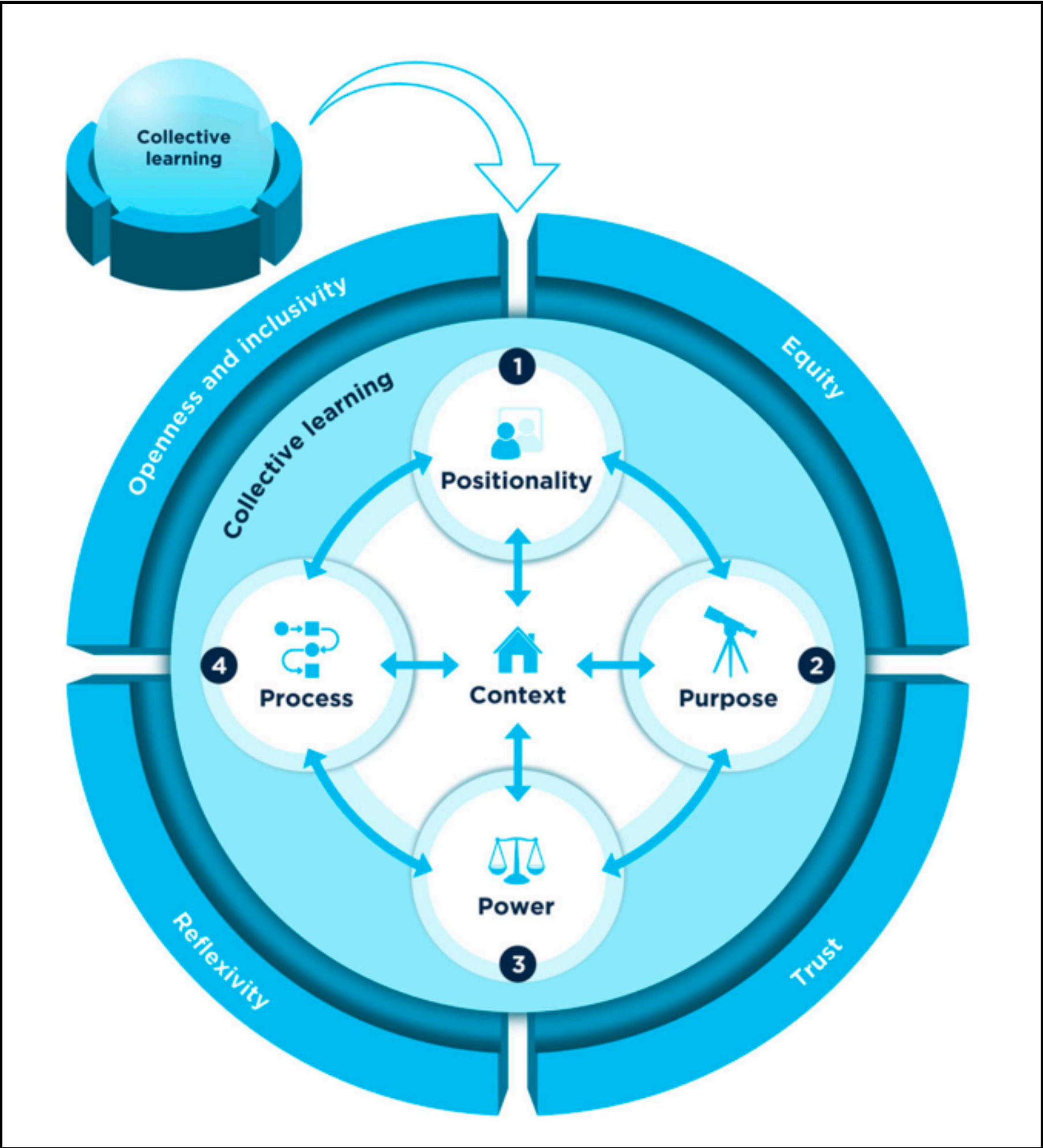


Table 1 Description of each co-production element in the Context centred 4 P's knowledge co-production framework (Fig. 1).

Co-production element	Description	See for example
 Context	The scope, context, operating space, research or intervention setting of the project. Many frameworks are available to assist characterising this, but each provides a limited lens so need to be considered carefully. Inclusion of knowledge systems and temporal and scalar aspects is useful to open participants view of the system, as is a framework that is not too narrowly prescriptive.	(Fazey et al. 2018, Ostrom, 2009, Leith et al. 2014, Gorddard et al. 2016)
 Positionality	Refers to the multi-layered characteristics (social + researcher identities) that make up individuals and teams and require an awareness of how they and others see themselves in relation to others. Include: • Individual researcher identity (i.e. social demographic factors, onto-epistemological & values) • Project team collective and strategic (organisational) positioning • (for later on) researcher role/positioning within transdisciplinary research collective. The particular (or multiple) 'hats' or roles an individual wears/performs. (Note this is shaped by co-production context & purpose)	(Maclean et al. 2022, Secules et al. 2021, Holmes, 2020, Pearce and Ejderyan, 2020)
 Purpose	Refers to both the <i>research purpose</i> (project aims) and the <i>purposes for engaging with co-production</i> . Both purposes need to be explored within the team, potentially to be revisited with transdisciplinary collaborators. Where appropriate, research and co-production purposes can be co-designed, and revisited in project monitoring.	(Chambers et al. 2021, Leith et al. 2017, Pearce and Ejderyan, 2020)
 Power	Refers to making visible and transparent the variety of power differentials that exist within research collaborations and broader societal actors involved in change processes. Reflects access to decision making via various frameworks, for example, these could comprise ideological, structural, actor and resource or discursive power. Dynamics of power and influence shape every aspect of research, from funding, problem definition, methodological preference, to who is involved, how engagement occurs, what outputs are produced and who benefits (or not).	(Lukes, 1974, McCabe et al. 2021, Turnhout et al. 2020, Avelino, 2017, Saif et al. 2022)
 Process	Refers to establishing the governance, learning, risk/benefit sharing and evaluation operating conditions, as well as the respective roles and responsibilities of individuals within the extended research collective. An effective collective learning environment requires foundational pillars of equity, trust, reflexivity, openness and inclusivity.	(O'Connor et al. 2019, Austin et al. 2019, Campion et al. 2023, Greenaway et al. 2022, Djenontin and Meadow, 2018, Freeth and Caniglia, 2020)



**Hay tres partes constitutivas de una
comunidad de práctica:
compromiso mutuo; un propósito y una
tarea conjuntas; y un repertorio compartido.**

Cousin, G., & Deepwell, F. (2005). Designs for network learning: A communities of practice perspective. *Studies in Higher Education*, 30(1), 57-66. <https://doi.org/10.1080/0307507052000307795>

A decorative graphic on the left side of the slide, featuring a network of stylized human figures in circular frames, connected by lines, set against a dark background.

10 rasgos de una CdP eficiente

1. Reto > Misión > Proyectos > Objetivos > Resultados > Indicadores > Prácticas
2. Gestión del tiempo ajustada al reto y cada una de las fases
3. Sentimiento de pertenencia a la comunidad.
4. Compromiso por parte de todos los miembros de la comunidad respecto al grupo y a la tarea que debe abordar.
5. Normas y protocolos de comportamiento y comunicación.
6. Práctica conjunta, colaboración, participación (en interacciones conjuntas, en espacios comunes físicos o digitales).
7. Acceso a recursos compartidos y generación de hitos en forma de artefactos digitales .
8. Capacidad del grupo para decidir las herramientas de gestión y comunicación a utilizar.
9. La importancia de la dinamización de la CdA.
10. La necesidad de apoyo técnico.

Artefactos digitales



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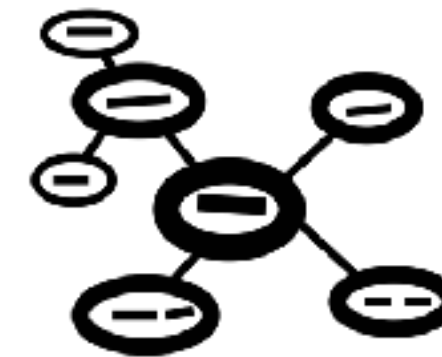
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Aprendizaje en red desde una CdP

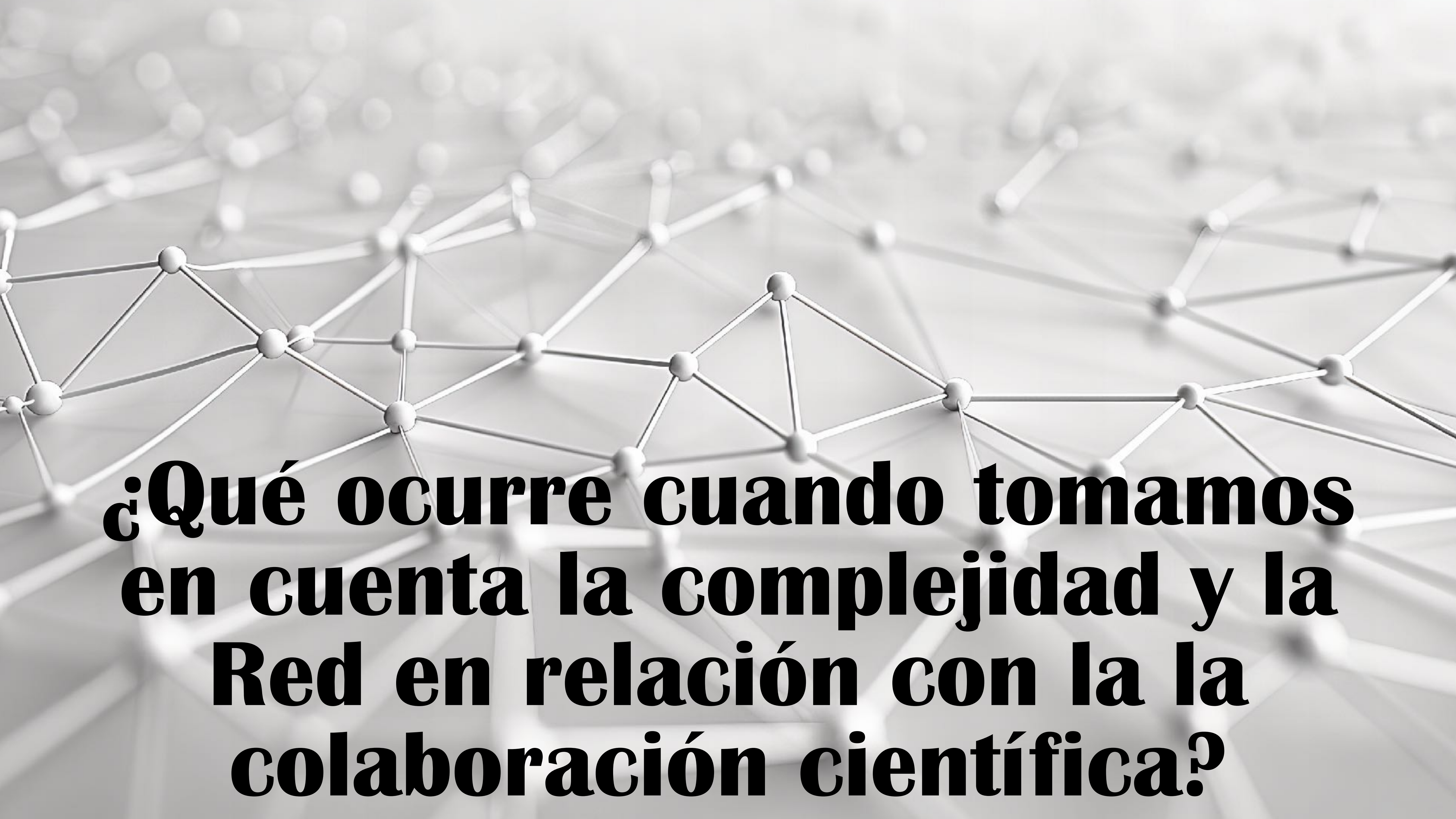
- Es necesario que haya tiempo para que un grupo desarrolle un repertorio compartido.
- Las prácticas de aprendizaje y las prácticas sociales están interconectadas.
- La participación creativa debe equilibrarse con la “reificación” (prácticas establecidas, normas, producción de artefactos, etc.).
- La variedad de niveles de experiencia y competencia puede promover el aprendizaje (por ejemplo, los “recién llegados” y los “participantes periféricos” pueden aportar ideas frescas y transformadoras);
- El aprendizaje en red debe apoyar las visitas a la «otredad» (facilidades de imaginación) y equilibrar esto con formas de “volver a casa” (facilidades de alineación).

Cousin, G., & Deepwell, F. (2005).
Designs for network learning: A
communities of practice perspective.
Studies in Higher Education, 30(1), 57-
66. [https://doi.org/
10.1080/0307507052000307795](https://doi.org/10.1080/0307507052000307795)



Name	Characteristics of other structures	Communities of practice
Team	■ Deliver a product, service, or function ■ Focus on a task with a joint commitment to achieving it ■ Disband when task is done	■ Deliver a capability ■ Commitment to a learning partnership across multiple tasks or teams ■ Evolve until domain no longer relevant
Task force	■ Seeking solution to a broad problem ■ Members come as representatives of specific constituencies ■ Agreed solution requires negotiation across perspectives	■ Members participate as individual learners even if they represent different organizational units ■ Mutual engagement not necessarily expected to produce a unique, negotiated position
Training	■ Transmission of a curriculum defined by experts ■ May or may not be relevant to practice ■ Timebound learning events	■ Practitioners in the driver's seat ■ Learning driven by challenges of practice and directly relevant to practice ■ Ongoing learning loops over time
Network	■ Defined by connections among people ■ Does not require a collective identity or focus ■ Enables information flows in broad and unpredictable ways ■ Easy entry and exit	■ Defined by identification with a shared domain ■ Commitment to collective progress in practice ■ Information flows more focused and predictable because of shared commitment ■ Membership significant

Wenger-Trayner, E., Wenger-Trayner, B., Reid, P., & de Bruderlein. (2023). Communities of Practice. Social Learning Lab.

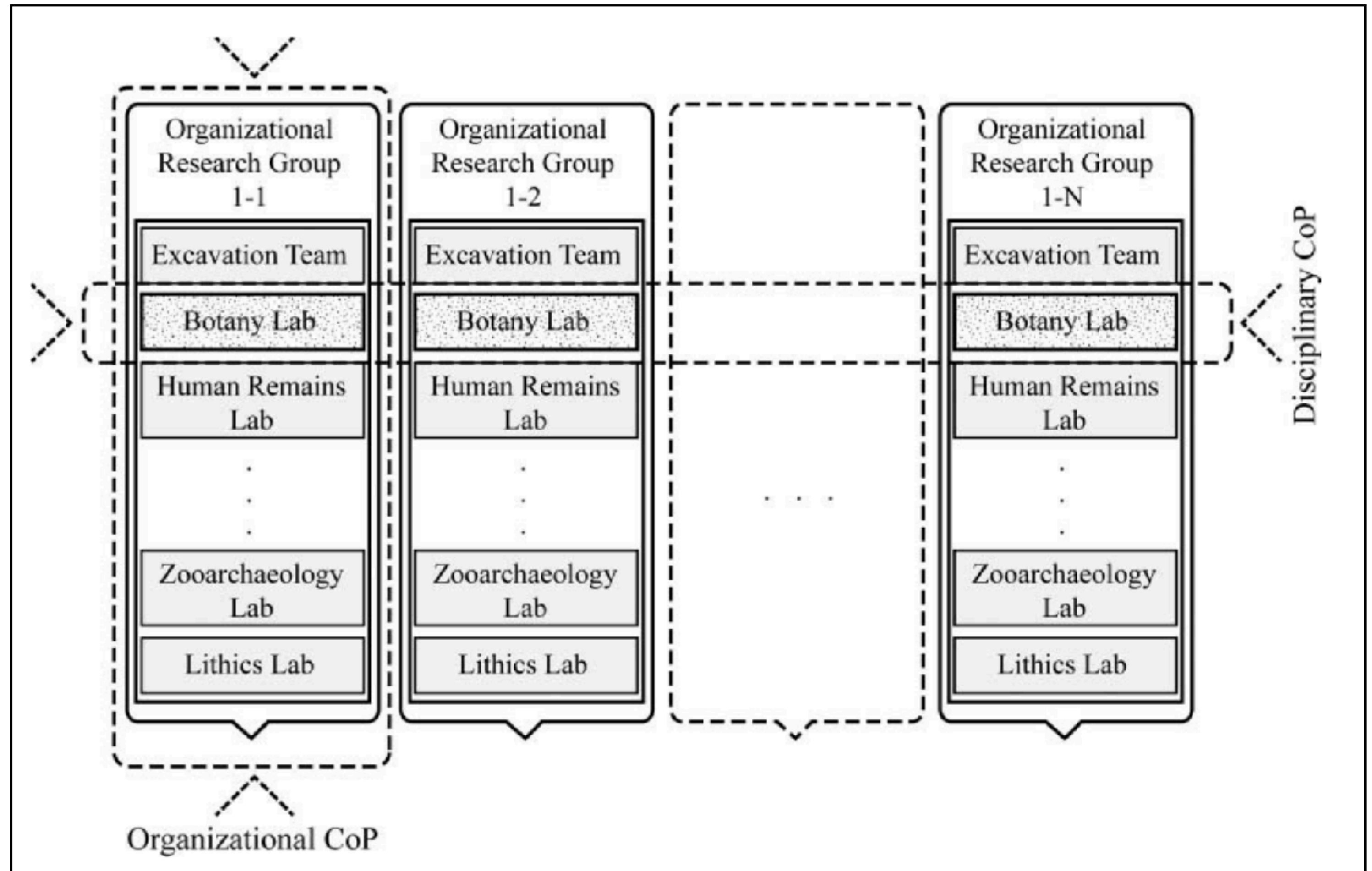


**¿Qué ocurre cuando tomamos
en cuenta la complejidad y la
Red en relación con la la
colaboración científica?**

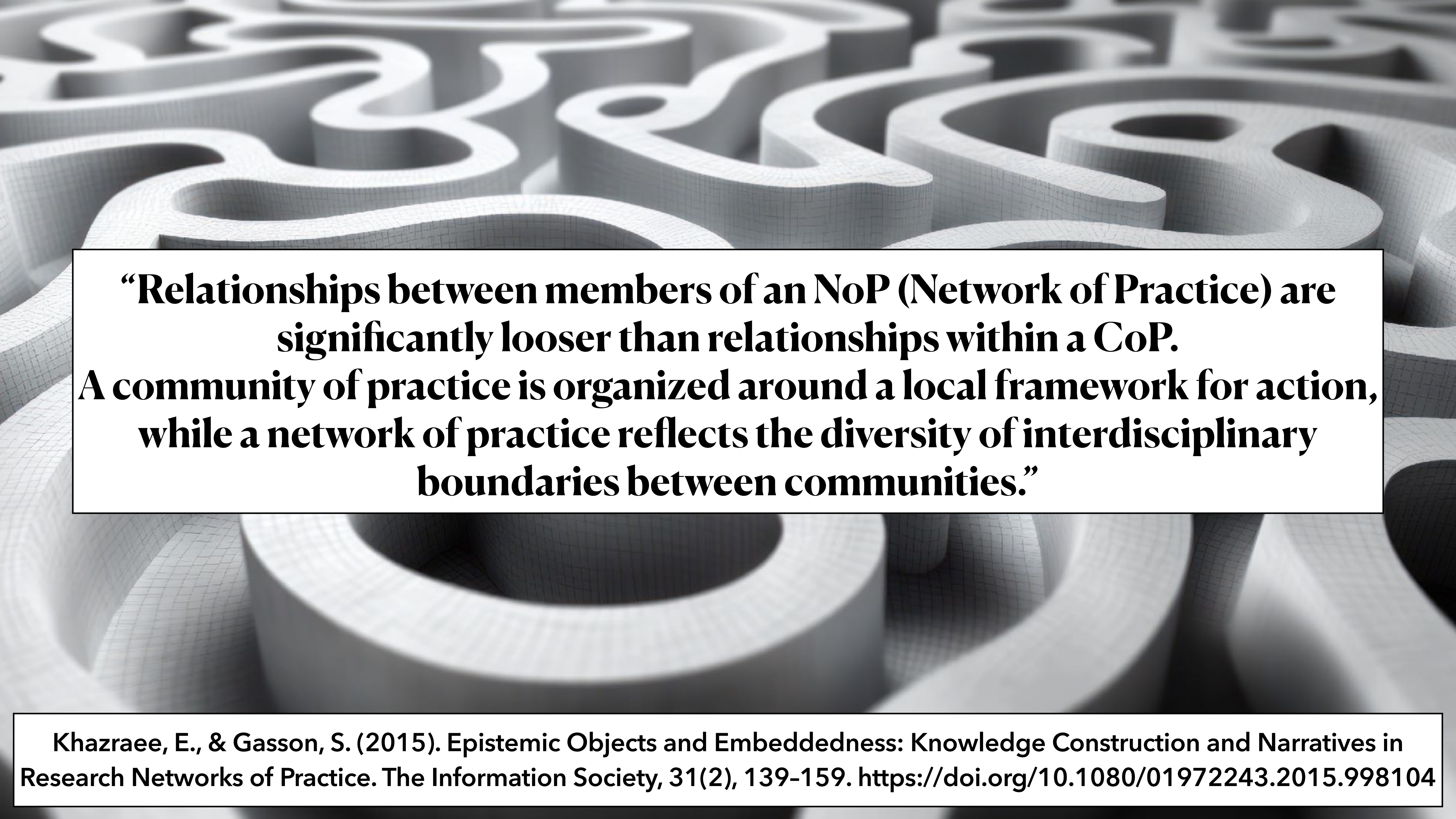
“Virtual knowing relies on elaborate networks that support distanciated connectivity, while knowing in action within professional or high creativity collaborations draws upon a mixture of virtual interaction, temporary local coalitions, institutional and professional ties that are not reducible to local space, and varied forms and intensities of mobility.”



“Individual researchers work within project-based or organizational groups that span different disciplines. These groups constitute a community of practice, a collectivity collaborating around common practices, shared cultural norms, and values.”

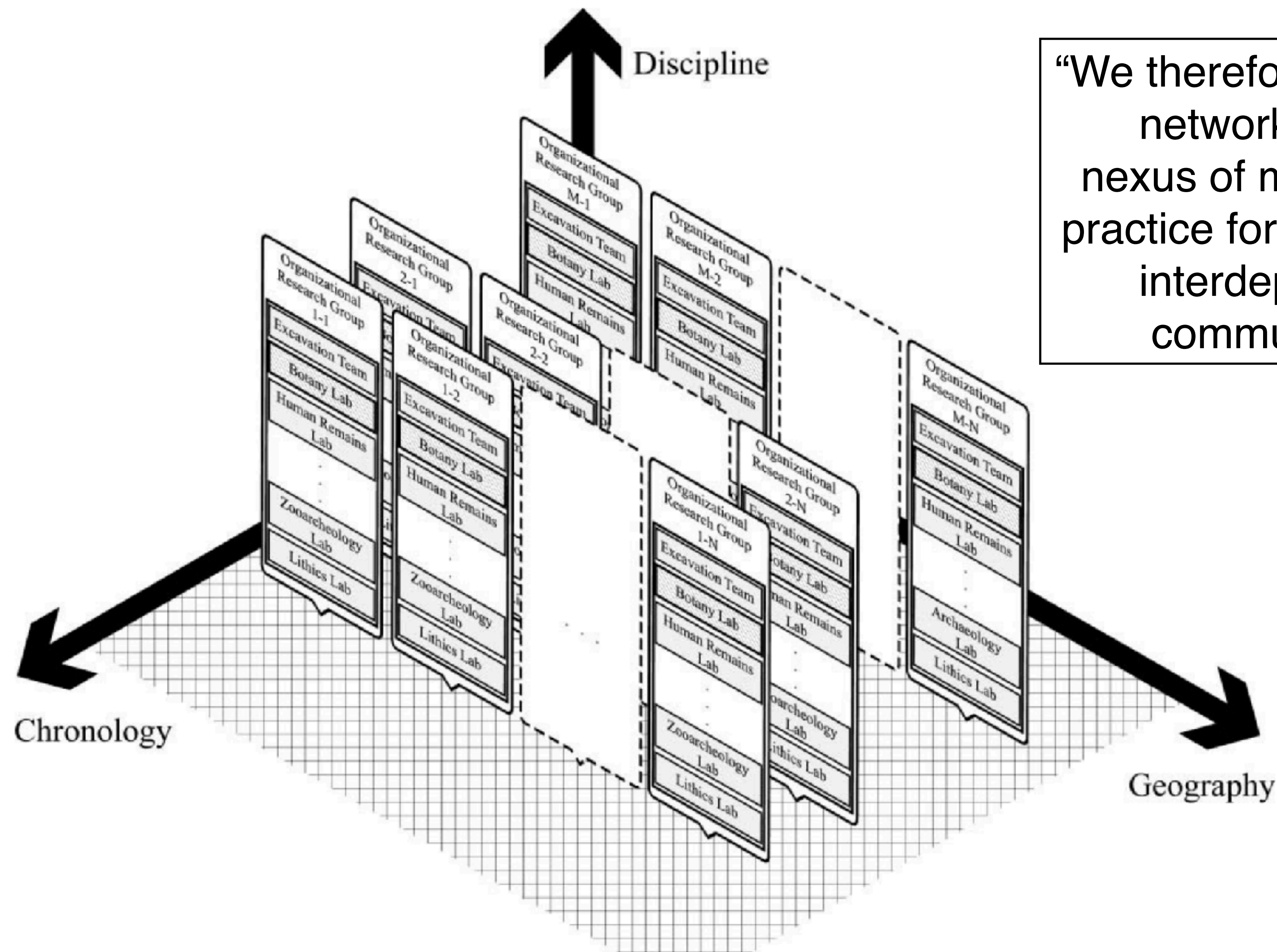


Khazraee, E., & Gasson, S. (2015). Epistemic Objects and Embeddedness: Knowledge Construction and Narratives in Research Networks of Practice. *The Information Society*, 31(2), 139–159. <https://doi.org/10.1080/01972243.2015.998104>



“Relationships between members of an NoP (Network of Practice) are significantly looser than relationships within a CoP. A community of practice is organized around a local framework for action, while a network of practice reflects the diversity of interdisciplinary boundaries between communities.”

Khazraee, E., & Gasson, S. (2015). Epistemic Objects and Embeddedness: Knowledge Construction and Narratives in Research Networks of Practice. The Information Society, 31(2), 139-159. <https://doi.org/10.1080/01972243.2015.998104>



“We therefore conceptualize a network of practice as the nexus of materially mediated practice formed around linked interdependencies across communities of practice.”

Khazraee, E., & Gasson, S. (2015). Epistemic Objects and Embeddedness: Knowledge Construction and Narratives in Research Networks of Practice. *The Information Society*, 31(2), 139-159. <https://doi.org/10.1080/01972243.2015.998104>

★ TURN ★
IDEAS INTO
REALITY



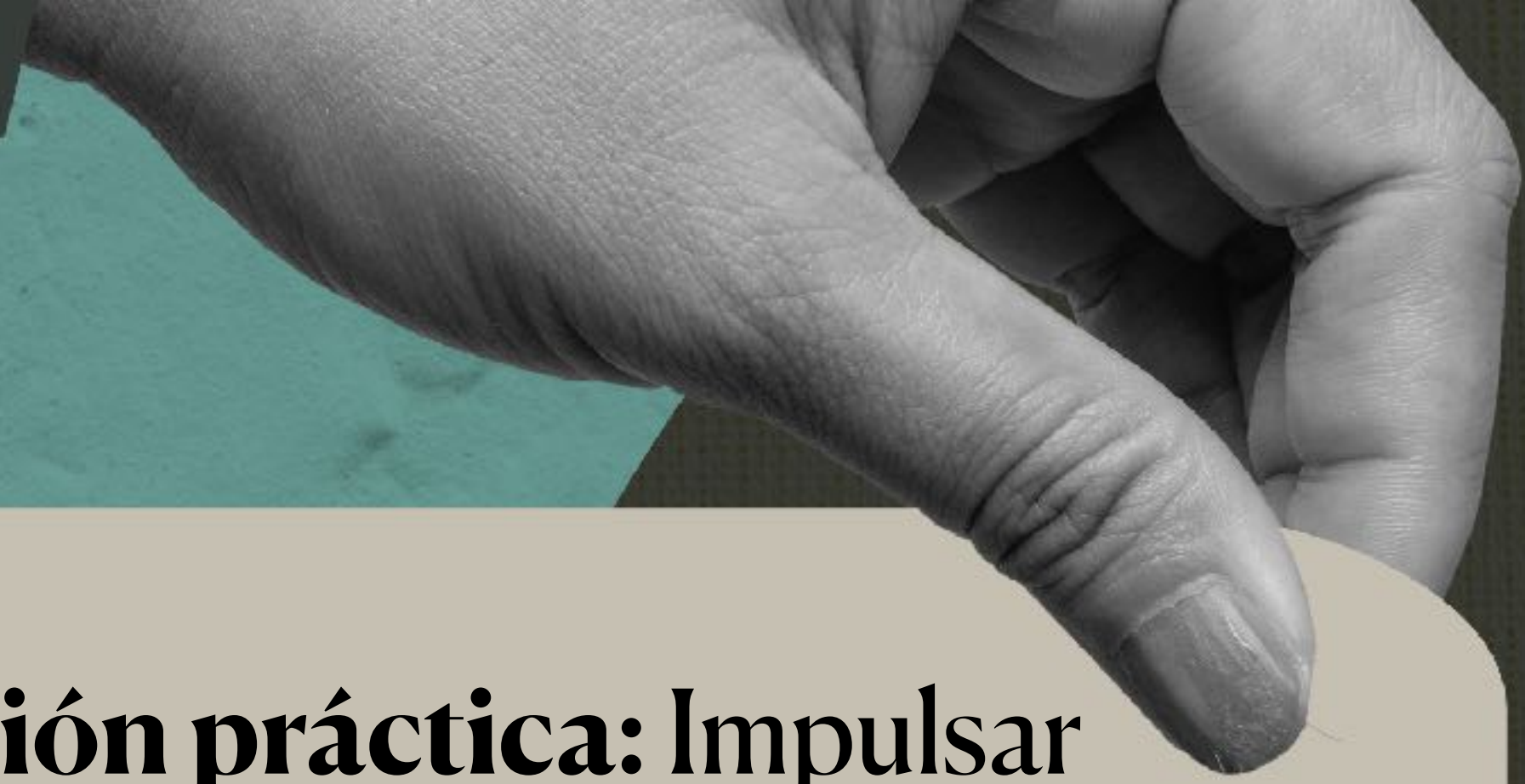


Un decálogo para la colaboración científica en red

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1. Fomentar la Cultura de Colaboración y Red (CCR):

La colaboración científica es fundamental para impulsar la investigación y la innovación y para abordar las “grandes preguntas”. Es crucial crear una "cultura de red" dentro de la institución y por parte de los gobiernos.



Recomendación práctica: Impulsar campañas de sensibilización interna y programas de mentoría interdepartamentales

que promuevan la colaboración activa y el intercambio de experiencias entre investigadores de distintas áreas.



“

2. Abrazar la Ciencia Abierta en equipo:

La investigación académica es cada vez más social, y la tendencia hacia la ciencia abierta y en equipo es robusta e indiscutible. La colaboración se ha convertido en una necesidad más que una elección en la ciencia contemporánea.

”





Recomendación práctica: Crear incentivos y reconocimientos para la participación en proyectos de "Team Science"



facilitando la formación de equipos multidisciplinarios tanto a nivel nacional como internacional.

“

3. Superar las barreras y miedos digitales:
La resistencia a nuevas herramientas es natural
(la tecnología como "némesis" digital).
Enfrentémosla con capacitación adaptada y
resaltando los beneficios tangibles que las
herramientas digitales aportan al trabajo diario.

”

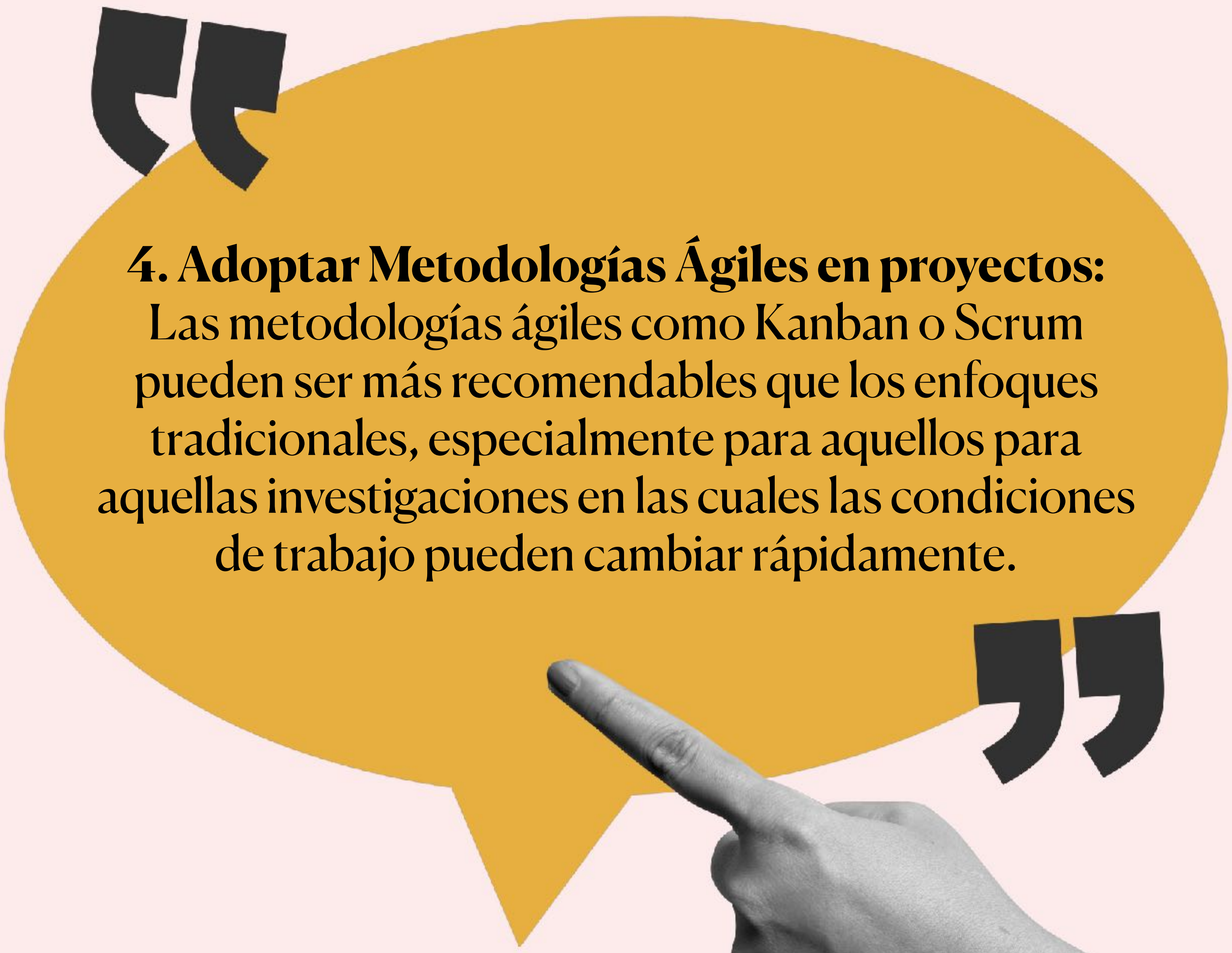




Recomendación práctica: Ofrecer talleres prácticos y personalizados y experiencias informales de aprendizaje sobre el uso de herramientas de colaboración digital



(ej. Teams, Trello, Notion)
dirigidos a todo el personal, con especial atención a aquellos con menor familiaridad tecnológica.

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4. Adoptar Metodologías Ágiles en proyectos:
Las metodologías ágiles como Kanban o Scrum pueden ser más recomendables que los enfoques tradicionales, especialmente para aquellos para aquellas investigaciones en las cuales las condiciones de trabajo pueden cambiar rápidamente.



Recomendación práctica:
Implementar el uso de tableros visuales
(ej. Trello, Microsoft Planner) para la
gestión de proyectos



permite una visualización
clara del flujo de trabajo y
una adaptación rápida a los
imprevistos.

5. Poner el foco en la información y comunicación:

Es importante utilizar herramientas digitales que permitan un repositorio único de conocimiento, facilitando el acceso, la organización y el seguimiento del progreso del proyecto así como establecer protocolos claros para cuándo usar cada canal de comunicación (correo, mensajería, videoconferencia).

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Recomendación práctica: Establecer
y promover el uso de una plataforma
digital integrada que unifique

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la gestión de proyectos, la
comunicación y el
almacenamiento de archivos,
evitando la fragmentación de la
información.

“

6. Optimizar la producción de documentos técnicos y científicos de manera colaborativa:

El uso de herramientas digitales puede promover una producción más eficaz de documentos a lo largo de los proyectos. Para ello, una visión expandida de los documentos como “artefactos digitales” puede ser de utilidad.

”





Recomendación práctica: Emplear plataformas de edición colaborativa para documentos compartidos



o incentivar el uso de Electronic Lab Notebooks o wikis para manuales de laboratorio y procedimientos.

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**7. Gestionar el “código fuente” de la investigación
(datos, procesos, resultados) de forma
colaborativa:**

Disponer de mecanismos para el manejo del “código fuente” de la investigación de manera colaborativa es el primer paso para la Ciencia Abierta, y también para la calidad y la eficiencia de nuestra investigación.

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Recomendación práctica: Proporcionar formación y soporte técnico para el uso de plataformas de control de versiones (ej. GitHub, GitLab) a todo el personal investigador

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asegurando que se cumplan los principios de la ciencia abierta, la seguridad en el manejo de los datos y la trazabilidad del proceso.

8. Aprovechar de manera intensiva las Redes de Investigación de la institución... y más allá:

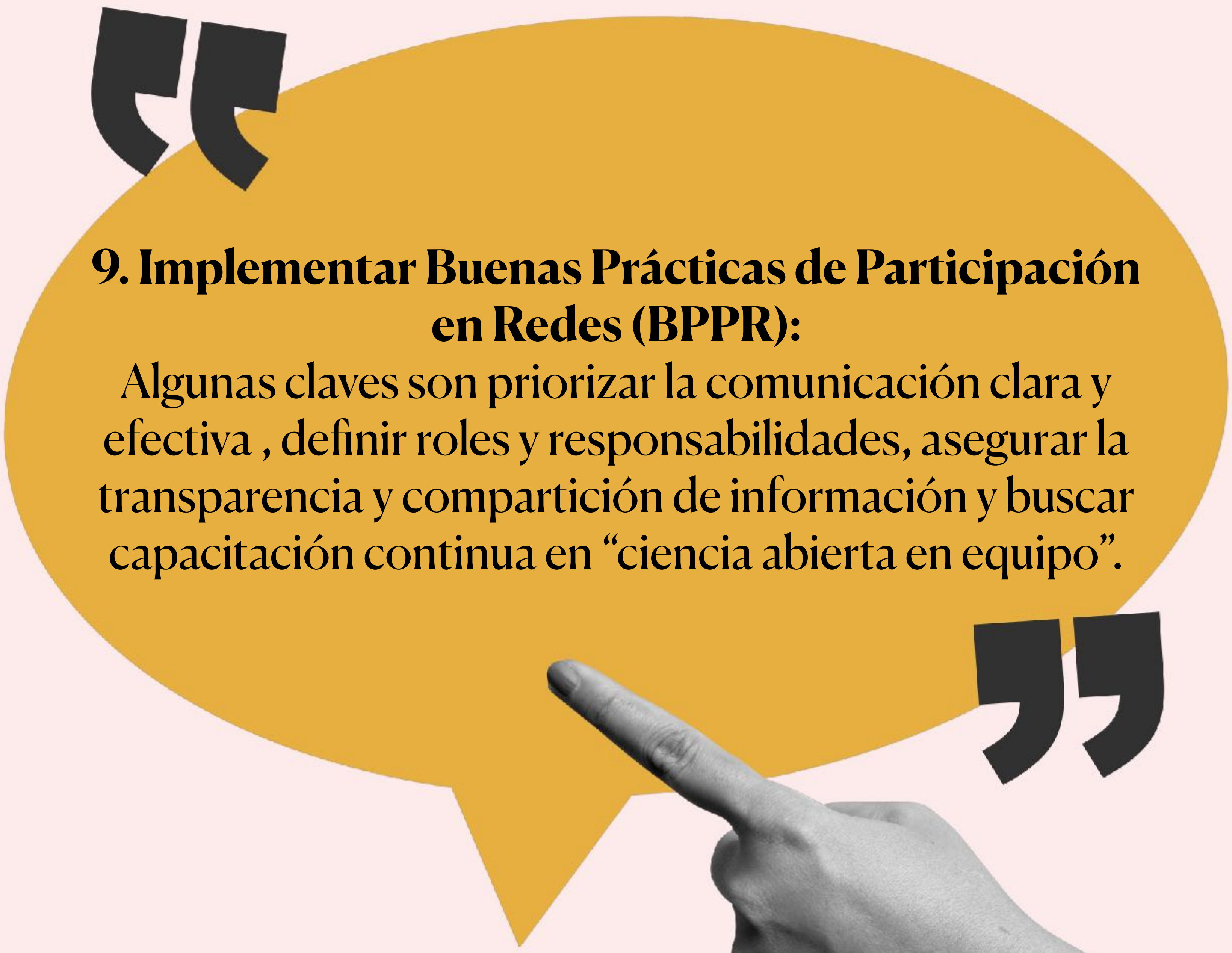
Participar activamente en las Plataformas Temáticas Interdisciplinarias (PTIs) del CSIC y otras redes (AEI, CYTED, COST Actions) nos permite generar las Redes de Práctica necesarias para la investigación.

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Recomendación práctica: Mantener un directorio actualizado de las redes de investigación activas en las que la institución participa

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facilitando la identificación y el acceso a los investigadores interesados, y promover activamente la participación en convocatorias de redes.



9. Implementar Buenas Prácticas de Participación en Redes (BPPR):

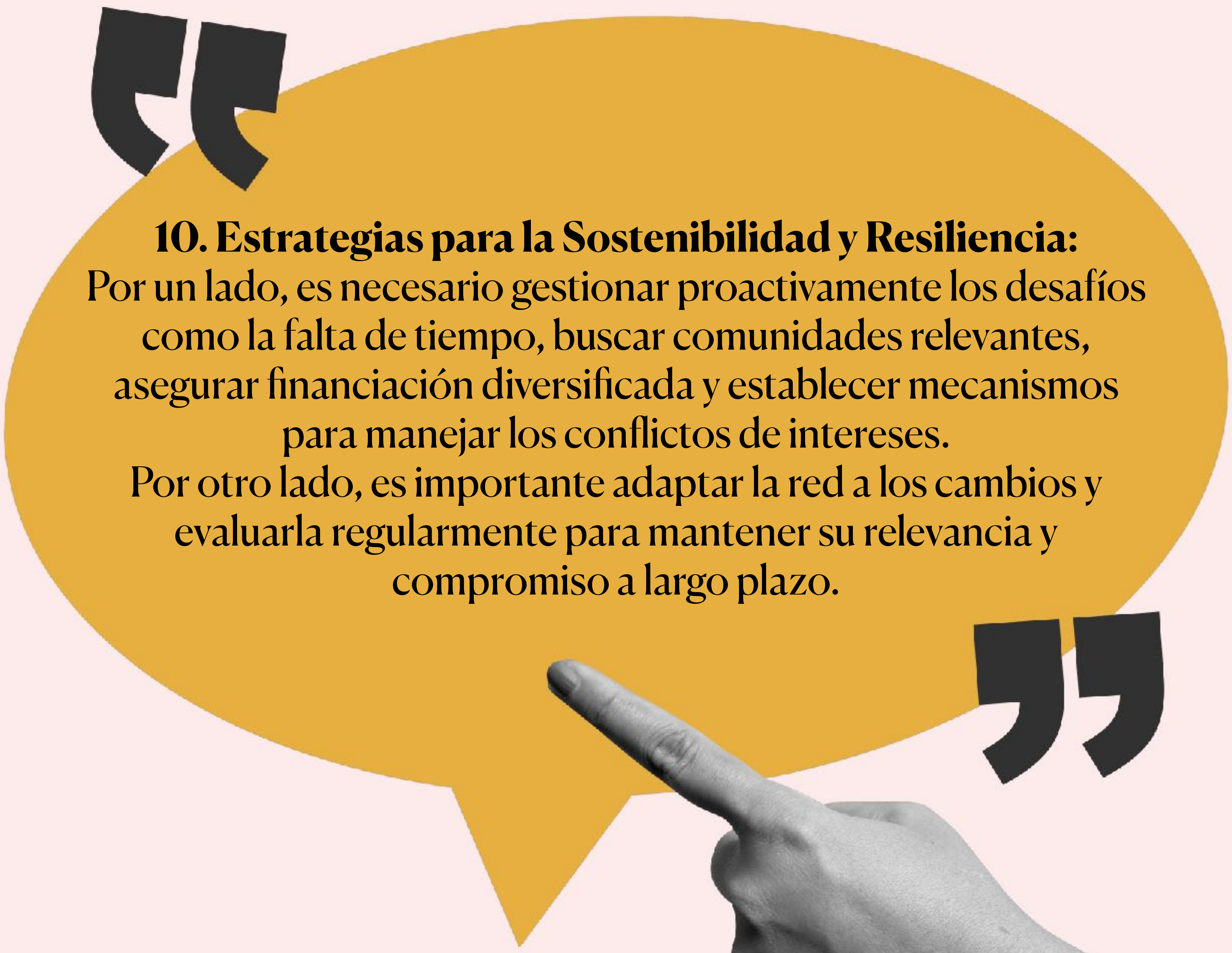
Algunas claves son priorizar la comunicación clara y efectiva , definir roles y responsabilidades, asegurar la transparencia y compartición de información y buscar capacitación continua en “ciencia abierta en equipo”.

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Recomendación práctica: Desarrollar guías internas de buenas prácticas para la participación en redes, que aborden, entre otras cuestiones,

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la gestión del tiempo, la comunicación intercultural o la resolución de conflictos, especialmente para redes internacionales.

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10. Estrategias para la Sostenibilidad y Resiliencia:

Por un lado, es necesario gestionar proactivamente los desafíos como la falta de tiempo, buscar comunidades relevantes, asegurar financiación diversificada y establecer mecanismos para manejar los conflictos de intereses.

Por otro lado, es importante adaptar la red a los cambios y evaluarla regularmente para mantener su relevancia y compromiso a largo plazo.

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Recomendación práctica: Establecer un sistema de apoyo para la creación y sostenibilidad de nuevas redes

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ofreciendo asesoramiento en la implementación de estructuras organizativas que aseguren el compromiso de los miembros a largo plazo.

**“In contemporary
science,
no matter the discipline,
to research means to
collaborate...
Collaboration in science
has become a need much
more than a choice.”**



Emilia Leogrande and Renato Nicassio (2021) Collaborative Processes in Science and Literature: an In-Depth Look at the Cases of CERN and SIC. *Frontiers in Research Metrics and Analytics*. 5:592819, 2. doi: 10.3389/frma.2020.592819

“Las personas se motivan por buenas ideas ligadas a la acción; se estimulan aún más al llevar a cabo la acción con otras personas; son impulsadas aún más al aprender de sus errores; y por último, son propulsadas por las acciones que tienen un impacto.”



Hargreaves, A., y Fullan, M. 2014.
Capital profesional. Madrid: Morata.

**¡GRACIAS
Y HASTA
SIEMPRE!**





*Mis mejores deseos
para el futuro.*

Fernando Trujillo Sáez @ftsaez