IMPACT-ORIENTED RESEARCH

Towards an Euro-Mediterranean Cooperation Alliance

Research notes **3**

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Towards an Euromediterranean Cooperation Alliance

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About the Author

Monica Bianco, Ecosystems Cooperation Advisor at CRF, works on fostering collaboration within research-driven innovation ecosystems, supporting territorial development and promoting sustainable, inclusive growth across the Euro-Mediterranean region

Executive Summary

The contemporary research landscape, increasingly driven by metrics, academic rankings, and funding competition, has largely lost sight of its fundamental mission: to generate tangible territorial, social, and economic impact.

In the Euro-Mediterranean region — marked by systemic imbalances, regional disparities, and untapped potential — there is an urgent need to redefine research not merely as the pursuit of knowledge for its own sake, but as a strategic lever for development, integration, and cooperative growth.

This Research Notes advocates for a shift: from publication-centered research towards impact-oriented research — research that is solution-driven, mission-oriented, and capable of catalyzing regional regeneration.

This position does not diminish the essential value of basic research, which expands the frontiers of human understanding and lays the foundations for future innovation.

Rather, it affirms that, particularly in territories where social and economic renewal is urgent, research institutions must strengthen their capacity to translate knowledge into applied solutions.

Technical disciplines - engineering, medicine, law, management - have historically not been created to produce scientists, but to train professionals capable of using scientific foundations to design applications, develop technologies, and deliver social benefits.

Reducing these professions to mere extensions of academic science — disconnected from real-world needs — is a profound strategic error.

In contexts demanding applied research and technological innovation, it is imperative to restore the rightful identity of technical and professional faculties: not as minor branches of theoretical science, but as pillars of applied development and societal transformation.

This Research Notes lays the groundwork for the establishment of a Euromediterranean Cooperation Alliance:

a future platform connecting universities, research centers, regional agencies, and innovation ecosystems, united by a common mission to realign research, education, and cooperation towards building a resilient, integrated, and impactful Euro-Mediterranean future.

Beyond metrics, beyond disciplinary fragmentation, beyond isolated scientific excellence:

this is a call to rebuild research as an enabling infrastructure for territories and societies, where knowledge becomes action, and innovation serves people.

Beyond Publications: Reclaiming Research for Territorial Impact

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

In recent decades, academic research has progressively drifted from its original mission of advancing knowledge and fostering societal development. This drift is largely due to the hypertrophic focus on publication metrics as the primary measure of research value [1][2]. As highlighted by Hicks et al., "evaluation processes must support the quality, not merely the quantity, of research output" [1].

The "publish or perish" dynamic, initially conceived to encourage scientific vitality, has instead generated profound distortions in the way research is conceived, conducted, and evaluated [3]. According to Schot and Steinmueller, this creates "an innovation system oriented more to scientific production than to societal problem solving" [3].

Today, the centrality of publication output risks suffocating the laboratory, undermining experimental practice, and disconnecting research from real-world problems and societal needs.

This article critically examines the mechanisms that have led to the publication-driven distortion of research, the systemic consequences of this drift, and the role that a renewed culture of applied research can play in re-establishing research as a transformative infrastructure for territorial development.

The Mechanisms of Distortion: How Publication Metrics Reshaped Research

The centrality of publication metrics has triggered a series of predictable and self-reinforcing distortions.

First, *acceleration of outputs*: research is often fragmented into "least publishable units" to maximize the number of outputs in the shortest time [4]. As Kaur et al. note, "pressure to publish drives fragmentation of studies into salami-sliced publications" [4].

Second, *dominance of literature-based studies*: experimental research, particularly in fields requiring long development cycles, is penalized because it cannot guarantee rapid publications. This has led to a proliferation of literature reviews and simulations in place of original experimentation [5]. Heuritsch observes that "scientists increasingly resort to low-risk, rapid-output research paths" [5].

Third, *multiplication of authorship*: the pressure to publish promotes excessive co-authorship practices, diluting scientific responsibility and prioritizing quantity over quality [6]. As Evans and Foster point out, "co-authorship networks grow, but depth of collaboration often diminishes" [6].

Fourth, *preference for safe topics*: researchers prefer predictable, "publishable" topics over exploratory research addressing complex, high-risk problems [7]. According to Bornmann et al., "academic incentives rarely reward risky or interdisciplinary work" [7].

Finally, *neglect of societal relevance*: research increasingly marginalizes local or applied issues if perceived as less rewarding in terms of publication metrics [8]. Johnstone and Schot argue that "there remains a profound disconnect between research outputs and sustainability transitions needs" [8].

As a result, research activity is increasingly designed not to produce new knowledge or societal solutions, but to optimize positioning within academic visibility systems [9].

Systemic Consequences: Research Losing Ground to Societal Impact

The consequences of this distortion are profound and multifaceted.

First, there is a growing *alienation from real problems*: research risks becoming a self-referential system, increasingly detached from societal and territorial needs [10]. As reported by Digital Science, "the research system often values outputs over outcomes, prestige over practical relevance" [10].

Second, the weakening of experimental infrastructures exacerbates this detachment. As rapid publication becomes the dominant goal, long-cycle experimental activities — such as laboratory work, field trials, and real-world pilots — are progressively marginalized. Investments in infrastructures essential for applied research diminish, undermining the capacity to develop and test innovative solutions in real contexts [11]. Overton notes that "investment in experimental capacity lags behind publication growth" [11].

Third, this dynamic contributes to the *devaluation of professional and technical disciplines*. Fields historically oriented toward practical application, such as engineering, agronomy, medicine, and management, are increasingly pressured to conform to the epistemic standards of pure sciences [12]. According to the Academy of Management, *"practice-oriented disciplines are forced into theoretical publication frameworks that ignore their applied missions"* [12].

Finally, the cumulative effect of these distortions leads to a loss of public trust. Citizens and local communities increasingly perceive research as disconnected from their needs, fostering skepticism towards scientific institutions and weakening the social legitimacy of the academic enterprise [13]. Bornmann emphasizes that "metrics-driven research risks losing public confidence and societal relevance" [13].

Applied Research and Territorial Impact: A Necessary Reorientation

To reclaim research for territorial impact, a profound rebalancing of the knowledge production ecosystem is necessary.

On the one hand, *fundamental research* must continue to advance knowledge independently, pursuing new conceptual frontiers and expanding the boundaries of human understanding. Its autonomy and long-term perspective are indispensable for the vitality of the scientific enterprise.

On the other hand, *applied research* must fully reclaim its historical and strategic role as a translator between scientific discovery and societal challenges [14]. As Schot and Kanger argue, "transformative innovation demands engagement with societal needs, not just scientific excellence" [14].

Applied research plays a crucial role by *co-creating solutions with local stakeholders* [15], *accelerating technological deployment* through pilots and demonstrators [16], *regenerating territorial systems* [17], and *rebuilding trust between scientific institutions and society* [18].

By addressing tangible needs and producing visible benefits, applied research restores the social legitimacy of knowledge production and anchors innovation processes within territorial realities.

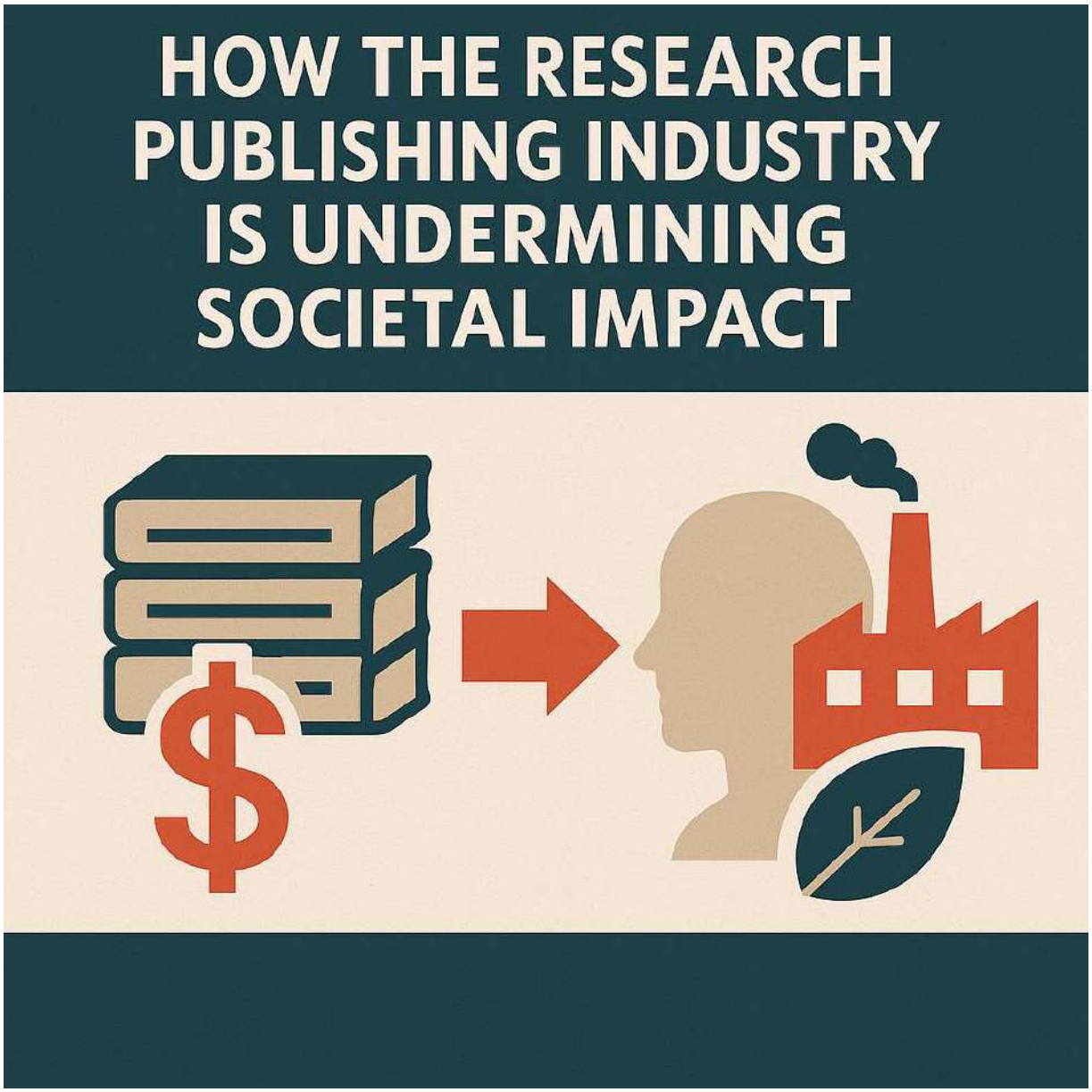
Far from representing a degradation of scientific ambition, applied research embodies the *completion of science's societal mission*. It ensures that knowledge not only advances in abstract terms but also transforms the material and institutional conditions of societies, contributing to a more resilient, equitable, and sustainable future.

Conclusion

The hypertrophy of publication-centric incentives has turned research into a self-referential system, penalizing experimental practice and diminishing societal relevance.
Reclaiming research for territorial development requires a profound shift: valuing applied research, restoring experimental infrastructures, and redefining success based on real transformative impact, not only on publication outputs.
Only through this reorientation can research reconnect with its original mandate: *to serve humanity, solve problems, and regenerate territories* [19].

References

1. Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). The Leiden Manifesto for research metrics. Nature, 520(7548), 429–431.
2. San Francisco Declaration on Research Assessment (DORA). (2012). Retrieved from https://sfdora.org/
3. Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. Research Policy, 47(9), 1554–1567.
4. Kaur, J., Ferrara, E., Menczer, F., Flammini, A., & Radicchi, F. (2014). Quality versus quantity in scientific impact. arXiv preprint arXiv:1411.7357.
5. Heuritsch, J. (2021). Reflexive behaviour: How publication pressure affects research quality in astronomy. arXiv preprint arXiv:2109.09375.
6. Evans, J. A., & Foster, J. G. (2011). Metaknowledge. Science, 331(6018), 721–725.
7. Bornmann, L., Haunschild, R., & Adams, J. (2018). Do altmetrics assess societal impact in a comparable way to case studies? arXiv preprint arXiv:1807.03977.
8. Johnstone, P., & Schot, J. (2023). Shocks, institutional change, and sustainability transitions. Research Policy, 52(1), 104–115.
9. Fast Track Impact. (2018). Ten essentials for transformative research.
10. Digital Science. (2023). Welcome to… Research Transformation! Retrieved from https://www.digital-science.com
11. Overton. (2024). Bridging the gap between business school research and policymaking. Financial Times.
12. Academy of Management. (2024). Business school and the pursuit of rigour, resonance and relevance. Financial Times.
13. Bornmann, L. (2014). Validity of altmetrics data for measuring societal impact: A study using data from Altmetric and F1000Prime. arXiv preprint arXiv:1406.7611.
14. Schot, J., & Kanger, L. (2018). Deep transitions: Emergence, acceleration, stabilization and directionality. Research Policy, 47(6), 1045–1059.
15. Fast Track Impact. (2020). The Research Impact Handbook (2nd Edition).
16. Research England. (2019). Guidance on Research Impact. Retrieved from https://re.ukri.org
17. European Commission. (2020). Towards a European Research Area for Innovation.
18. UNESCO. (2021). Recommendations on Open Science.
19. OECD. (2022). Promoting Research for Social Impact.



The Business of Science: How the Publication Industry Detached Research from Reality

The commodification of scientific output and its consequences on innovation ecosystems

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

In recent decades, the scientific ecosystem has undergone a profound mutation.

What was once an intellectual endeavor aimed at advancing understanding and solving real-world problems has increasingly morphed into a highly commercialized system.

As Hicks et al. emphasize, "the systematic use of simplistic metrics to assess research threatens to displace judgment and to create perverse incentives" [1]. Rather than focusing on impact, experimentation, and societal relevance, research today is often organized around the production of publishable units optimized for journal metrics, rankings, and funding evaluations.

The publishing industry — historically intended as a means to disseminate knowledge — has evolved into a profitable economic sector with vested interests in maintaining and reinforcing this dynamic. Consequently, scientific communication has shifted from being a public good to a commodified output, influencing profoundly what research is done, how it is conducted, and which knowledge is prioritized.

The Rise of the Publication Industry and Its Economic Logic

The transformation of scientific publishing into a business was neither inevitable nor neutral.

As Larivière et al. observed, "a small number of publishers have succeeded in building monopolistic or oligopolistic positions, extracting high rents from public-funded research" [2]. This structural concentration of publishing power has had profound implications on the way research is produced, evaluated, and disseminated.

One of the critical mechanisms underpinning this economic model is the use of the *Journal Impact Factor* (JIF) as a universal currency. Originally developed merely as a tool for assisting librarians in journal selection, the JIF has progressively evolved into a proxy for research quality, despite its many distortions and limitations. As Seglen critically pointed out, "the impact factor is not a reliable indicator of the quality of individual articles" [3]. Nevertheless, researchers are strongly pressured to publish in high-JIF journals to secure grants, promotions, and institutional recognition, reinforcing a cycle where perceived prestige outweighs scientific relevance.

Another important development is the spread of *Article Processing Charges* (APCs), especially with the rise of open access models. According to Björk and Solomon, "APCs have institutionalized a direct financial transaction between authors and publishers" [4], effectively transforming the act of publishing from a merit-based dissemination of knowledge into a pay-to-publish business.

Simultaneously, the number of academic journals has exploded, driven not by genuine scientific demand but by market segmentation strategies aimed at maximizing revenue streams. As Mabe and Amin noted, "the growth dynamics of journals are often explained more by publisher expansion strategies than by actual increases in research output" [5].

Finally, the widespread adoption of *metric-driven evaluation systems* has completed the transformation. University rankings, research funding decisions, and individual career advancements increasingly rely on bibliometric indicators such as publication counts and citation metrics. Moher et al. emphasize that "assessment practices heavily dependent on bibliometrics risk promoting perverse incentives that prioritize quantity over quality" [6].

As a cumulative effect of these interlocked mechanisms, the value of research is today less determined by its societal relevance, transformative potential, or experimental originality, and more by its visibility and performance within a commercially-driven publishing ecosystem.

Distortions in Research Practices: From Knowledge Creation to Metric Optimization

The industrialization of scientific production has led to a series of profound systemic distortions, reshaping the very nature of research activities.

One major consequence is the fragmentation of scientific outputs into minimal units of publishable material. Researchers are increasingly incentivized to divide their results into multiple articles, a phenomenon known as "salami slicing". As Salager-Meyer describes, "fragmented publication practices are driven more by career pressures than by genuine advances in knowledge" [7]. This leads to an inflation of publication numbers without a corresponding growth in substantive contributions.

Closely linked to this is the decline of experimental and long-term research. As Heuritsch notes, "projects requiring extensive experimentation and longitudinal studies are structurally disfavored because they do not yield rapid publishable results" [8]. The time-consuming nature of real experimentation is at odds with the need for continuous publication outputs, resulting in a research environment that systematically marginalizes slow but crucial forms of scientific inquiry.

The multiplication of authorships and the phenomenon of hyper-collaboration further distort research practices. Wuchty, Jones, and Uzzi found that "the increasing dominance of large teams reflects the reward structure favoring volume over individual accountability" [9]. This often leads to the dilution of scientific responsibility, where the relationship between individual researchers and the quality of published results becomes blurred.

Another significant distortion is the prioritization of fashionable topics over neglected but socially critical areas. Brembs highlights that "fields aligned with editorial trends and citation potential enjoy disproportionate visibility, whereas less glamorous but vital research remains sidelined" [10]. This results in a biased research agenda that follows the logic of market visibility rather than societal needs.

Finally, applied research and research addressing local or territorial issues are increasingly marginalized. Adams points out that "research focused on local needs struggles to find publication venues within high-prestige circuits, reinforcing global imbalances in knowledge production" [11]. This not only creates an intellectual asymmetry but also deepens territorial inequalities in the distribution of research attention and funding.

Thus, research activities are no longer primarily optimized for discovery, innovation, or problem-solving; instead, they are increasingly aligned with the imperatives of metric performance and market visibility.

Consequences for Territorial Development and Societal Resilience

The dominance of the publication industry has profound systemic consequences for the relationship between research and society, progressively eroding the foundations that historically linked scientific knowledge to social advancement.

One major effect is the alienation of research from the territories that fund and host it.

As Bornmann et al. observe, "societal needs are systematically underrepresented in metric-driven research portfolios" [12], highlighting how research agendas increasingly prioritize academic visibility over tangible community impact.

Rather than addressing the urgent challenges faced by local societies — such as environmental degradation, energy transition, or social inequalities — research tends to orbit around topics that guarantee high-impact publications, often remote from everyday realities. Closely connected to this is the weakening of the experimental infrastructure necessary for transformative innovation.

The focus on rapid and easily publishable outputs marginalizes long-term experimental setups, pilot plants, and real-world laboratories, which are instead critical for sectors like water management, renewable energy, agriculture, and health. Johnstone and Schot emphasize that "without robust experimental infrastructures, the capacity for systemic transitions towards sustainability is severely compromised" [13].

The loss of experimental platforms deprives territories of vital tools for innovation and resilience building. Another critical consequence is the erosion of the credibility and social legitimacy of science. Citizens, perceiving a growing disconnect between the pressing issues they face and the often abstract outputs of academia, become increasingly skeptical.

As Merton already warned, "the credibility of science depends crucially on its perceived alignment with societal concerns" [14]. When science appears more focused on maintaining internal prestige than solving real problems, public trust inevitably deteriorates.

Finally, the commercialization of scientific publishing exacerbates territorial inequalities. Regions already under-represented in high-impact publication circuits — particularly in the Global South and in peripheral areas of Europe and the Mediterranean — see their research efforts marginalized, creating a vicious cycle. As Chan et al. argue, "structural inequalities in research visibility reinforce funding disparities and entrench knowledge hierarchies" [15]. This dynamic not only deepens the scientific divide between regions but also undermines the potential for inclusive, bottom-up innovation essential for sustainable development. Thus, the commercialization of scientific publishing is not a neutral process; it actively reshapes the geography of knowledge production, amplifying imbalances and weakening the societal role of research.

Towards a New Evaluation Culture: From Metrics to Meaning

To reclaim the transformative role of research, a profound cultural shift is required — one that not only modifies technical evaluation procedures but redefines the very purpose of scientific activity within society.

First, it is essential to restore *peer judgment* and *contextual evaluation* as the foundation of research assessment.
Research should be judged based on expert scrutiny of its methods, results, and relevance to societal needs, rather than simply on the prestige of the journal in which it is published.

As Hicks et al. affirm, "evaluation processes must support the quality, not merely the quantity, of research output" [1].

In parallel, funding and evaluation systems must evolve to *support applied and mission-oriented research*.

It is crucial to recognize and reward research that addresses concrete societal challenges, even when it does not conform to the traditional high-impact publication model.

Schot and Steinmueller underline that "transformative change requires re-aligning research agendas with societal missions rather than with narrow academic incentives" [16].

Furthermore, the indicators of success in research must be diversified.

Societal impact, technology transfer, policy influence, and territorial regeneration should become central criteria for evaluating research quality and relevance.

The European Commission explicitly states that "a broader set of impact pathways, including societal and policy contributions, must complement traditional bibliometric indicators" [17].

Finally, it is imperative to challenge the monopolistic structures that currently dominate scientific publishing.

Open science initiatives, public repositories, and new, community-based models of scientific communication must be promoted to reduce dependency on commercial publishers and to democratize access to scientific knowledge.
UNESCO's Recommendation on Open Science emphasizes that "open access to scientific knowledge is a global public good and a fundamental pillar for building inclusive knowledge societies" [18].

This shift is not merely technical; it is strategic and cultural.

It involves rethinking the role of research in society — moving away from a system optimized for metric performance towards an infrastructure dedicated to resilience, innovation, inclusion, and real-world transformation.

Conclusion

The commercialization of scientific publishing has profoundly altered the priorities, practices, and outcomes of research, detaching it from its societal mission.
If research is to reclaim its role as a driver of territorial development and systemic resilience, it must break free from the logic of metric optimization and reconnect with real-world problems and transformative agendas.
Restoring meaning to research evaluation is not only a matter of academic reform — it is a prerequisite for building a more sustainable, inclusive, and resilient future.

References

20. Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). "The Leiden Manifesto for research metrics." Nature, 520(7548), 429–431.
21. Larivière, V., Haustein, S., & Mongeon, P. (2015). "The oligopoly of academic publishers in the digital era." PLOS ONE, 10(6), e0127502.
22. Seglen, P. O. (1997). "Why the impact factor of journals should not be used for evaluating research." BMJ, 314(7079), 498–502.
23. Björk, B. C., & Solomon, D. (2015). "Article processing charges in OA journals: Relationship between price and quality." Scientometrics, 103(2), 373–385.
24. Mabe, M., & Amin, M. (2002). "Growth dynamics of scholarly and scientific journals." Scientometrics, 51(1), 147–162.
25. Moher, D., Naudet, F., Cristea, I. A., Miedema, F., Ioannidis, J. P., & Goodman, S. N. (2018). "Assessing scientists for hiring, promotion, and tenure." PLOS Biology, 16(3), e2004089.

26. Salager-Meyer, F. (2014). "Scientific publishing in developing countries: Challenges for the future." Journal of English for Academic Purposes, 13, 87–95.
27. Heuritsch, J. (2021). "Reflexive behaviour: How publication pressure affects research quality in astronomy." arXiv preprint arXiv:2109.09375.
28. Wuchty, S., Jones, B. F., & Uzzi, B. (2007). "The increasing dominance of teams in production of knowledge." Science, 316(5827), 1036–1039.
29. Brembs, B. (2013). "Prestigious science journals struggle to reach even average reliability." Frontiers in Human Neuroscience, 7, 291.
30. Adams, J. (2013). "The fourth age of research." Nature, 497(7451), 557–560.
31. Bornmann, L., Haunschild, R., & Adams, J. (2018). "Do altmetrics assess societal impact?" arXiv preprint arXiv:1807.03977.
32. Johnstone, P., & Schot, J. (2023). "Shocks, institutional change, and sustainability transitions." Research Policy, 52(1), 104–115.
33. Merton, R. K. (1973). "The sociology of science: Theoretical and empirical investigations." University of Chicago Press.
34. Chan, L., Okune, A., Hillyer, R., & Posada, A. (2019). "Contextualizing openness: Situating open science." Canadian Journal of Development Studies, 40(2), 170–183.
35. Schot, J., & Steinmueller, W. E. (2018). "Three frames for innovation policy: R&D, systems of innovation and transformative change." Research Policy, 47(9), 1554–1567.
36. European Commission. (2020). "A new ERA for Research and Innovation." Brussels: COM(2020)628 final.
37. UNESCO. (2021). "Recommendations on Open Science."

The Fragmentation Trap in EU Research Funding: How Competitive Schemes Weaken Regional Strategies and Reinforce Academic Oligopolies

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

The increasing reliance on competitive funding schemes in European research policy, particularly through programs such as Horizon Europe, has profound implications for the ability of regions and institutions to pursue coherent, long-term research and innovation strategies. While competition is often justified as a driver of excellence and inclusion, this article argues that current funding mechanisms paradoxically reinforce academic oligopolies, concentrate resources among leading institutions, and undermine the ideal of a free and diversified research system. By critically examining the structural weaknesses introduced by fragmented funding models, this work calls for a rethinking of funding strategies to foster genuine territorial development, institutional diversity, and systemic innovation.

Introduction

Over the past two decades, European research funding has increasingly shifted towards highly competitive, project-based allocations. Framework programs such as Horizon 2020 and Horizon Europe promote competition among institutions to access limited resources, emphasizing short-term deliverables and high-visibility outputs. As Laredo notes, *"project-based funding tends to produce fragmented research portfolios poorly aligned with long-term socio-economic needs"* [1].

While competition is officially intended to foster excellence, its unintended consequence has been the fragmentation of research agendas, the erosion of institutional continuity, and the emergence of a closed elite of research actors.

Benner and Sandström argue that *"competitive funding undermines the strategic autonomy of research organizations, pushing them into opportunistic project-hopping"* [2].

In the European context, this has led to a concentration of leadership positions and financial flows within a narrow circle of top universities and research centers.

The Mechanics of Fragmentation and Oligopoly Formation

The core issue with European competitive funding lies in its prioritization of discrete, isolated projects over systemic regional strategies.

Research teams often chase thematic calls, aligning proposals with funding priorities rather than with territorial needs or long-term development missions. As Geuna and Martin highlight, *"short-termism in research funding policies systematically discourages cumulative knowledge building and long-range exploration"* [3].

Moreover, the evaluation criteria and project management complexities embedded in European calls favor institutions already equipped with sophisticated administrative structures and international networks. Merton's Matthew Effect is clearly visible: *"scientific prestige and resources become increasingly concentrated in a limited number of actors"* [4].

This has produced a structural oligopoly: a small group of universities and research organizations dominate project coordination roles, while smaller universities and peripheral regions are relegated to subordinate, often tokenistic participation.

Whitley notes that *"the proliferation of project-based funding reduces the incentives for researchers to engage in risky or interdisciplinary endeavors, favoring established paradigms"* [5].

Thus, European funding mechanisms, instead of democratizing research and promoting widespread innovation, end up reinforcing existing hierarchies and reducing the plurality of scientific approaches.

Consequences for Regional Development and Scientific Diversity

The consolidation of academic oligopolies through European funding systems has several negative implications for territorial development and scientific freedom.

First, it alienates research from the regions and communities that finance it.Bornmann et al. observe that *"societal needs are systematically underrepresented in metric-driven research portfolios"* [6], with funding flows concentrating in already dominant territories.

Second, it undermines the building of local experimental infrastructures essential for sustainable innovation. Johnstone and Schot emphasize that *"systemic transitions require robust, territorially embedded experimental platforms, not just excellence clusters"* [7].

Third, it exacerbates geographical inequalities. European Commission reports admit that *"Framework Programme participation remains concentrated in a few leading regions, with persistent underrepresentation of less developed areas"* [8].

Finally, the concentration of resources and prestige within a closed elite threatens the legitimacy and inclusiveness of the European Research Area itself. Ryan argues that *"short-term competitive logics promote exclusionary dynamics, leading to disillusionment among peripheral research actors"* [9].

Thus, rather than creating an open and resilient European research system, current funding practices entrench structural divides and limit the transformative capacity of science.

Towards a More Inclusive and Mission-Oriented Research Funding System

Reversing the fragmentation and oligopoly effects requires a strategic rethinking of European funding policies. As Mazzucato stresses, *"mission-oriented innovation policies should create stable, long-term frameworks that encourage cumulative learning, cross-sector collaboration, and systemic change"* [10].

Such an approach would include:

- Prioritizing long-term regional missions over isolated project calls.
- Supporting consortia led by emerging universities and research centers, not only the established giants.
- Evaluating success based on cumulative societal impact, not just publications or short-term deliverables.
- Guaranteeing structural funding for research infrastructures, especially in underserved regions.

Moreover, as Schot and Steinmueller argue, *"transformative innovation policy must align funding mechanisms with systemic change needs, rather than perpetuating fragmented competition detached from territorial regeneration"* [11].

Only by breaking the oligopolistic dynamics and reinvesting in widespread territorial innovation can Europe build a research ecosystem capable of facing grand societal challenges.

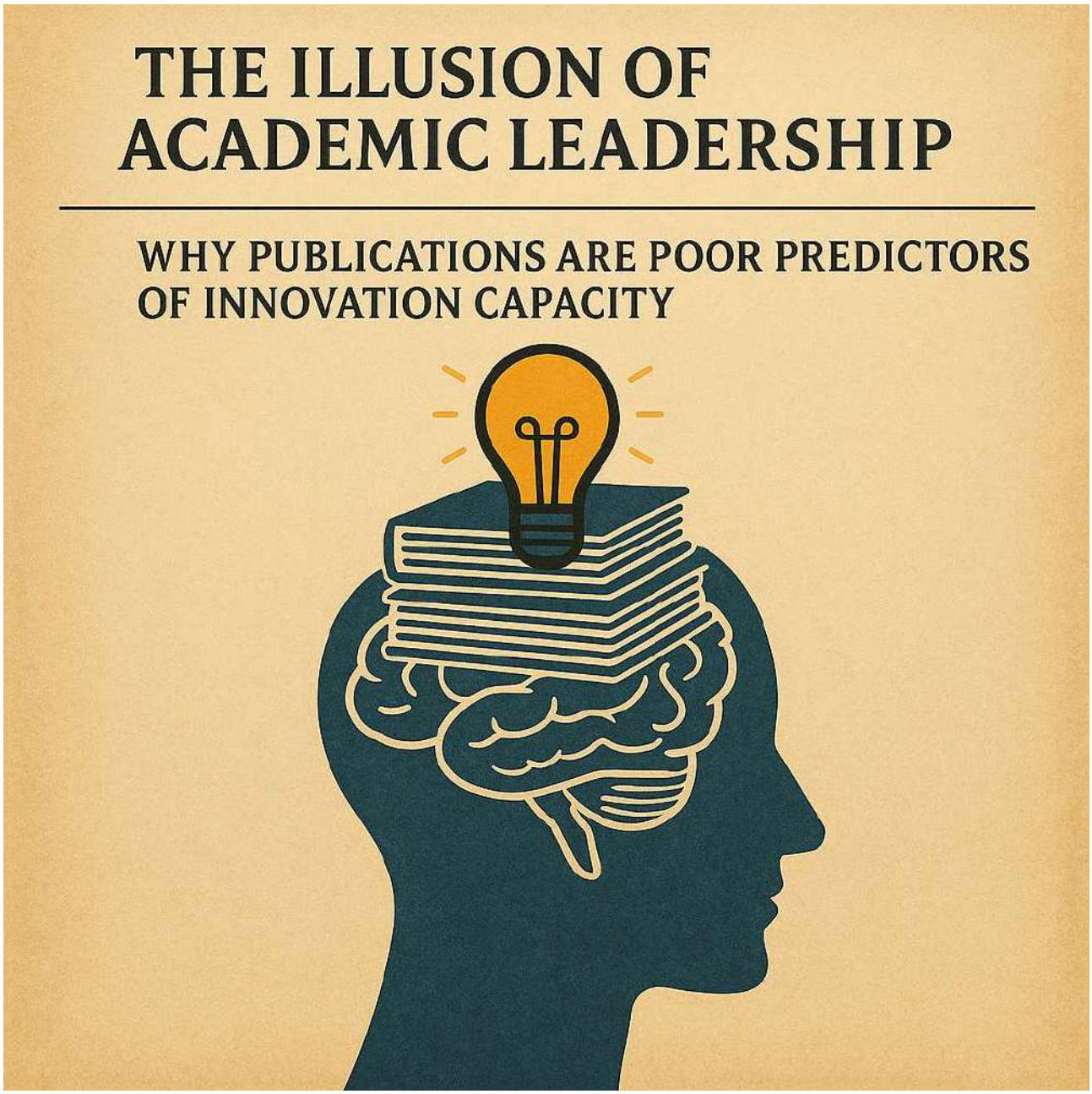
Conclusion

The competitive, fragmented nature of European research funding, far from fostering widespread innovation and inclusion, has reinforced a closed system dominated by elite universities. This has led to the concentration of resources, prestige, and leadership, marginalizing smaller institutions and peripheral regions. Reclaiming the transformative role of science requires a profound reorientation of funding strategies: embracing mission-driven, territorially embedded, and inclusive approaches capable of regenerating both research systems and societies.

Only by dismantling the academic oligopolies and redistributing opportunities can Europe truly realize a resilient, free, and socially impactful research ecosystem.

References

38. Laredo, P. (2007). "Revisiting the third mission of universities: Toward a renewed categorization of university activities?" Higher Education Policy, 20(4), 441–456.
39. Benner, M., & Sandström, U. (2000). "Institutionalizing the triple helix: Research funding and norms in the academic system." Research Policy, 29(2), 291–301.
40. Geuna, A., & Martin, B. R. (2003). "University research evaluation and funding: An international comparison." Minerva, 41(4), 277–304.
41. Merton, R. K. (1968). "The Matthew Effect in Science." Science, 159(3810), 56–63.
42. Whitley, R. (2003). "Competition and pluralism in the public sciences: The impact of institutional frameworks on the organization of academic science." Research Policy, 32(6), 1015–1029.
43. Bornmann, L., Haunschild, R., & Adams, J. (2018). "Do altmetrics assess societal impact?" arXiv preprint arXiv:1807.03977.
44. Johnstone, P., & Schot, J. (2023). "Shocks, institutional change, and sustainability transitions." Research Policy, 52(1), 104–115.
45. European Commission (2021). "Framework Programme Participation Analysis."
46. Ryan, B. (2015). "The Academic Profession: Changes, Challenges, and Consequences." Higher Education Quarterly, 69(1), 91–111.
47. Mazzucato, M. (2018). "Mission-oriented research and innovation in the European Union: A problem-solving approach to fuel innovation-led growth." European Commission, Policy Brief.
48. Schot, J., & Steinmueller, W. E. (2018). "Three frames for innovation policy: R&D, systems of innovation and transformative change." Research Policy, 47(9), 1554–1567.



The Illusion of Academic Leadership: Why Publications Are Poor Predictors of Innovation Capacity

Why Selection Based on Publications Fails to Identify True Innovation Drivers

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

The dominant models for evaluating academic leadership and innovation potential have increasingly relied on publication metrics such as the number of articles, citation counts, and journal impact factors. While these indicators offer a measure of academic visibility, they represent a poor proxy for real innovation capacity, particularly when research is expected to address complex societal challenges and drive transformative territorial development. This article critically examines how metric-centric selection systems distort the identification of true innovation drivers, marginalizing those actors most capable of translating scientific knowledge into technological, social, and economic progress. A profound rethinking of research evaluation is needed to align scientific systems with missions of sustainable innovation and societal resilience.

Introduction

In contemporary research systems, particularly those influenced by European and Anglo-American funding models, publication metrics have become the dominant standard for assessing academic leadership, research quality, and eligibility for funding and strategic positions. This shift, often summarized in the "publish or perish" paradigm, has conflated academic productivity with innovation potential, assuming that quantity and visibility of publications are reliable indicators of transformative capacity. However, as Moher et al. rightly point out, *"the heavy reliance on publication counts and journal impact factors risks conflating visibility with real research quality and relevance"* [1], undermining the broader societal role of research.

The problem is not merely technical but structural. A system that prioritizes publication performance above all else inherently favors certain types of research outputs — mainly theoretical, disciplinary, incremental — while marginalizing interdisciplinary, applied, and mission-oriented work that often carries higher risk and longer development cycles. *This systemic bias distorts the recognition of true innovation drivers, leading to leadership selection processes that reinforce academic self-referentiality rather than catalyzing societal transformation.*

Publications and Innovation: A Misaligned Correlation

The assumption that strong publication records predict strong innovation outcomes is deeply flawed. Empirical studies consistently show that the skills and attributes required to excel in academic publishing are not the same as those needed to drive innovation ecosystems. As D'Este and Patel observed, *"academic publishing and engagement with industry and society are often governed by different logics and reward systems"* [2]. Where publications reward theoretical contributions to specialized fields, innovation demands problem-oriented, multidisciplinary collaboration capable of navigating complexity and uncertainty.

Moreover, real-world innovation is frequently born not in the most visible research hubs but in peripheral contexts, where necessity drives creative adaptation. The OECD notes that *"high scientific output regions do not automatically correlate with regions that lead in technological innovation or societal transformation"* [3]. Thus, evaluating innovation potential primarily through publication records leads to systematic exclusion of researchers and institutions whose strength lies in applied creativity, technological development, or societal engagement rather than academic citation accumulation.

Structural Biases Created by Metric-Centric Selection

Metric-driven evaluation systems introduce structural biases that undermine the identification of effective innovation leaders. First, they systematically favor theoretical researchers over those engaged in application, co-creation, and stakeholder collaboration. As Perkmann et al. highlight, *"engagement with external partners and societal challenges often carries lower rewards in academic career systems dominated by bibliometric indicators"* [4]. Researchers who invest time and energy in translating knowledge into solutions, prototypes, policies, or startups often do so at the cost of lower publication rates, and are therefore penalized in metric-based evaluations.

Second, publication-centered systems disadvantage interdisciplinary scholars. Complex societal challenges — such as climate adaptation, digital transitions, or health equity — inherently demand integration across disciplines, sectors, and knowledge systems. Yet interdisciplinary work struggles to find a place in high-impact disciplinary journals, resulting in lower visibility and career penalties. This misalignment disincentivizes systemic thinking precisely when it is most needed.

Third, the current model exacerbates geographical and institutional inequalities. Researchers from smaller universities, emerging regions, and less prestigious networks often lack the cumulative citation capital needed to compete on metric grounds, regardless of their innovation potential. As Bornmann emphasizes, *"the emphasis on publication quantity promotes safe, incremental research rather than high-risk, high-reward innovation"* [5], further entrenching a conservative, elitist research system.

Finally, metric-centric evaluations discourage risk-taking and experimentation. Scholars aiming to maximize publications tend to favor predictable, low-risk topics, which are more likely to yield publishable results quickly. This dynamic reduces the incentive to engage in transformative research programs whose outcomes may be uncertain but whose societal impact could be substantial.

Rethinking Selection Criteria for Innovation Leadership

A profound rethinking of research evaluation and leadership selection is urgently needed if we are to identify and empower true drivers of innovation. *First, evaluations must explicitly prioritize societal impact, technological deployment, policy relevance, and territorial regeneration over mere bibliometric performance.* Qualitative peer reviews, narrative CVs, and *evidence of real-world outcomes must become central components of assessment.*

Second, the ability to engage with diverse stakeholders — from industry to communities to policymakers — must be recognized as a core leadership competency. As Woolley et al. argue, *"collective intelligence and collaborative problem-solving are stronger predictors of innovation success than individual academic prestige"* [6]. *Building and orchestrating diverse innovation ecosystems demands skills that pure academic publishing neither selects for nor rewards.*

Third, interdisciplinary and transdisciplinary capacities must be valorized explicitly. Mission-oriented research challenges cannot be solved within narrow disciplinary boundaries. Selection systems should reward researchers who demonstrate the ability to bridge scientific domains, integrate different types of knowledge, and design holistic solutions.

Finally, a deliberate effort must be made to open leadership opportunities to emerging actors from peripheral institutions and territories. As Mazzucato emphasizes, *"building transformative innovation systems requires nurturing a wide range of actors, not just those with existing academic prominence"* [7]. Supporting diversity and inclusion is not only a matter of fairness but a strategic imperative for systemic resilience and creativity.

Conclusion

The reliance on publication-based metrics as proxies for innovation capacity represents a profound distortion of the research ecosystem. Far from identifying true societal innovators, current selection systems privilege academic visibility, disciplinary orthodoxy, and risk aversion, undermining the transformative potential of science and technology. To realign research with its societal mission, evaluation frameworks must move beyond simplistic bibliometric indicators and embrace a richer, more holistic approach that values impact, interdisciplinarity, stakeholder engagement, and territorial regeneration.

Only by redefining how we recognize and empower academic leadership can we cultivate the innovation ecosystems necessary to address the grand challenges of our time and to build a more inclusive, resilient, and sustainable future.

References

49. Moher, D., Naudet, F., Cristea, I. A., Miedema, F., Ioannidis, J. P. A., & Goodman, S. N. (2018). "Assessing scientists for hiring, promotion, and tenure." PLOS Biology, 16(3), e2004089.
50. D'Este, P., & Patel, P. (2007). "University–industry linkages in the UK: What are the factors underlying the variety of interactions with industry?" Research Policy, 36(9), 1295–1313.
51. OECD (2022). "Promoting Research for Social Impact." OECD Publishing, Paris.
52. Perkmann, M., King, Z., & Pavelin, S. (2011). "Engaging excellence? Effects of faculty quality on university engagement with industry." Research Policy, 40(4), 539–552.
53. Bornmann, L. (2013). "What is societal impact of research and how can it be assessed? A literature survey." Journal of the American Society for Information Science and Technology, 64(2), 217–233.
54. Woolley, A. W., Chabris, C. F., Pentland, A., Hashmi, N., & Malone, T. W. (2010). "Evidence for a collective intelligence factor in the performance of human groups." Science, 330(6004), 686–688.
55. Mazzucato, M. (2018). "Mission-oriented research and innovation in the European Union: A problem-solving approach to fuel innovation-led growth." European Commission, Policy Brief.

The Engineering of Innovation Crises: How Markets Hijack Scientific Credibility and Fracture Society

Narrative Construction, Mass Media, and Technology Forecasting Agencies Distorting Innovation Trajectories

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

The innovation economy in the Western world has become progressively detached from scientific rigor, driven by financialized narratives and artificially manufactured expectations. Agencies like Gartner, supported by media amplification and investment-driven agendas, have systematically shaped research and development trajectories toward speculative targets rather than grounded societal needs. This article analyzes the mechanisms by which technological narratives are constructed, the systemic consequences of their failures, and the erosion of scientific credibility that results. It calls for a deep rethinking of research evaluation, innovation governance, and the role of communication in restoring public trust and authentic technological progress.

Introduction

Research and innovation are critical pillars of societal development, but their alignment with public interest and scientific rigor has been severely compromised. The Western innovation system, increasingly financialized, no longer responds to societal needs but to speculative cycles orchestrated by narrative construction, media amplification, and investment agencies. As Sarewitz (2020) points out, *"innovation has become less about solving real problems and more about maintaining the machinery of expectation and hype"* [1]. This has profound consequences not only for technological failure rates but also for the social contract between science and society.

The Manufacturing of Technological Trajectories: The Role of Forecasting Agencies

The primary mechanism of distortion begins with technology forecasting agencies, notably Gartner, Forrester, and IDC. Gartner's "Hype Cycle" model, introduced in the mid-1990s, became a template for framing emerging technologies along a predictable curve: inflated expectations, inevitable disillusionment, and eventual (but rare) productive adoption.

However, a systematic analysis by Fenn and Raskino (2019) admits that *"only a small fraction of technologies identified as transformational achieve meaningful societal penetration"* [2]. Studies like Blosch (2020) criticize these models as *"self-referential systems that reward the agencies' own visibility rather than the technologies' societal impact"* [3].

Concrete examples abound. Gartner predicted in 2011 that autonomous vehicles would reach full market viability by 2020; as of 2024, the technology remains heavily limited by infrastructural, regulatory, and ethical challenges [4]. Similarly, the 2015 prediction that blockchain would transform supply chain management globally within five years failed to materialize: recent analyses report that *"over 90% of blockchain supply chain projects initiated between 2017 and 2020 were abandoned or failed to scale"* (Zhao et al., 2023) [5].

These failures are not anomalies but structural features of a predictive system designed more to stimulate investment waves than to assess scientific readiness. Gartner and similar agencies rarely revisit or audit their past forecasts, relying instead on the market's short memory and the perpetual search for the "next big thing."

Narrative Reinforcement through Mass Media and Investment Ecosystems

The manufacturing of innovation crises would be impossible without the active cooperation of mass media systems. Journalists, often without the technical background necessary for critical evaluation, replicate press releases generated by companies, universities, and think tanks.

Scheufele and Krause (2019) found that *"over 65% of science news articles rely heavily on uncritically reproduced press releases"* [6], amplifying narratives without verifying experimental validation, scalability, or real-world constraints.

Massive attention given to pseudo-breakthroughs — such as graphene revolutions, perovskite solar cells achieving commercialization within two years, or biodegradable plastics — follows the same script: early-stage laboratory results are extrapolated into imminent market disruptions without regard for energy balances, environmental costs, or economic viability. As Pisano (2022) notes, *"science hype creates misaligned expectations that not only lead to financial losses but erode the public's ability to discern real innovation from opportunistic narrative construction"* [7].

Structural Consequences: Bubbles, Disillusionment, and the Degradation of Scientific Literacy

The consequences of this system extend far beyond individual technological failures. Financial and technological bubbles systematically drain public resources and private investments away from more resilient, grounded innovation paths. As the European Investment Bank notes in its 2023 Innovation Report, *"over 30% of EU venture capital funding between 2015 and 2020 was allocated to sectors later deemed overvalued or underperforming"* [8].

Territories and smaller research centers, lacking access to major investment ecosystems or media visibility, are structurally marginalized. Innovation policies become reactive rather than proactive, forcing alignment with globalized hype cycles that do not reflect local needs or capabilities.

At the educational level, the impact is devastating. Young researchers, trained in an environment dominated by publication metrics and media narratives, prioritize fast results and alignment with fashionable topics over deep experimentation and interdisciplinary exploration. As Ioannidis (2021) warns, *"the metric-driven system risks creating a generation of researchers more adept at gaming indicators than at contributing to robust knowledge production"* [9].

Ultimately, these dynamics fracture societal trust. The public, after repeated cycles of overhyped promises and technological underperformance, becomes skeptical of scientific announcements and disengages from serious innovation discourse. Jasanoff (2020) notes that *"the erosion of public trust in science is not primarily due to anti-scientific attitudes but to the visible complicity of science in speculative economic agendas"* [10].

Conclusion: Toward a New Governance of Innovation

Restoring scientific credibility and sustainable innovation requires dismantling the mechanisms that manufacture speculative futures. Technology forecasting must be critically regulated, with mandatory auditing of predictive performance and public disclosure of forecast success rates.

Science communication must move beyond amplification of promises and engage critically with uncertainties, risks, and developmental timescales. Research funding agencies must prioritize experimental rigor, reproducibility, and territorial anchoring over media visibility and speculative alignment.

Finally, society must reaffirm that innovation is not an automatic outcome of financial speculation but a difficult, iterative process that demands patience, critical reflection, and systemic responsibility.

Only by confronting the fabrication of innovation crises at their roots can we rebuild a science that serves humanity rather than speculative cycles.

References

56. Sarewitz, D. (2020). "Can Science Solve the Real Problems of Humanity?" Issues in Science and Technology, 36(4).
57. Fenn, J., & Raskino, M. (2019). Mastering the Hype Cycle: How to Choose the Right Innovation at the Right Time. Harvard Business Review Press.
58. Blosch, M. (2020). "Gartner Hype Cycles: A Critical Reassessment." Journal of Technology Forecasting and Social Change, 157, 120103.
59. Litman, T. (2023). "Autonomous Vehicle Implementation Predictions: Implications for Transport Planning." Victoria Transport Policy Institute Report.
60. Zhao, Y., Zhou, M., & Li, S. (2023). "Blockchain Adoption in Supply Chains: Successes, Failures, and Lessons." Journal of Business Logistics, 44(2).
61. Scheufele, D. A., & Krause, N. M. (2019). "Science audiences, misinformation, and fake news." Proceedings of the National Academy of Sciences, 116(16), 7662–7669.
62. Pisano, G. P. (2022). "Bubbles in Innovation: When Good Ideas Get Hijacked by Hype." Harvard Business Review.
63. European Investment Bank (2023). Innovation Report 2023: Rebalancing Growth and Sustainability.
64. Ioannidis, J. P. A. (2021). "Meta-research: Why research on research matters." PLOS Biology, 19(3), e3000961.
65. Jasanoff, S. (2020). Science and Public Reason. Routledge.

The Great Mystification of AI

How the AI Narrative Manufactures Hype, Distorts Perceptions, and Masks Market-Driven Technology Cycles

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

Artificial Intelligence (AI) has become one of the most potent myths of the 21st century. Far from representing a genuine form of autonomous intelligence, today's so-called AI systems are statistical tools developed and steered entirely by human cognition and purpose. The term "AI" itself is a product of careful narrative construction, designed to inflate expectations, attract investments, and shape public perceptions. This article critically analyzes how the myth of AI has been manufactured, why it misleads societies about the real nature of technological change, and how a market-driven approach sacrificed genuine innovation for the rapid commodification of probabilistic models. Recognizing the mystification surrounding AI is essential to restoring a realistic, responsible approach to digital innovation.

Introduction

There is no such thing as artificial intelligence. There is human intelligence, and there are artifacts created by humans — sophisticated, impressive, but fundamentally inert without human design, human interpretation, and human meaning. As Marcus (2022) argues, *"what is currently branded as AI is, in truth, little more than advanced statistical interpolation across enormous datasets"* [1]. Yet the mystification persists, fueled by an uncritical media landscape and a market hungry for futuristic promises.

The very choice of the term "Artificial Intelligence" was not neutral. It evokes images of sentient machines, autonomous decision-makers, and science fiction futures. Had these technologies been honestly named — as "statistical pattern recognition tools" or "advanced computational systems" — they would not have mobilized public fascination or multibillion-dollar investments. The mystification lies not in the tools themselves but in the deliberate framing that obscures their true nature.

Narrative Construction: How AI Became a Symbol

The AI boom has been less a technological inevitability than a carefully engineered communication phenomenon. Naming, framing, and repetition across media, politics, and academia created an illusion of imminent, autonomous machine intelligence. As Crawford (2021) writes, *"AI is less a technical field than a political and social project to automate inequality and power asymmetries"* [2].

This mystification serves distinct purposes. In the public imagination, "AI" promises transcendence: machines capable of surpassing human limitations. In the market, "AI" promises disruption: new territories to colonize with products, patents, and profits. In the media, "AI" delivers a perpetual spectacle of revolution, innovation, and impending doom, all of which sustain attention economies.

Critically, those who speak loudest about "AI ethics" — pundits, executives, policymakers — often lack even basic technical literacy. Few understand the inner workings of language models, computer vision systems, or reinforcement learning architectures. Yet their pronouncements shape societal debates, policy directions, and funding priorities. As Pasquale (2020) notes, *"the myth of AI has allowed corporations to displace responsibility onto 'algorithms' while insulating themselves from public accountability"* [3].

Market Forces and the Betrayal of Genuine Innovation

The AI narrative was also shaped by strategic technological choices driven by market imperatives. In the early 2010s, a crossroads appeared: pursue slow, foundational research into cognitive architectures (adaptive, embodied, developmental AI) or invest massively into deep learning — a scalable, data-hungry statistical paradigm promising immediate applications.

The choice was clear. Deep learning could produce marketable outputs: recommendation engines, speech recognition, predictive analytics. Investment flooded into this domain. As Bender et al. (2021) explain, *"large language models demonstrate proficiency in surface-level pattern reproduction, not in semantic understanding or reasoning"* [4].

Thus, the myth of intelligent machines was built atop infrastructures that fundamentally lacked cognitive capabilities. But they sufficed for commercial needs: selling AI-as-a-service, automating advertising, generating synthetic media, predicting consumer behavior. The AGI (Artificial General Intelligence) dream, if ever genuinely pursued, was sacrificed to the altar of quarterly profits.

Digital Infrastructure as Utility, Not Value Creator

Another critical mystification concerns the role of digital technologies themselves. Too often, digitalization is portrayed as an intrinsic source of value. In reality, as Lanier (2023) argues, *"digital infrastructures are utilities; they generate value only when embedded in social, cultural, and economic contexts capable of transforming information into action"* [5].

The digital, including AI, does not automatically produce growth, inclusion, or sustainability. On the contrary, in regions lacking education systems, industrial ecosystems, or institutional capacities, digitalization can exacerbate exclusion and dependency. Technology amplifies existing inequalities more often than it corrects them.

Mariana Mazzucato (2021) reinforces this view: *"Value creation requires mission-driven engagement, public-private collaboration, and societal directionality — technology alone is not enough"* [6]. Thus, AI, stripped of its mystique, is revealed for what it is: a tool. Powerful, yes. But inert without human intelligence, cultural frameworks, and democratic governance.

Conclusion: Toward De-Mystifying the Digital

Recognizing the great mystification of AI is not an exercise in pessimism but a necessary act of intellectual honesty. If society continues to project intelligence onto tools, it risks abdicating responsibility for their design, deployment, and consequences.

There is no autonomous intelligence lurking in servers or circuits. There are only tools, designed by human minds, governed by human choices, producing human consequences.

Only by stripping away the mythology can we build a future where digital technologies genuinely serve human dignity, societal needs, and planetary sustainability — rather than merely fueling speculative cycles of hype and disappointment.

References

66. Marcus, G. (2022). Rebooting AI: Building Artificial Intelligence We Can Trust. Pantheon.
67. Crawford, K. (2021). Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence. Yale University Press.
68. Pasquale, F. (2020). New Laws of Robotics: Defending Human Expertise in the Age of AI. Harvard University Press.
69. Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). "On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?" Proceedings of the ACM Conference on Fairness, Accountability, and Transparency.
70. Lanier, J. (2023). Who Owns the Future?. Simon & Schuster (updated edition).
71. Mazzucato, M. (2021). Mission Economy: A Moonshot Guide to Changing Capitalism. Penguin Books.

IMPACT-ORIENTED RESEARCH: FROM DISCIPLINES TO PROBLEMS

Rebuilding Research for Applied and Societal Impact through an Engineering-First Approach

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

Contemporary research faces a deep structural contradiction. On one hand, specialization and disciplinary excellence have led to unprecedented scientific advances; on the other, this same specialization has fragmented knowledge, isolated researchers, and increasingly detached academia from the urgent, complex needs of society. Addressing the intertwined challenges of climate transition, digital transformation, social cohesion, and territorial resilience requires a radical shift. This article argues for the necessity of reorganizing research ecosystems around impact-oriented, problem-driven missions, operationalized through an Engineering-First logic. Only by re-centering problems, projects, and real-world constraints can research reconnect with its transformative social mission.

Introduction: The End of Disciplinary Comfort Zones

The traditional organization of knowledge into disciplines, while historically fruitful, has become a structural impediment to tackling the multidimensional crises of the 21st century. Problems like climate adaptation, digital divides, or resilient food systems inherently cross disciplinary boundaries, demanding integration of physical sciences, social sciences, engineering, and humanities.

As Nowotny, Scott, and Gibbons (2001) powerfully assert, "knowledge production must become more socially robust, context-sensitive, and transdisciplinary if it is to maintain legitimacy" [1]. The disciplinary comfort zone, centered on internal academic validation, is increasingly at odds with the external societal demand for actionable, systemic solutions.

The Problem as Organizing Principle

Inverting the relationship between disciplines and problems is the starting point. Instead of fitting problems into disciplinary molds, research must fit disciplines into problem spaces. Mariana Mazzucato (2021) proposes that mission-oriented innovation must be organized "not around sectors or technologies, but around the concrete problems that societies face" [2].

Framing research around problems creates natural drivers for multidisciplinarity, as no single discipline holds the monopoly of insight. It fosters systemic thinking, because real problems reveal interdependencies, feedback loops, and non-linear dynamics. It also demands a culture of humility and collaboration, replacing disciplinary territoriality with operational solidarity.

Engineering-First Research: Toward Operational Intelligence

The Engineering-First approach provides a pragmatic epistemology for this shift. Engineering does not primarily seek to understand for the sake of understanding; it seeks to act, to design, to solve under constraints. In the engineering mindset, knowledge is always instrumental, always directed toward application.

Henry Petroski (2010) notes that "the engineer’s fundamental duty is to design for real-world operation, where idealizations fail and complexity dominates" [3]. Applying this logic to research at large implies

embracing failure as a learning vector, iteration as an operational method, and adaptability as a core scientific virtue.

Engineering-First research is therefore not anti-scientific; it is post-disciplinary, integrating theoretical insights into systemic operational designs that are resilient, adaptive, and territorially embedded.

Projects as Laboratories of Systemic Intelligence

Projects emerge as the natural operational unit of impact-oriented research. A project structures time, resources, and expertise around a specific mission, aligning diverse competences toward a shared goal. In this context, projects become laboratories of systemic intelligence: spaces where biological sciences, data analytics, political economy, and urban design meet to solve complex societal issues.

As Gibbons et al. (1994) argue in *The New Production of Knowledge*, "Mode 2 research is characterized by its context-driven, problem-solving orientation, involving heterogeneous teams operating in socially accountable ways" [4]. Projects cultivate this context-sensitivity, embedding research into social, economic, and environmental realities.

Within a project-based ecosystem, learning happens horizontally, knowledge is co-produced with stakeholders, and impact is measured by territorial transformation, not merely by academic outputs.

Systemic Thinking as a Core Competence

If impact-oriented research demands integration across knowledge domains, it simultaneously demands a re-education of researchers themselves. Systemic thinking must become a core intellectual habit, beyond technical specialization.

Donella Meadows (2008) emphasized that "the highest leverage for transformation lies in changing mental models, in shifting the paradigms out of which the system arises" [5]. Researchers trained in systemic intelligence recognize patterns across domains, foresee unintended consequences, and design interventions that strengthen resilience rather than optimizing isolated parameters.

This systemic literacy is critical for addressing mission-oriented challenges, where technological, social, economic, and institutional dynamics interact in unpredictable ways.

Territorial Innovation: From Abstract Excellence to Situated Impact

Territories — cities, regions, local communities — are not passive spaces but active laboratories where societal challenges and innovation opportunities converge. Embedding research into territorial ecosystems transforms abstract excellence into situated impact.

The European Commission's Joint Research Centre (JRC) emphasizes that "place-based innovation ecosystems are key to achieving the Green Deal, digital transition, and social cohesion objectives" [6]. Living labs, urban demonstrators, and regional innovation hubs exemplify how research, when anchored to local realities, can produce tangible societal transformations.

A territorial perspective restores scale, complexity, and human agency to research endeavors, moving beyond the abstraction of global metrics to the concreteness of lived experiences.

Rethinking Evaluation and Funding: From Metrics to Missions

The transition to impact-oriented, Engineering-First research is impossible without transforming how success is measured and rewarded. Current evaluation systems, dominated by publication counts and journal rankings, reinforce disciplinary fragmentation and abstraction.

The San Francisco Declaration on Research Assessment (DORA) and the Leiden Manifesto for Research Metrics both argue for a "context-sensitive, mission-driven, and qualitative assessment of research" [7][8]. Funding agencies must prioritize projects based on their relevance to societal missions, their systemic integration, and their potential for territorial transformation.

This shift implies moving from competition among individuals toward collaboration among ecosystems; from career incentives based on insular prestige toward recognition of systemic contributions.

Conclusion: Toward a New Research Social Contract

Impact-oriented research, structured around problems and operationalized through an Engineering-First approach, represents not a rejection but an expansion of scientific ambition. It reconnects research with its historical mission: to serve humanity, to empower territories, to transform societies.

This new paradigm demands new institutions, new evaluation systems, new educational models, and above all, new intellectual virtues: humility, systemic vision, operational intelligence, and territorial engagement.

Rebuilding the social contract between science and society requires nothing less than this comprehensive transformation.

References

72. Nowotny, H., Scott, P., & Gibbons, M. (2001). Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty. Polity Press.
73. Mazzucato, M. (2021). Mission Economy: A Moonshot Guide to Changing Capitalism. Penguin.
74. Petroski, H. (2010). The Essential Engineer: Why Science Alone Will Not Solve Our Global Problems. Vintage.
75. Gibbons, M., et al. (1994). The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies. Sage.
76. Meadows, D. H. (2008). Thinking in Systems: A Primer. Chelsea Green Publishing.
77. European Commission, Joint Research Centre (2022). Place-Based Innovation Ecosystems: Key Actors and Practices for Territorial Transformation. JRC Science for Policy Report.
78. San Francisco Declaration on Research Assessment (DORA). (2012). https://sfdora.org/
79. Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). "The Leiden Manifesto for Research Metrics." Nature, 520(7548), 429–431.
80. OECD (2023). Promoting Research for Regional Resilience. OECD Publishing.

LIVING LABS AS INFRASTRUCTURES FOR REGIONAL COOPERATION AND INNOVATION

How Socio-Technical Complexity Requires New Spaces for Applied Research and Systemic Learning

Author: Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

In a context increasingly dominated by systemic crises, societal challenges, and fragmented innovation landscapes, Living Labs emerge as crucial infrastructures for reconnecting research, innovation, and territorial development. Rooted in the principles of co-creation, experimentation, and territorial anchoring, Living Labs provide the socio-technical environments necessary to transform the complexity of real-world problems into collaborative opportunities for action. This article explores the role of Living Labs in operationalizing impact-oriented research, reducing systemic complexity, and fostering cultural transformation within research ecosystems. Drawing on European Commission frameworks and the experience of the European Network of Living Labs (ENoLL), we argue that Living Labs must be recognized as strategic infrastructures for territorial resilience and cooperative innovation.

Introduction: Complexity, Crisis, and the Need for New Infrastructures

The contemporary landscape of innovation and societal development is characterized by escalating complexity. Technological transitions, ecological imperatives, and social inequalities interact in unpredictable ways, producing what Rittel and Webber (1973) famously called "wicked problems" [1].

In such a context, traditional disciplinary research structures and top-down innovation models prove insufficient. Complex socio-technical systems cannot be governed through linear approaches; they require spaces for iteration, negotiation, and collective intelligence.

As the European Commission's Joint Research Centre (2022) emphasizes, territorial innovation ecosystems must be "place-based, mission-driven, and grounded in collaborative infrastructures capable of handling systemic complexity" [2]. Living Labs are precisely such infrastructures: spaces where complexity is not denied but embraced and made governable through collaborative design and adaptive experimentation.

Living Labs: Concept and Evolution

Living Labs, as formalized by the European Network of Living Labs (ENoLL), are defined as "user-centered, open innovation ecosystems based on a systematic co-creation approach integrating research and innovation processes in real-life communities and settings" [3].

Initially conceptualized to bridge the gap between research and society, Living Labs have evolved into strategic platforms for multi-stakeholder engagement, participatory prototyping, and mission-oriented innovation. They operate at the intersection of academic knowledge, technological development, policy agendas, and societal aspirations, thus embodying the systemic integration demanded by impact-oriented research.

From Research to Impact: The Role of Living Labs

Impact-oriented research requires more than methodological rigor; it demands social embeddedness, territorial relevance, and iterative learning cycles. Living Labs provide the operational environment where research moves from disciplinary abstraction to societal co-creation.

Through Living Labs, projects become iterative experiments, policies are prototyped rather than imposed, and technologies are adapted rather than transferred. This transition from a "knowledge-push" to a "problem-pull" dynamic is crucial for ensuring that research produces outcomes that are not only scientifically valid but also socially meaningful and territorially sustainable.

Living Labs as Instruments of Complexity Reduction

One of the less explored but fundamental roles of Living Labs is their function as instruments for the reduction of systemic complexity.

In environments where the interaction between actors, technologies, and contexts generates overwhelming complexity, Living Labs serve as "boundary infrastructures" — physical and conceptual spaces that selectively reduce complexity by focusing attention, enabling negotiation, and structuring adaptive experimentation.

In this sense, Living Labs can be seen as filters, amplifiers, and negotiation arenas that make systemic complexity actionable.

They transform the "hypercomplex" into the "manageable-complex" through processes of co-design, real-world testing, and dynamic stakeholder alignment.

Moreover, Living Labs act as social orientation devices. They offer actors — researchers, enterprises, policymakers, citizens — a shared space to redefine their roles, expectations, and collaboration modalities.

This social function is crucial, as it enables cultural transformations necessary for cooperative innovation: the overcoming of academic arrogance, the valorization of practical knowledge, and the re-centering of research around problem-solving rather than prestige accumulation.

The European Vision: Living Labs for the Green and Digital Transitions

The European Commission's strategies for the Green Deal and Digital Europe explicitly recognize the need for participatory, territorialized innovation ecosystems.

Living Labs are highlighted as key infrastructures to achieve mission-driven innovation, citizen engagement, and place-based transitions [2].

Several European initiatives — such as the Urban Agenda partnerships, the Climate-Neutral Cities Mission, and the European Bauhaus — explicitly deploy Living Lab methodologies to integrate top-down strategies with bottom-up experimentation. As ENoLL states in its 2022 Annual Report, "Living Labs are not simply innovation spaces; they are platforms for societal learning, adaptive governance, and territorial regeneration" [3].

Toward a Living Lab Ecosystem for Regional Resilience

To fully realize their potential, Living Labs must evolve from isolated experiments to interconnected infrastructures embedded within regional innovation strategies. Their functions must expand beyond single projects to include:

- Structuring systemic learning across sectors and scales.
- Bridging gaps between research, enterprises, public authorities, and communities.
- Anchoring mission-driven innovation within territorial realities.
- Acting as long-term platforms for the regeneration of resilience, inclusiveness, and sustainability.

Regional networks of Living Labs, cooperating across borders and sectors, could form the backbone of a new Euro-Mediterranean strategy for impact-oriented, engineering-driven research and innovation — capable of

transforming the Mediterranean from a frontier of vulnerability into a laboratory of cooperative regeneration.

Conclusion: Living Labs as the Operational Soul of Impact-Oriented Research

Living Labs are not just tools for improving technology transfer or citizen engagement. They represent a deeper shift: the move from an academic culture centered on disciplinary excellence to a projectual culture centered on systemic problem-solving and territorial impact.

In an era where complexity threatens to paralyze action, Living Labs offer the operational structures, the cultural frameworks, and the adaptive methodologies needed to govern complexity without denying it.

Recognizing, supporting, and expanding Living Labs is not a marginal option; it is a strategic necessity for any society serious about making research serve its people, its territories, and its futures.

References

81. Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning. Policy Sciences, 4(2), 155–169.
82. European Commission, Joint Research Centre (2022). Place-Based Innovation Ecosystems: Key Actors and Practices for Territorial Transformation. JRC Science for Policy Report.
83. European Network of Living Labs (ENoLL). (2022). Annual Report: Living Labs for a Sustainable Future.
84. EC Mission Board for Climate-Neutral and Smart Cities (2020). 100 Climate-Neutral Cities by 2030 – by and for the Citizens. European Commission.
85. OECD (2023). Living Labs and Territorial Innovation. OECD Publishing.

IMPACT RESEARCH NETWORKS: LIVING LAB AND RESILIENCE IN NETWORKED SYSTEMS

Author:

Sebastiano Martignano Research strategy advisor -CRF
Monica Bianco, Ecosystems Cooperation advisor -CRF Italy

Abstract

Contemporary societal challenges increasingly manifest as wicked problems — complex, evolving, and stakeholder-intensive issues that defy traditional linear approaches. Addressing these challenges demands a fundamental shift towards networked innovation ecosystems grounded in cooperation, adaptability, and territorial anchoring.

This article explores how Living Labs, as dynamic nodes within impact-oriented research networks, can act as infrastructures for systemic innovation and regional regeneration. Drawing from multilevel network theory and empirical studies on cooperative ecosystems, we analyze the design principles necessary for resilient network architectures, including specialization, complementarity, and trust. Particular attention is given to the systemic risks posed by toxic nodes and parasitic hubs that undermine network vitality, proposing strategies for governance, resilience, and inclusive growth. Ultimately, building resilient, impact-driven research networks represents a strategic imperative for regenerating territories and fostering sustainable futures across complex socio-technical systems.

Navigating Complexity: Wicked Problems and Networked Innovation

Contemporary societies are increasingly confronted with wicked problems, complex challenges that resist clear definitions and definitive solutions. Rittel and Webber (1973) introduced this concept to highlight the nature of issues whose formulation and resolution evolve dynamically, influenced by conflicting stakeholder perspectives and shifting contexts [1]. Unlike technical problems with a clear cause-and-effect chain, wicked problems demand adaptive, participatory, and systemic approaches.

The linear model of innovation, where knowledge flows from research to application in predictable steps, proves insufficient in the face of such complexity. As Head and Alford (2015) emphasize, *wicked problems require collaborative governance, interdisciplinary knowledge integration, and iterative learning processes* [2]. *Networked innovation ecosystems emerge as critical infrastructures*, linking diverse actors and facilitating collective sense-making, experimentation, and co-evolution.

Living Labs, as participatory, real-world experimentation environments, can function as dynamic nodes within these ecosystems, *operationalizing cooperation and anchoring innovation within territorial realities*. Their embeddedness and adaptability offer a strategic advantage in tackling complexity at regional scales.

Living Labs as Nodes in Regional Innovation Networks

Living Labs have evolved from isolated experimental spaces to become key enablers of regional innovation systems. As formalized by the European Network of Living Labs (ENoLL), they are open, user-centered ecosystems where multiple stakeholders co-create solutions in real-world settings [3].

Within regional innovation networks, Living Labs serve as interfaces between research institutions, enterprises, public authorities, and civil society. Their strength lies in facilitating iterative prototyping, feedback loops, and adaptation, essential capabilities when navigating the uncertainty and volatility inherent in wicked problems.

Rather than acting as isolated pilots, Living Labs must be integrated into broader, mission-driven strategies for territorial development. Leminen and Westerlund (2017) demonstrate that *Living Labs succeed when embedded within regional policies, supported by stable cooperation structures, and linked through multilevel governance frameworks* [4].

They are not mere facilitators of innovation but critical organizational nodes that sustain systemic learning, collective intelligence, and adaptive capacity across territories.

Designing Cooperative Network Architectures: Specialization, Complementarity, and Trust

Building effective impact research networks requires intentional design based on three interrelated principles: specialization, complementarity, and trust.

Specialization ensures that each node contributes unique competences and resources, avoiding redundancy and enabling knowledge recombination. Complementarity allows these specialized competences to synergize, creating a functional whole greater than the sum of its parts.

However, as Powell (1990) emphasized, specialization and complementarity alone are insufficient without trust [5]. *Trust acts as the invisible infrastructure that sustains collaboration, especially under conditions of uncertainty, asymmetry, and dynamic evolution.*

In wicked contexts, where problems cannot be fully defined or predicted, trust enables actors to experiment without fear, to admit and learn from failures, and to adapt strategies without blame. As Sabel (1993) argues, "learning by monitoring" — the iterative co-evolution of strategies through mutual evaluation — requires an environment of trust where actors are willing to expose vulnerabilities and share incomplete knowledge [6].

Without trust, networks tend to collapse into bureaucratic formalism or disintegrate into competitive fragmentation, losing their systemic coherence. Provan and Kenis (2008) show that network governance models succeed only when trust levels among participants are sufficient to sustain decentralized collaboration and adaptive capacity [7].

Thus, trust is not an ancillary cultural trait but a strategic asset that enables networks to remain resilient, innovative, and mission-driven even amidst turbulence.

Trust as an Enabler of Cooperative Networks

Trust operates simultaneously at interpersonal, interorganizational, and systemic levels. At the interpersonal level, trust reduces transaction costs and facilitates knowledge sharing. At the interorganizational level, it enables resource pooling, risk-sharing, and long-term commitment beyond contractual obligations. At the systemic level, trust in the governance structures of the network sustains its resilience and capacity for coordinated action.

In the context of wicked problems, where solutions are provisional and dynamic, trust becomes the condition that allows iterative experimentation and collective learning to flourish. Actors engaged in networks

characterized by high trust are more willing to co-invest in infrastructure, to engage in transparent communication, and to sustain cooperation even when immediate returns are uncertain.

Living Labs, by virtue of their participatory ethos and territorial anchoring, are natural trust builders. Their practice of co-design, open experimentation, and shared governance fosters the types of relational bonds necessary for cooperative resilience.

Building and maintaining trust, therefore, is not optional; it is a fundamental design requirement for any impact-oriented research network capable of addressing societal complexity.

Dynamics of Cooperation in Networks: Managing Resource Drain and Ensuring Resilience

Despite best intentions, networks are vulnerable to internal distortions. Among the most critical threats are the emergence of toxic nodes — actors that extract more resources than they contribute, distort information flows, and undermine trust.

As Provan and Kenis (2008) highlight, networks often fragment not because of external pressures but due to internal governance failures and asymmetries of power [7]. Toxic nodes can trigger cascading failures by disrupting reciprocity, monopolizing opportunities, or hijacking decision-making processes.

Detecting and neutralizing parasitic hubs requires dynamic monitoring, participatory governance structures, and mechanisms for sanctioning opportunistic behavior. It also demands a culture of collective responsibility, where the health of the network is understood as a shared asset.

Living Labs, due to their embeddedness in local ecosystems and commitment to transparency, are well positioned to act as early warning systems for emerging dysfunctions.

Their capacity to foster mutual accountability, inclusive governance, and adaptive feedback makes them crucial infrastructures for maintaining network vitality and territorial resilience.

Multilevel Network Structures: Theoretical Foundations and Practical Applications

Multilevel network theory, as articulated by Lazega et al. (2016), provides a powerful lens for understanding how different types of actors and interactions are embedded across scales [7]. In regional innovation ecosystems, actors operate simultaneously at local, regional, national, and transnational levels, requiring coordination across formal and informal structures.

Living Labs, positioned at the intersection of different governance levels, can function as *connective tissues that mediate knowledge flows, translate policies into local action, and channel grassroots innovation into systemic change.*

As Carayannis and Campbell (2012) argue in their quadruple and quintuple helix models, sustainable innovation ecosystems require the integration of academia, industry, government, civil society, and the environment [8].

Multilevel networks enable the alignment of these helices, fostering territorial resilience and systemic impact.

Conclusion: Toward Resilient and Impact-Oriented Research Ecosystems

Impact research networks structured around Living Labs and governed by cooperative architectures offer a transformative pathway to address wicked problems. They embody a shift from siloed, linear models of innovation towards adaptive, systemic, and territorially anchored infrastructures capable of fostering societal resilience.

Their success, however, hinges on the deliberate cultivation of specialization, complementarity, and trust, as well as the vigilant management of toxic dynamics that can fragment networks from within.

In a context where societal challenges are increasingly complex and urgent, building resilient, impact-oriented ecosystems is not merely an academic exercise: it is a strategic necessity for regenerating territories, empowering communities, and sustaining futures across the Euro-Mediterranean and beyond.

References

1. Rittel, H. W. J., & Webber, M. M. (1973). *Dilemmas in a General Theory of Planning*. Policy Sciences.
2. Head, B. W., & Alford, J. (2015). *Wicked Problems: Implications for Public Policy and Management*. Administration & Society.
3. European Network of Living Labs (ENoLL). (2022). *Annual Report*.
4. Leminen, S., & Westerlund, M. (2017). *Innovation via Living Labs*. Management Decision.
5. Powell, W. W. (1990). *Neither Market nor Hierarchy: Network Forms of Organization*. Research in Organizational Behavior.
6. Sabel, C. F. (1993). *Learning by Monitoring*. In N. J. Smelser & R. Swedberg (Eds.), *The Handbook of Economic Sociology*.
7. Provan, K. G., & Kenis, P. (2008). *Modes of Network Governance: Structure, Management, and Effectiveness*. Journal of Public Administration Research and Theory.
8. Sabel, C. F., & Zeitlin, J. (2012). *Experimentalist Governance*. Oxford Handbook of Governance.
9. Lazega, E., Jourda, M.-T., Mounier, L., & Stofer, R. (2016). *Multilevel Network Analysis*. Springer.
10. Carayannis, E. G., & Campbell, D. F. J. (2012). *Mode 3 Knowledge Production and Quadruple Helix Innovation Systems*. Springer.
11. Castells, M. (2010). *The Rise of the Network Society*. Wiley-Blackwell.
12. Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). *Complexity Leadership Theory*. Leadership Quarterly.
13. Chesbrough, H. (2006). *Open Innovation*. Harvard Business Press.
14. Holland, J. H. (1995). *Hidden Order: How Adaptation Builds Complexity*. Basic Books.
15. Freeman, L. C. (2004). *The Development of Social Network Analysis*. Empirical Press.
16. Ballon, P., Pierson, J., & Delaere, S. (2005). *Test and Experimentation Platforms for Broadband Innovation*. Communications & Strategies.
17. Juujärvi, S., & Pesso, K. (2013). *Actor Roles in Living Lab Innovation Systems*. Technology Innovation Management Review.
18. OECD (2023). *Ecosystems of Innovation and Regional Resilience*.
19. European Commission (2022). *Living Labs for Digital and Green Transition*.
20. Smith, A., Stirling, A., & Berkhout, F. (2005). *The Governance of Sustainable Socio-Technical Transitions*. Research Policy.