

Extended Data Figures

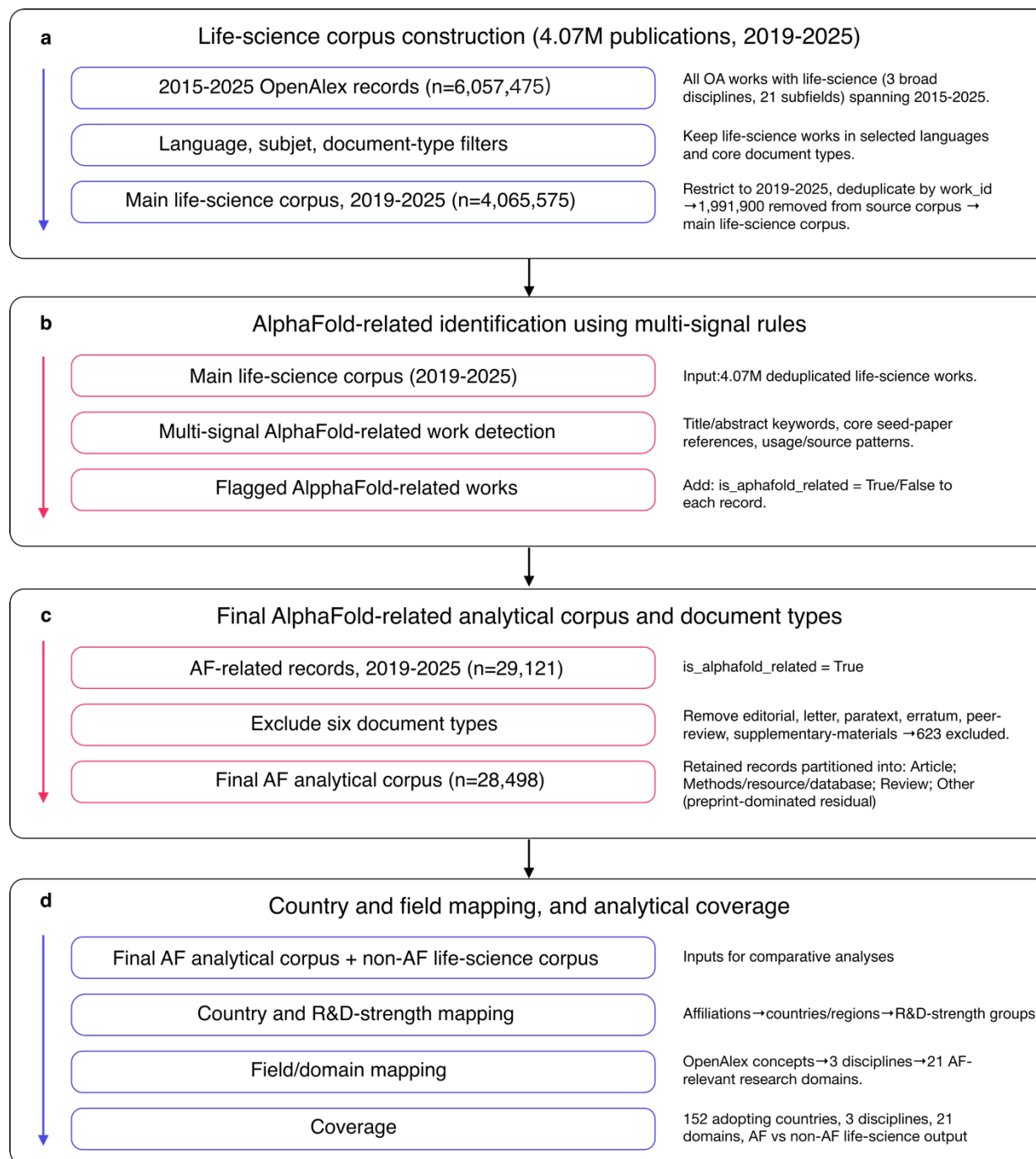


Figure.1 | Construction of the main study corpus. (a) The construction of the 2019-2025 life-science corpus from OpenAlex records. (b) Applies multi-signal rules to flag AlphaFold-related works. (c) Defines the final AlphaFold analytical corpus after document-type exclusions and its four document-type categories. (d) Maps the corpus to countries, R&D-strength groups, and 21 research domains, yielding coverage of 152 adopting countries/regions.

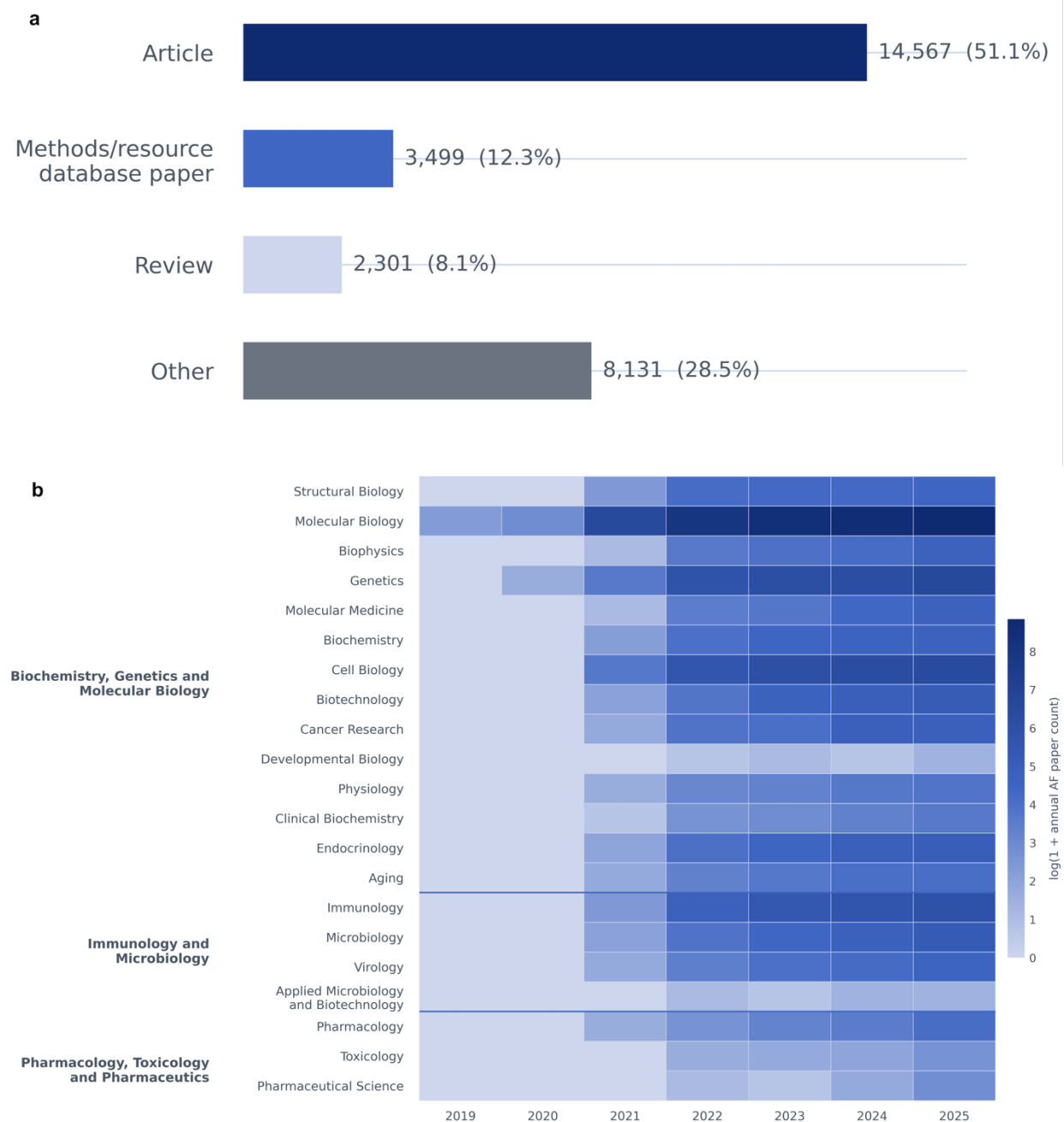


Figure 2 | Document-types and subfield diffusion of the AlphaFold-related corpus, 2019-2025. (a) Distribution of document types in the deduplicated AlphaFold-related corpus, including Articles, Methods/resource/database papers, Reviews, and other documents. The “Other” category is dominated by preprints and also includes datasets, book chapters, dissertations, books, and reports. (b) Temporal diffusion of AlphaFold-related publications across 21 subfields grouped into three broad disciplines: biochemistry, genetics and molecular biology; immunology and microbiology; and pharmacology, toxicology and pharmaceutics. Heatmap values indicate $\log(1+\text{count})$ of publications per subfield per year from 2019 to 2025.

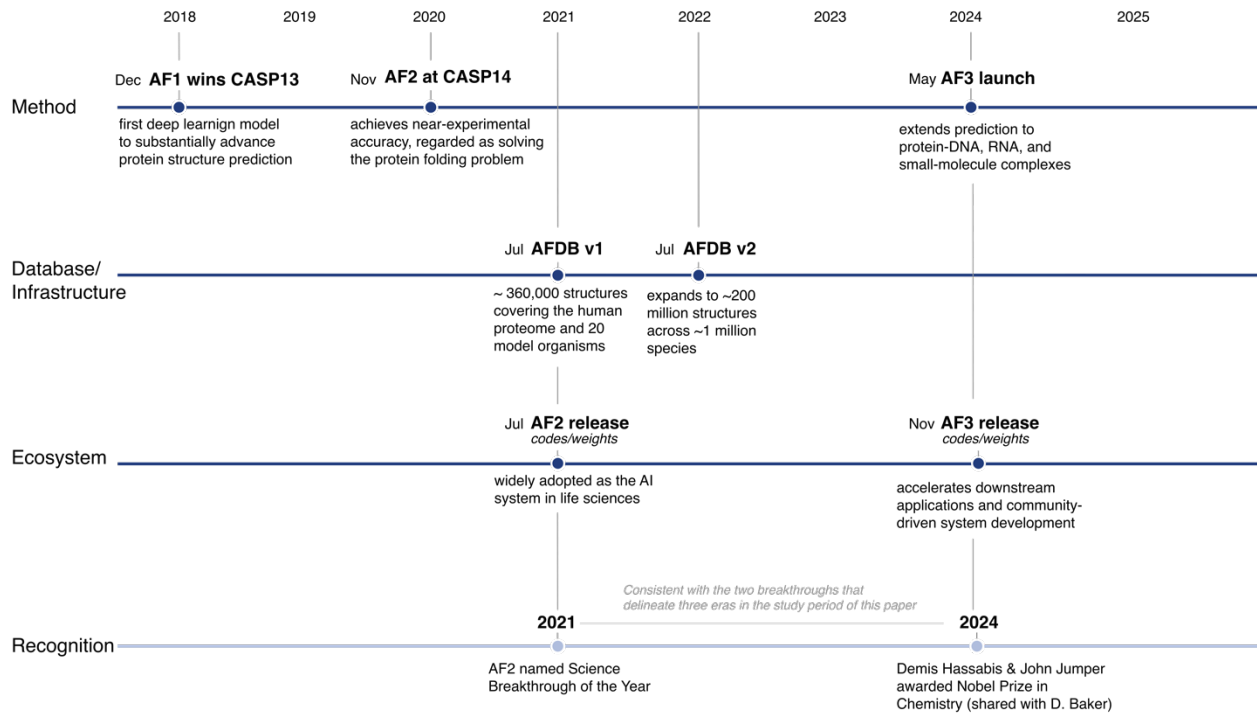


Figure 3 | Milestone timeline of the AlphaFold ecosystem. Timeline of major developments from 2018 to 2025 across four dimensions: method (key AlphaFold model releases), database/infrastructure (AlphaFold Protein Structure Database expansions), ecosystem (adoption and downstream applications) and recognition (high-profile scientific awards).

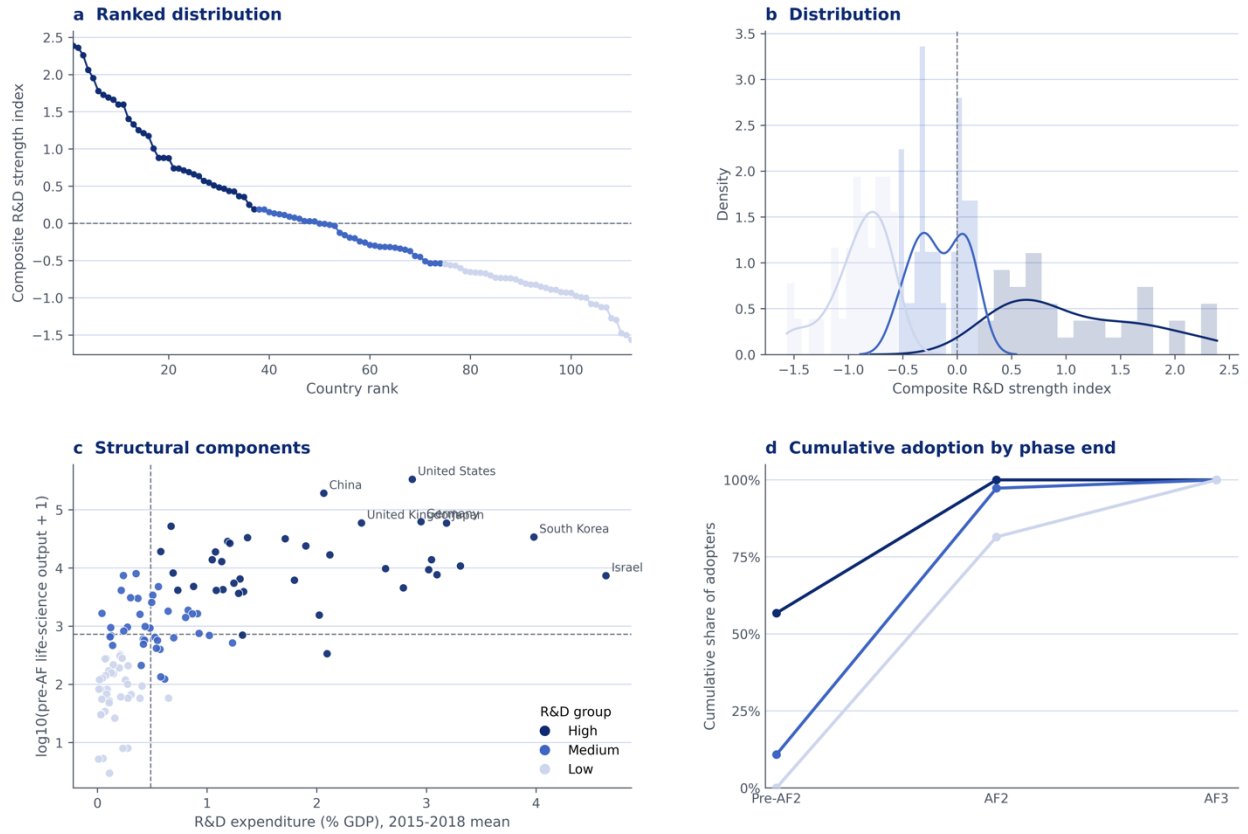


Figure 4 | Pre-existing R&D strength and diffusion of AlphaFold adoption. (a) Ranked distribution of countries by composite R&D strength index (2015-2018). (b) Overall distribution of the index across countries. (c) Relationship between R&D expenditure (% GDP) and pre-AlphaFold life-science output, with countries grouped into high-, middle- and low-R&D strength clusters. (d) Cumulative share of AlphaFold adopters by phase end across high-, middle-, and low-R&D-strength countries

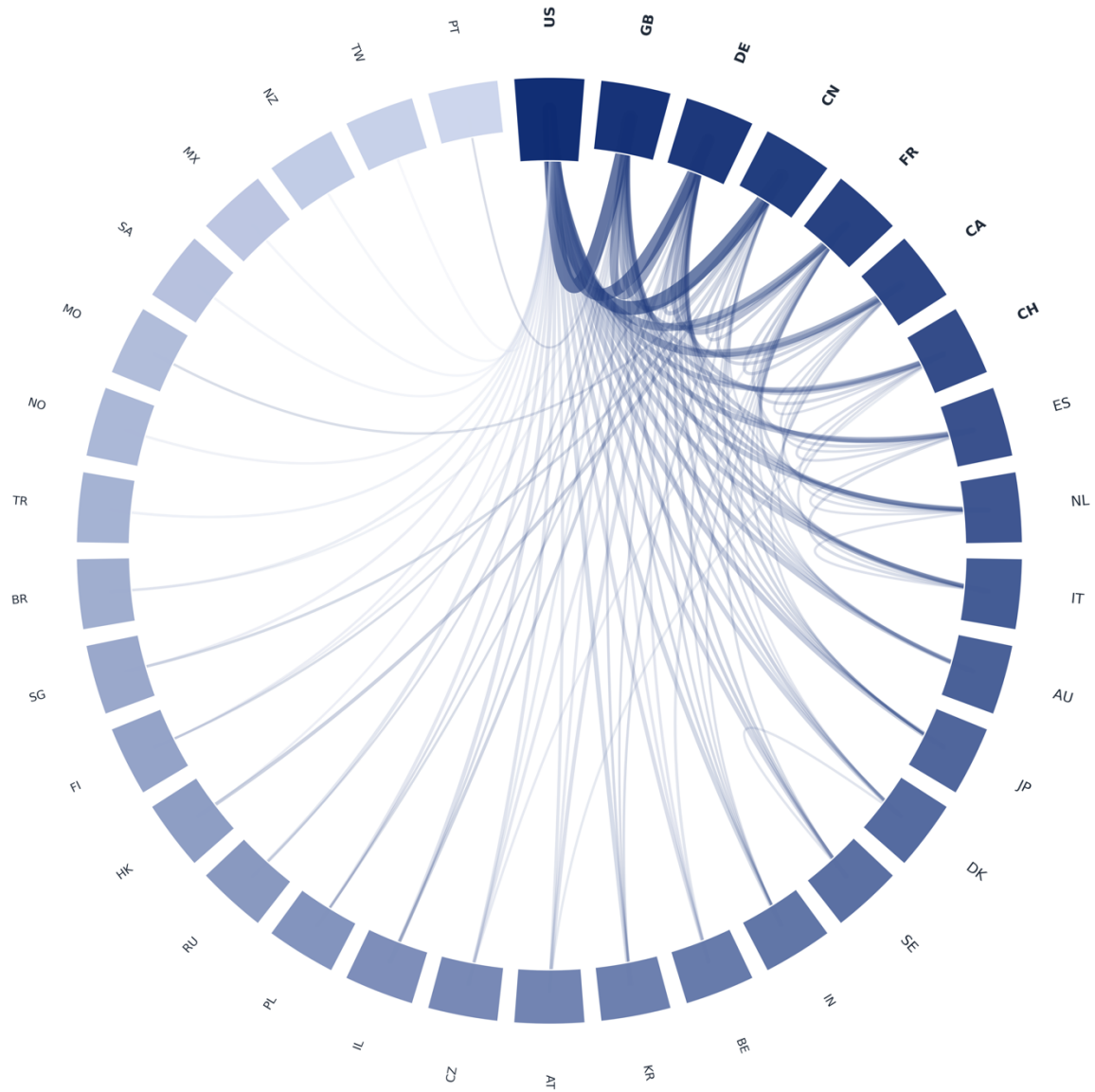


Figure 5 | Global collaboration/co-authorship network in AlphaFold research. Circular network diagram showing bilateral collaboration ties among AlphaFold-publishing countries. Each segment on the outer ring represents a country (ordered by total fractional AlphaFold-related output), with segment shading indicating total fractional publication volume. Curved links represent bilateral co-authorships weighted by fractional collaboration counts, and only ties above a minimum threshold are shown to improve legibility. The visual pattern highlights a dense core of high-output countries that collaborate intensively with one another and occupy central positions in the AlphaFold collaboration network.

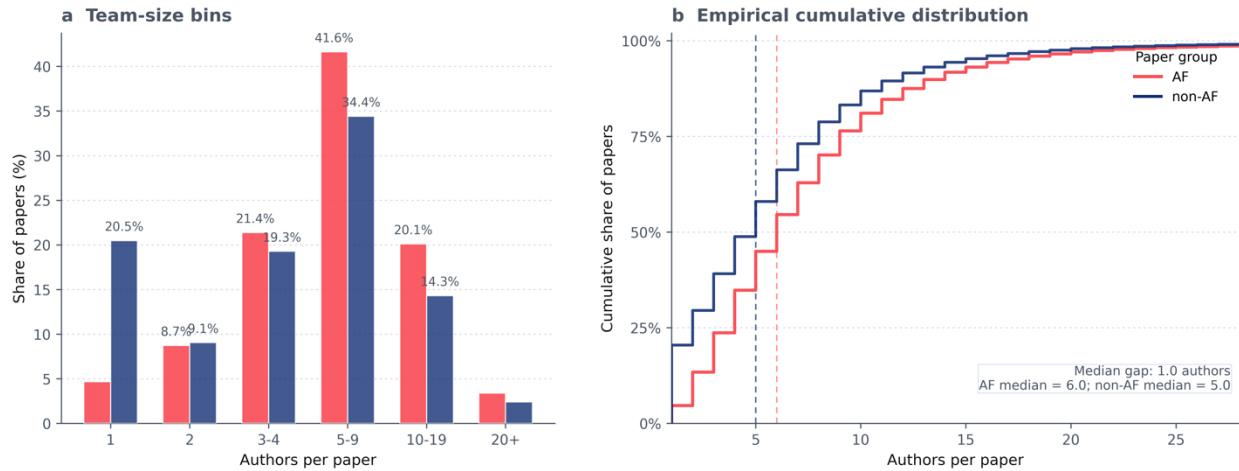


Figure 6 | Team-size distribution in AlphaFold-related research. (a) Binned team-size composition for AlphaFold-related versus non-AlphaFold life-science papers, showing a higher share of AF papers in 3-4, 5-9, and 10-19 author bins and fewer single-author and two-author papers. (b) Empirical cumulative distribution of authors per paper, indicating that AlphaFold-related teams are systematically larger, with a median 6 authors compared to 5 for non-AlphaFold papers.

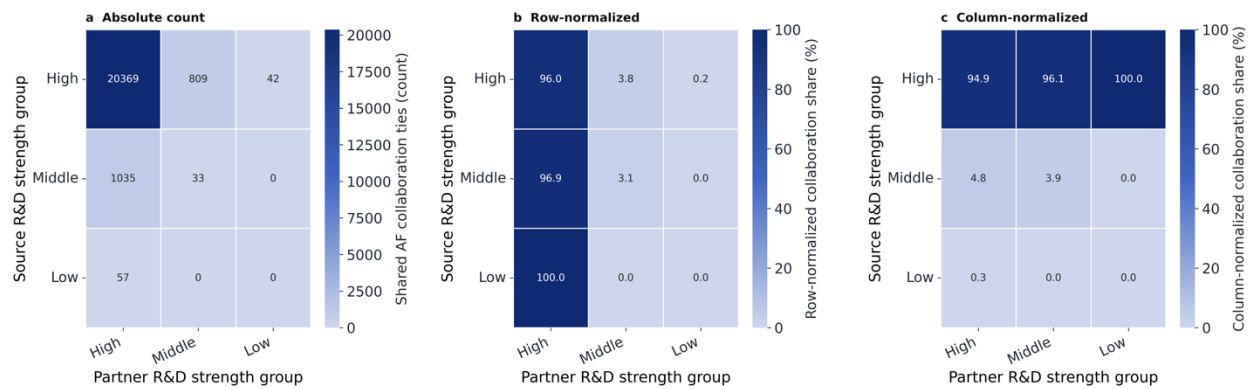


Figure 7 | Collaboration structures by R&D group. (a) Absolute bilateral co-authorship counts between source and partner R&D-strength groups in AlphaFold-related research. (b) Row-normalized shares showing that countries in each group collaborate predominantly with high-strength systems. (c) Column-normalized shares indicating that the vast majority of collaborations received by high-strength countries originate from within the same high-strength group, with middle-, and low-strength countries contributing only small fractions.

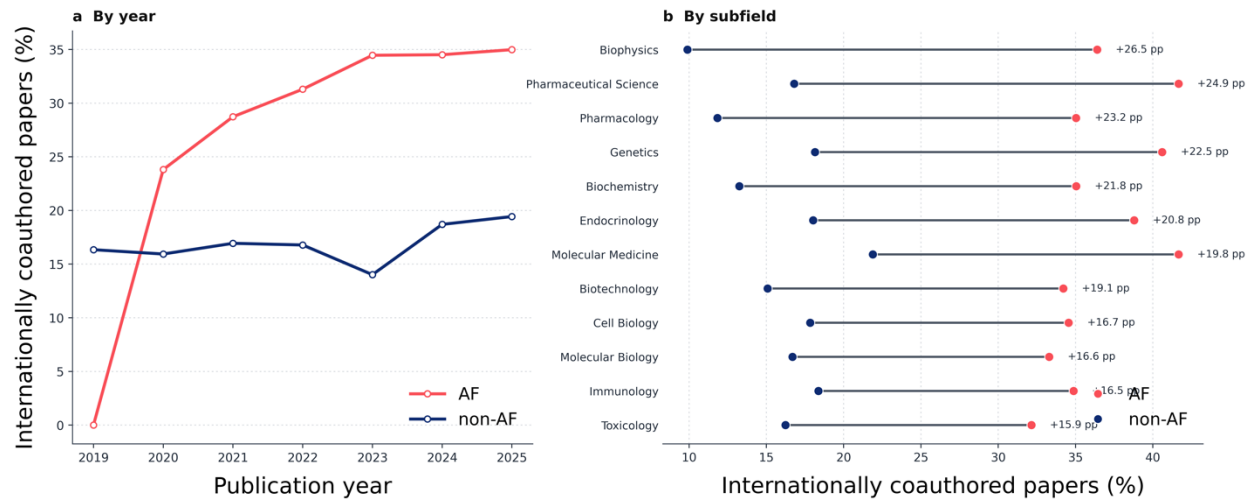


Figure 8 | International co-authorship in AlphaFold versus non-AlphaFold life-science research. (a) Temporal evolution of the share of international coauthored papers for AlphaFold-related and non-AlphaFold life-science publications from 2019 to 2025, showing consistently higher and more rapidly increasing international collaboration rates in AlphaFold research. (b) Field-wise comparison of international co-authorship shares for AlphaFold-related and non-AlphaFold papers in the 12 subfields with the largest gaps, highlighting systematically higher cross-border collaboration in AlphaFold across domains such as biophysics, pharmacology, genetics, and biochemistry.

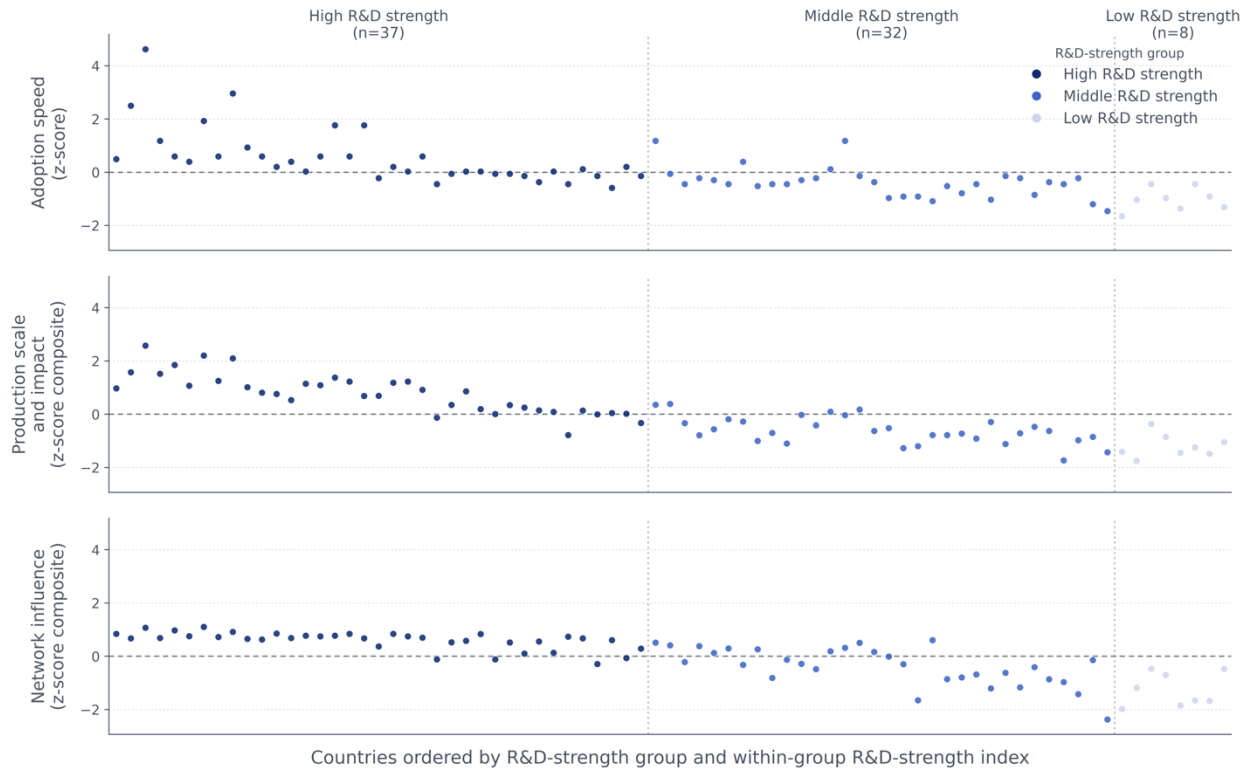


Figure 9 | Country-level AI4S capacity scores across three dimensions (77-country intersection sample).

Distribution of standardized z-scores for AlphaFold-based AI4S capacity along three dimensions – adoption speed, production output, and network influence – shown for 77 countries in the strict intersection of the adoption, output, network influence, and R&D-strength datasets. Countries are grouped by R&D-strength tertile and ordered within each group by the composite R&D-strength index in descending order. The figure is restricted to the 77 countries with non-missing values for AlphaFold adoption lag, collaboration centrality, AlphaFold-related output, and an R&D-strength classification.

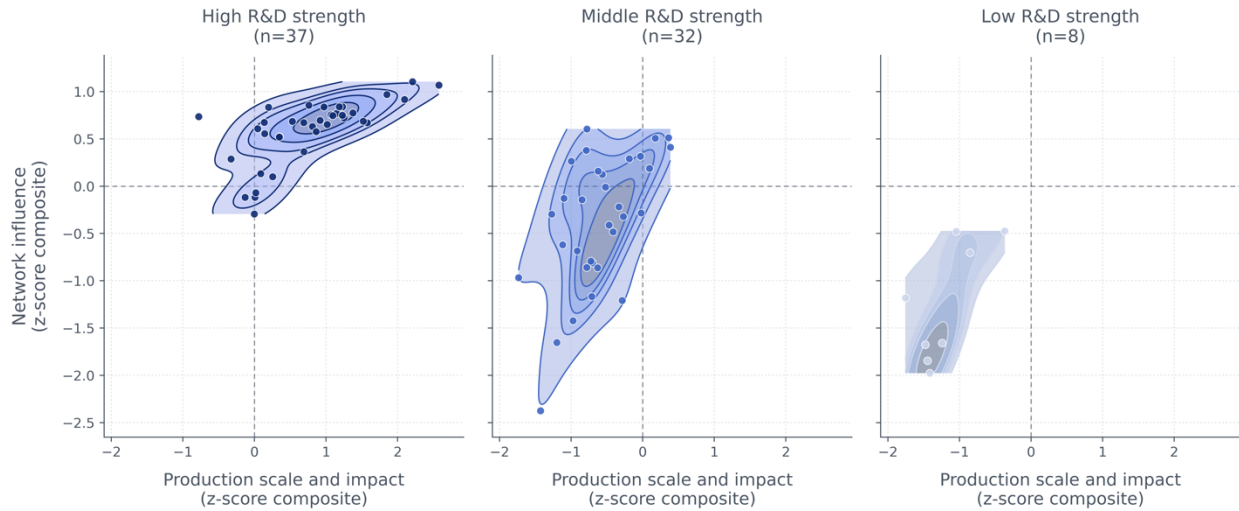


Figure 10 | Density of countries in AI4S capacity space by R&D-strength group. Kernel density estimates in the two-dimensional AI4S capacity space defined by production scale and impact (x-axis) and network influence (y-axis), shown separately for high-, middle-, and low-R&D-strength country groups. High-strength systems are concentrated in the high-output, high-influence corner of the space, whereas middle- and low-strength countries cluster at substantially lower capacity levels.