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Alignment of SDG-related research with SDG 17 on "Partnerships for the goals"

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GUIRR Webinar
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Introduction

Part of the UN's 2030 Agenda for Sustainable Development, these goals aim for a better and more sustainable future for all.

They are interconnected goals, especially SDG 17 on "Partnerships for the goals", which cuts across all other SDGs.

Since most SDGs require or otherwise benefit from scientific research, it is worthwhile tracking trends in related scientific outputs, especially from the perspective of SDG 17 on collaboration.

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Introduction

points to various types of collaborations:

- Target 17.6: International collaborations (especially North–South and South–South)
- Target 17.17: Public, public–private and civil society partnerships
- Cross-disciplinary collaborations: Not explicit in SDG 17, but widely recognized as key drivers of solutions to the complex issues facing modern societies
- Transdisciplinary research, combining the above to achieve translational outcomes, has been recognized as a promising approach to sustainable development[2]

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2. Hirsch Hadorn et al. (2013), Mauser et al. (2013), Salite et al. (2016)

Introduction – Goals of this presentation

Question 1: How collaborative is SDG-related research relative to all fields of science in the US?

Question 2: How do US patterns compare to those of the world, EU-27 and China?

To achieve this at scale, datasets of SDG-related peer-reviewed publications were built using semi-automated queries for the following SDGs grouped into 3 broad themes:

People

Planet

Prosperity

16 publication datasets in Scopus

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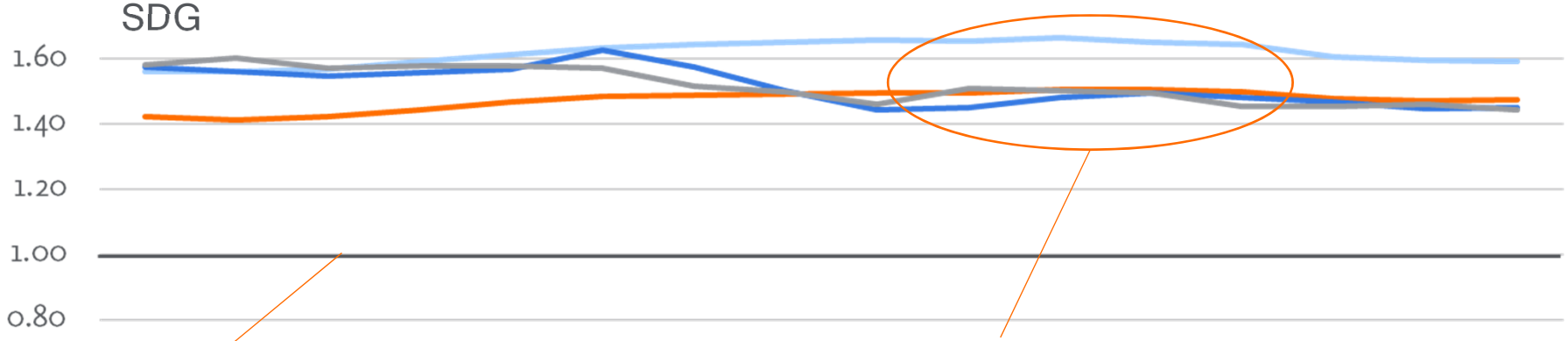
Methods – Indicator normalization

- Research practices (e.g., citations, collaborations) vary greatly across scientific subfields and through time
- The SDGs receive contributions from a wide range of disciplines, even within a single SDG



All indicators were subfield- & year-normalized using the **whole of science (in Scopus) as a reference.**

Can be the world, the US or any other country in any of the SDGs. Could fall above or below reference (black line = world in Scopus). A country in Scopus overall can also be above or below the world reference in Scopus.

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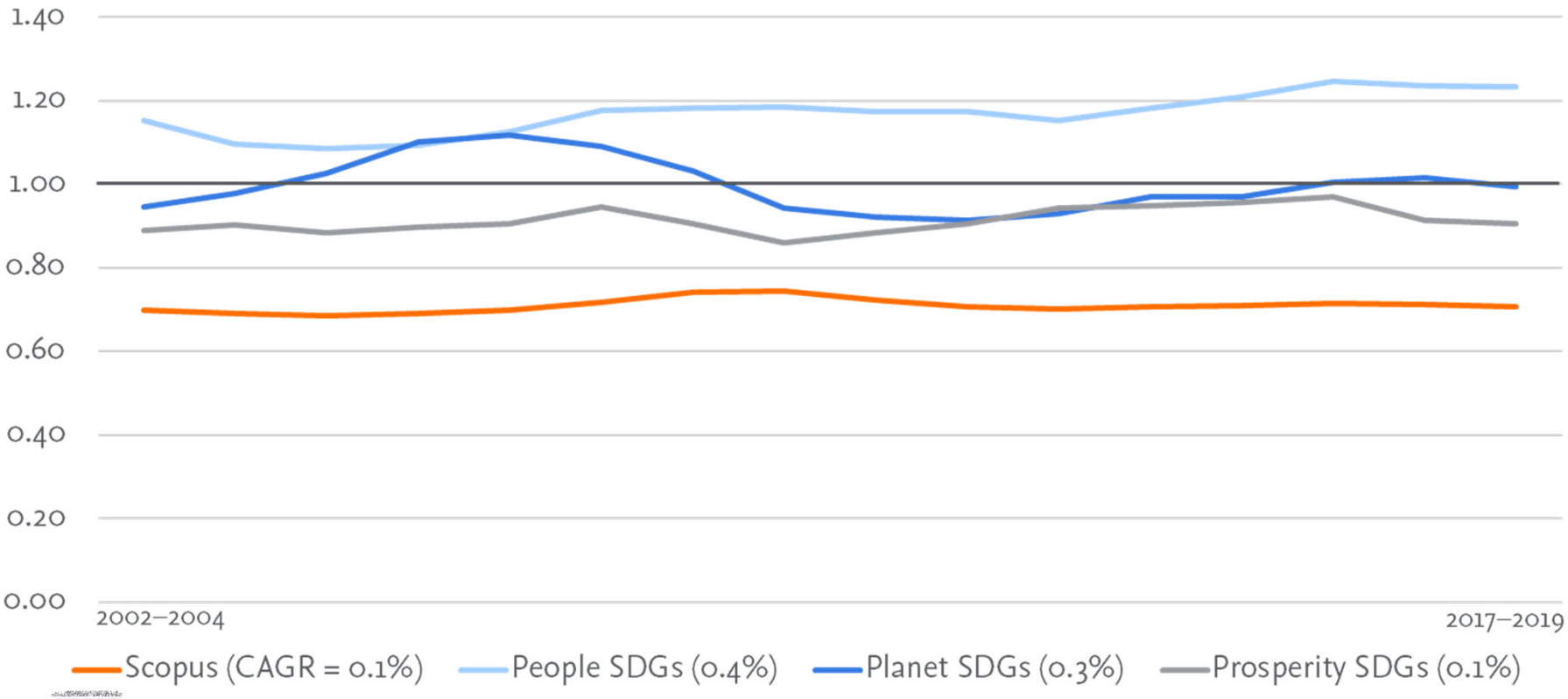
Methods – International co-publications

- Share of international co-publications: % of a country's publications with authors from at least two countries
- North–South co-publications:
  - Static subdivision based on income level instead of geographic location (per the World Bank's 2019 classification)
  - HICs: UMICs grouped with HICs as China and Brazil are highly active and productive in research. India, a LMIC, was also grouped with HICs for the same reason.
  - Two groups of LICs: LMICs and LICs
  - Share of HIC–LMIC co-publications: % of a HIC country's publications with at least one author from a LMIC
  - Share of HIC–LIC co-publications: % of a HIC country's publications with at least one author from a LIC

Trends in share of HIC–LMIC co-publications (subfield- & year-normalized) at US level, overall in Scopus and by SDG theme, 2002–2019



Source: Scopus

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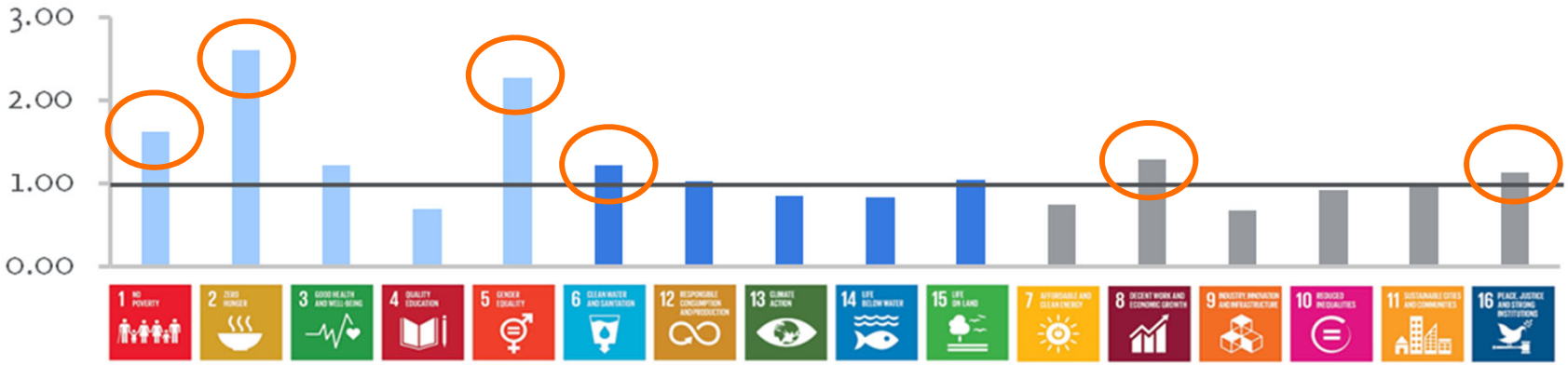
Share of HIC–LMIC co-publications (subfield- & year-normalized) at US level in 2017–2019



CAGR = -2.7%

CAGR = 2.7%

CAGR = 2.3%

CAGR = -2.8%

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Source: Scopus

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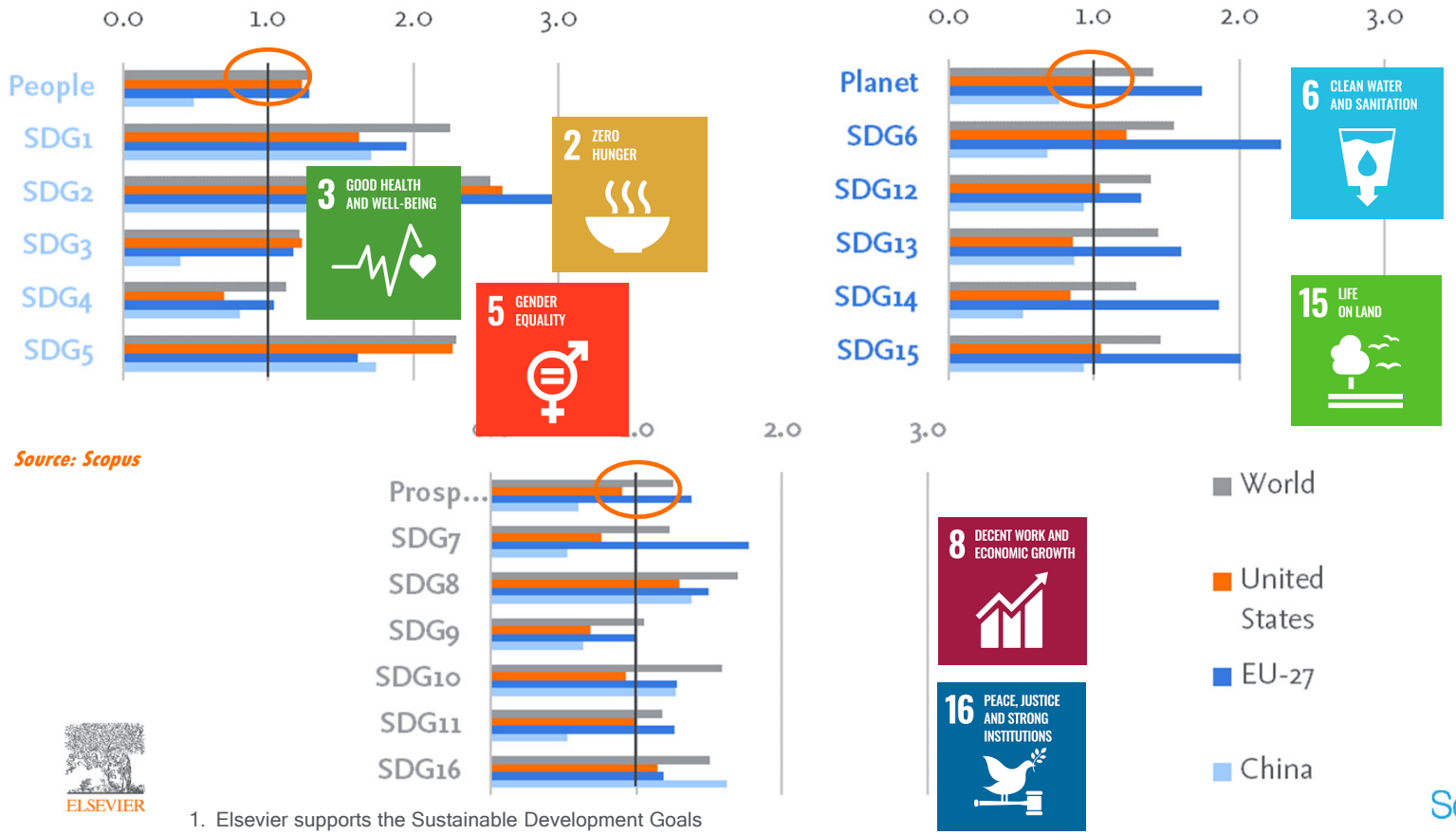
Share of HIC–LMIC co-publications (subfield- & year-normalized) of US vs. EU-27, China and the world, 2017–2019



Source: Scopus

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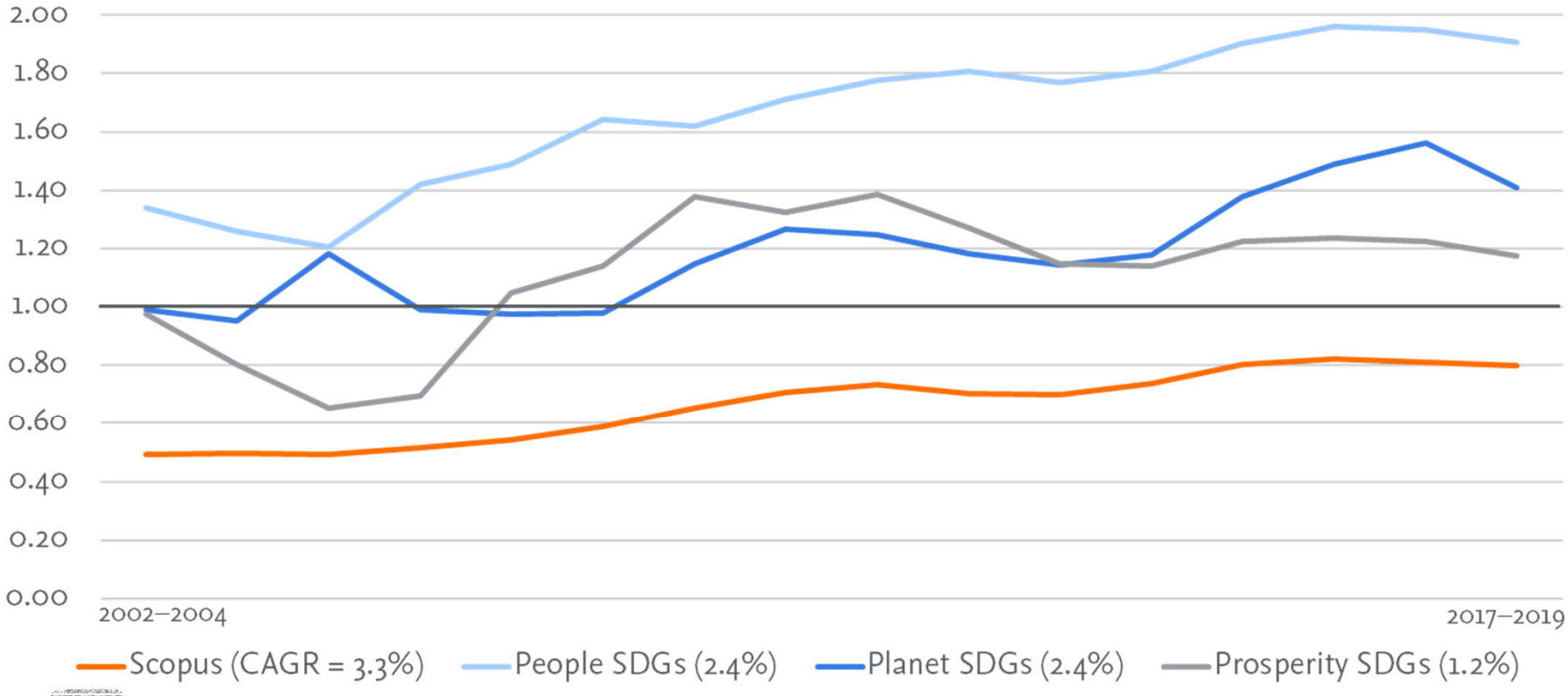
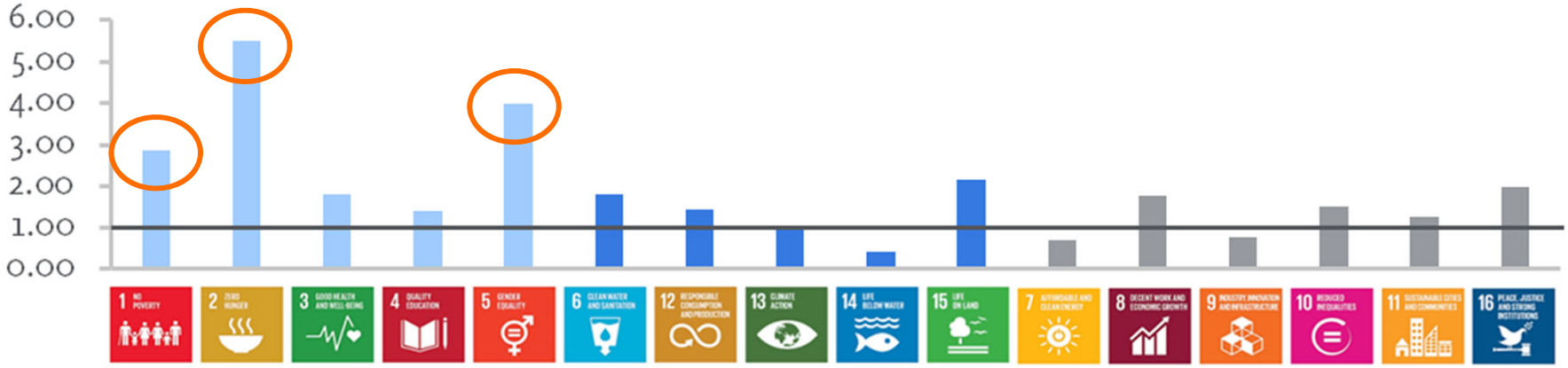
Trends in share of HIC–LIC co-publications (subfield- & year-normalized) at US level, overall in Scopus and by SDG theme, 2002–2019



Source: Scopus

Share of HIC–LIC co-publications (subfield- & year-normalized) at US level in 2017–2019



CAGR = 11.3%

CAGR = 17.5%

CAGR = -8.4%

CAGR = 7.6%

CAGR = 9.5%

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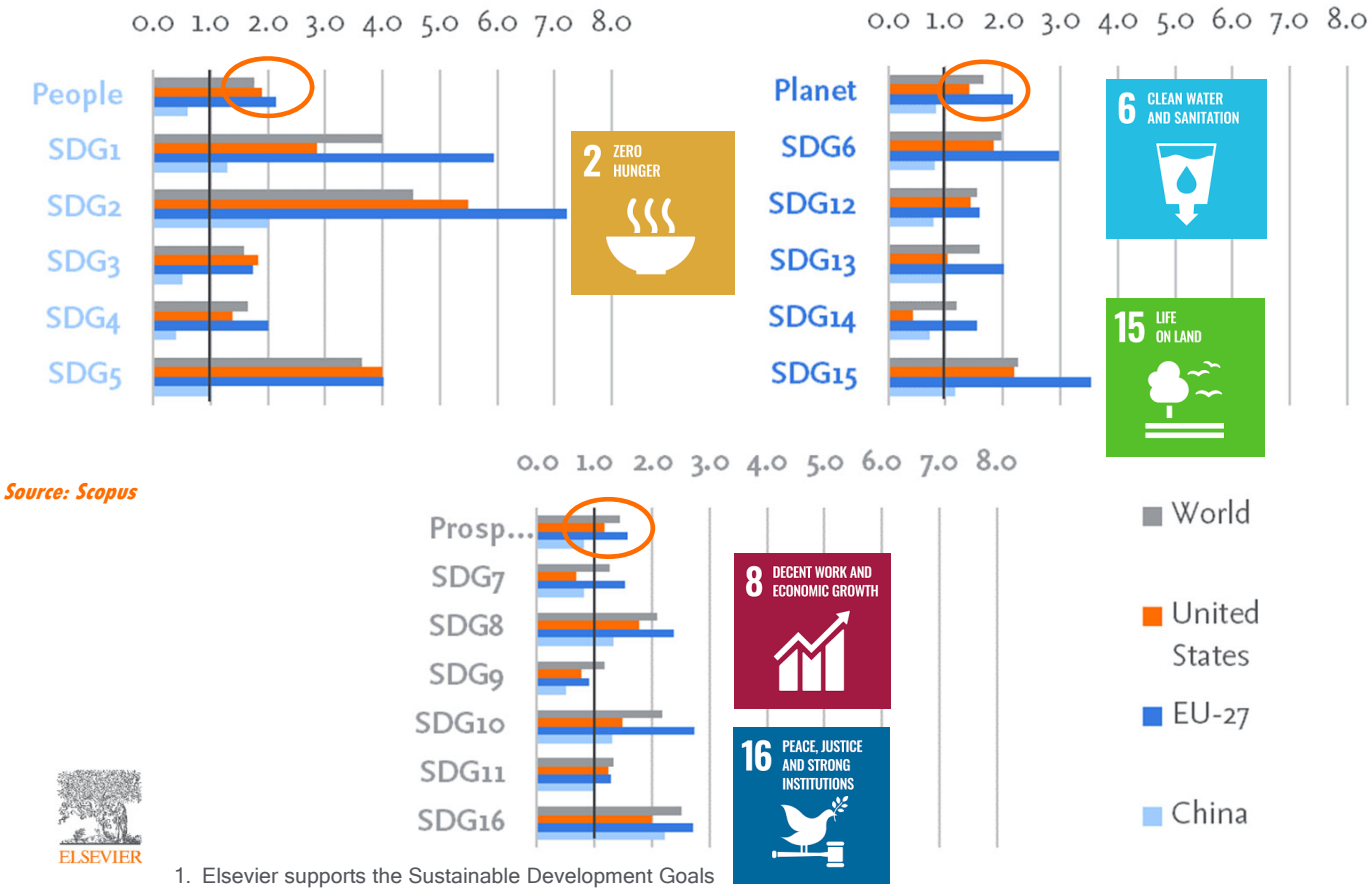
Source: Scopus

Share of HIC–LIC co-publications (subfield- & year-normalized) of US vs. EU-27, China and the world, 2017–2019



Source: Scopus

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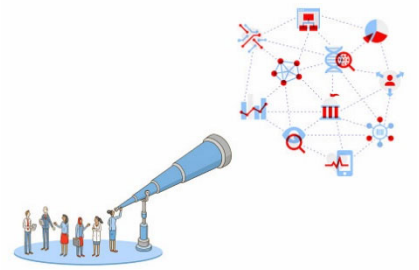
Methods – Two lenses to measure a paper's cross-disciplinarity



Multidisciplinarity index

Disciplinary diversity (Rao-Stirling index) in the academic background of a paper's research team

Interdisciplinarity index

Disciplinary diversity (Rao-Stirling index) in the references of a paper

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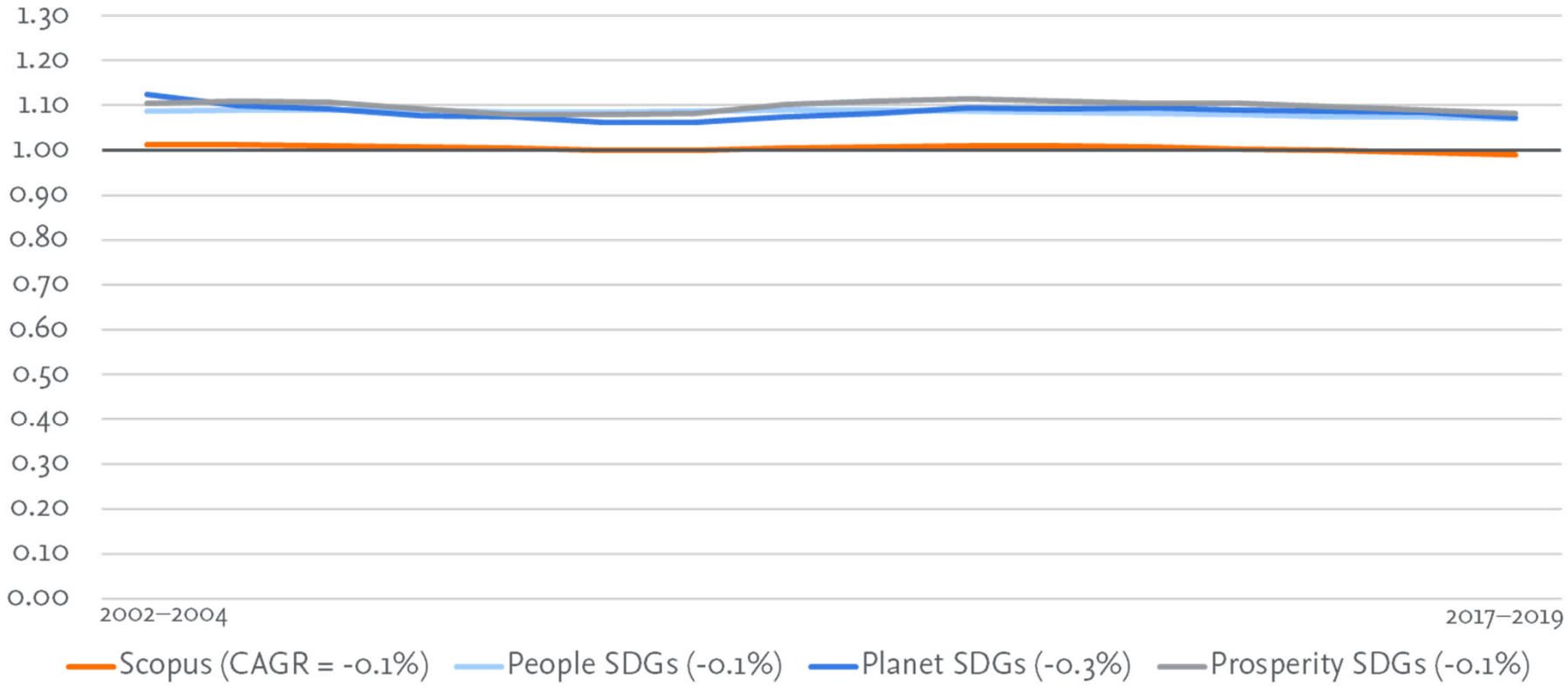
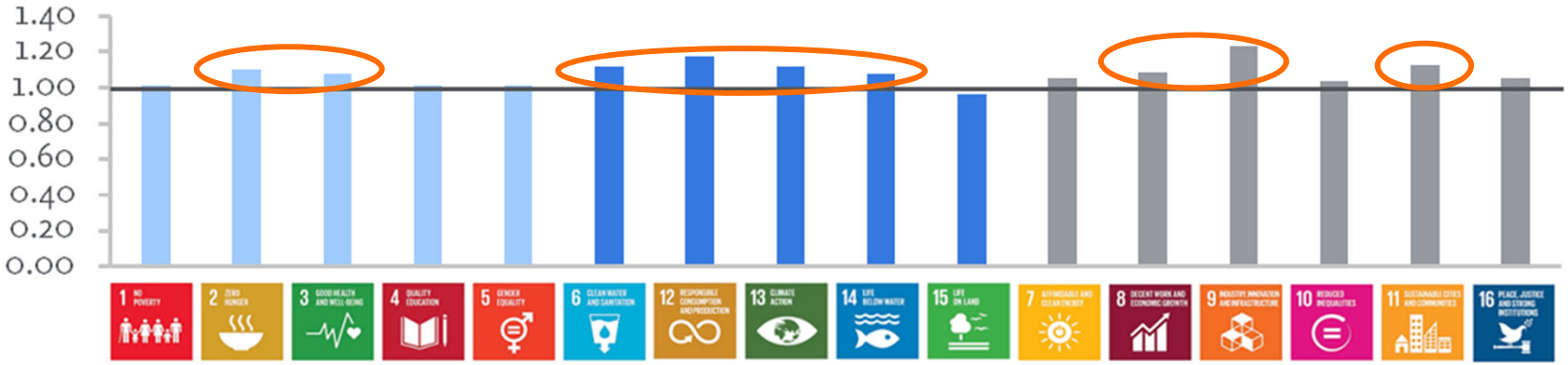
Trends in multidisciplinarity index (subfield- & year-normalized) at US level, overall in Scopus and by broad SDG theme, 2002–2019



Source: Scopus

Multidisciplinarity index (subfield- & year-normalized) at US level in 2017–2019



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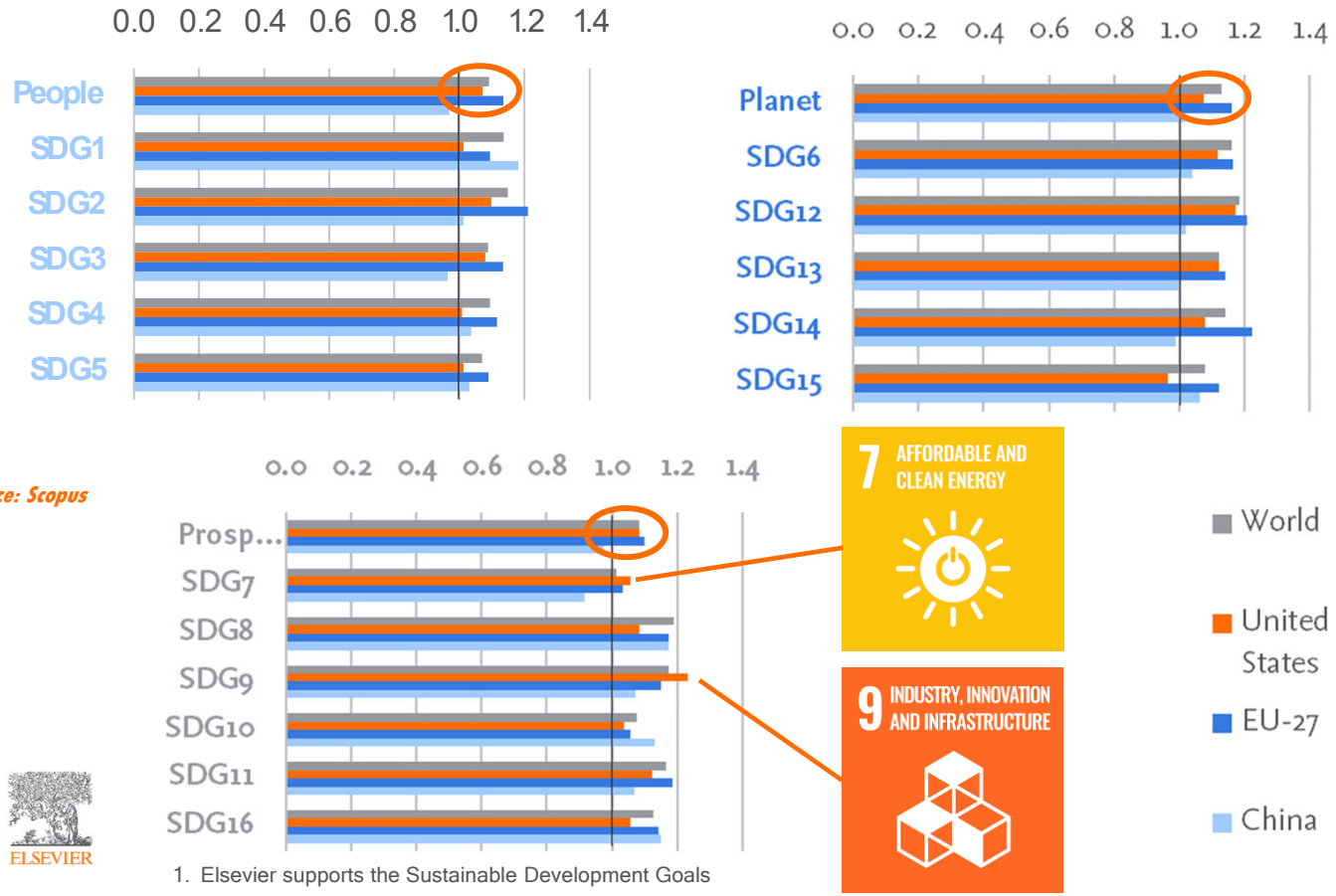
Source: Scopus

Multidisciplinarity index (subfield- & year-normalized) of US vs. EU-27, China and the world, by SDG within each broad theme, 2017–2019



Source: Scopus

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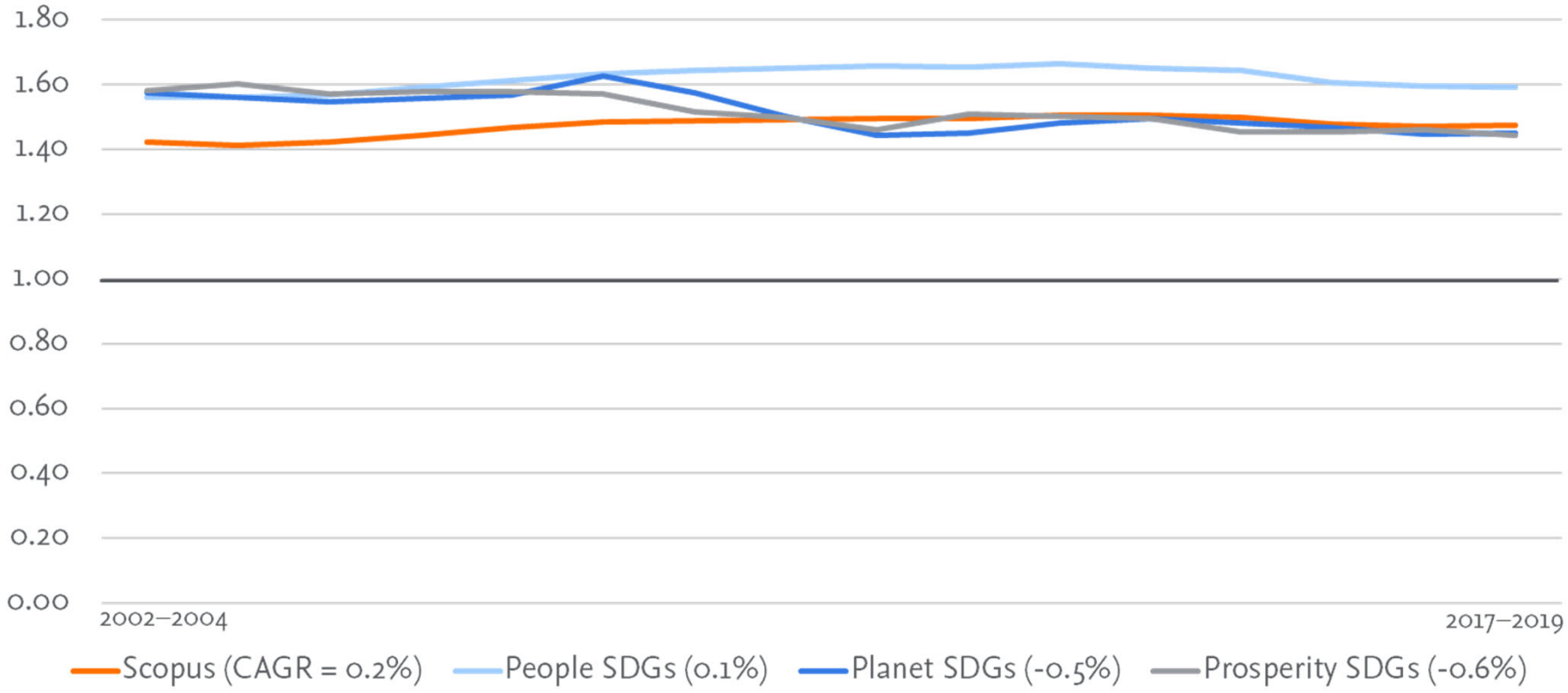
Methods – Public–private co-publications

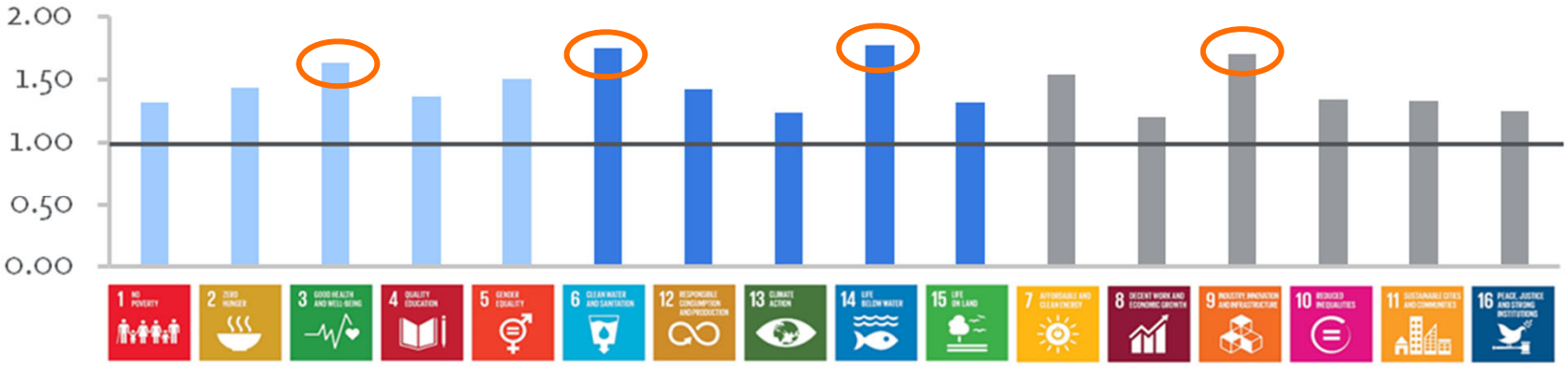
- Share of public-private co-publications: % of a country's publications involving at least one private (for profit) and one non-private institution
- Coding of addresses by sector:
  - All author addresses in Scopus were coded as belonging or not to the private for-profit sector using a 4-step algorithm:
    - Step 1: Coding of public organizations using generic terms (e.g., university)
    - Step 2: Coding based on a curated and exhaustive thesaurus of companies
    - Step 3: Additional coding using reliable filters based on types of business entities in various countries (e.g., Corp., Pty, Ltd, Inc, S.A., AB, GmbH, SP, GP, LP)
    - Step 4: Searching the database for the names of companies identified in the previous step, using a shorter form without the specific filter (e.g., Inc., LLP, GmbH)
  - Precision for private addresses = 97%, for non-private addresses = 100% (through random sampling)

Trends in share of public–private co-publications (subfield- & year-normalized) at US level, overall in Scopus and by SDG theme, 2002–2019



Source: Scopus

Share of public–private co-publications (subfield- & year-normalized) at US level in 2017–2019



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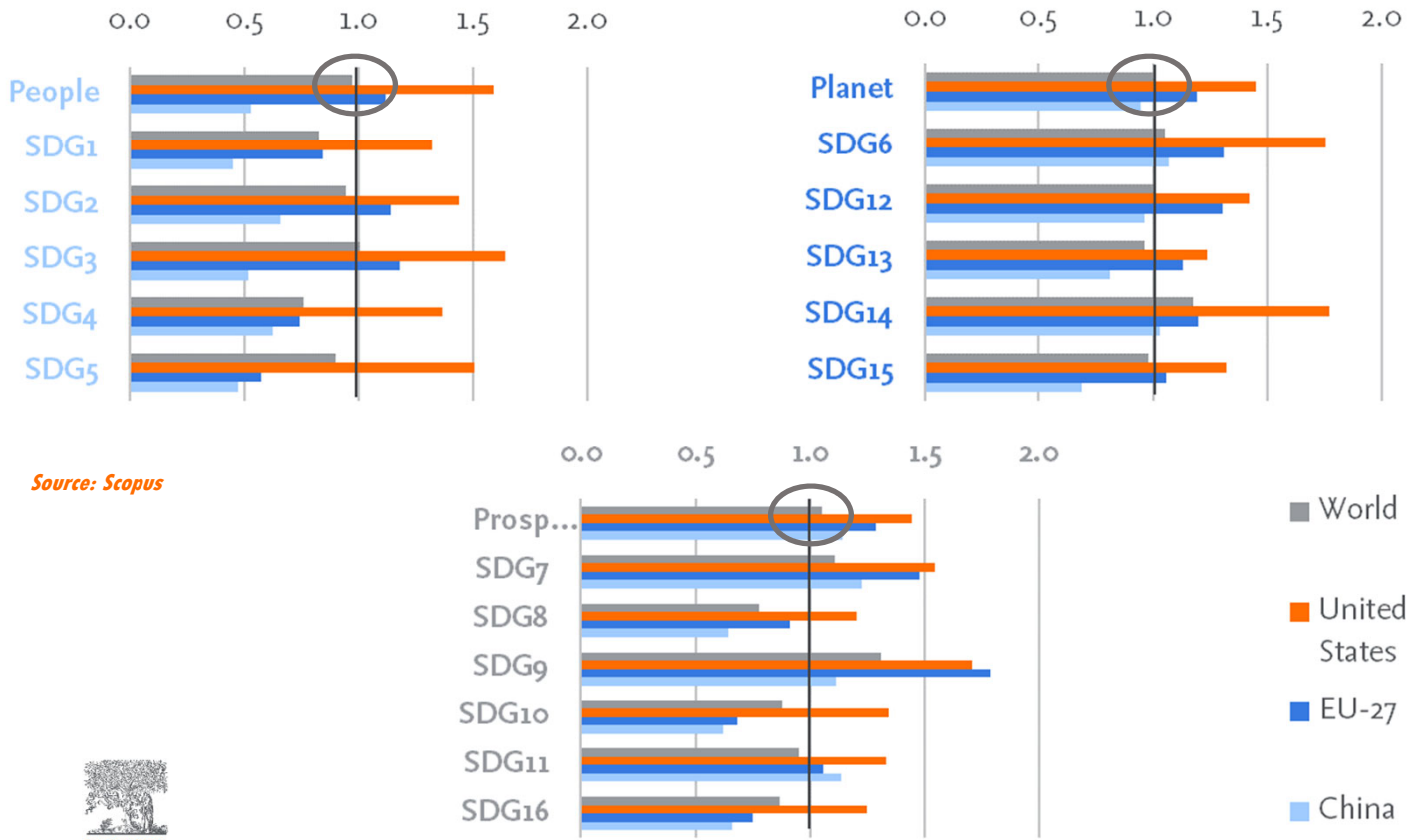
Share of public–private co-publications (subfield- & year-normalized) of US vs. EU-27, China and the world, 2017–2019



Source: Scopus

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Conclusions/Limitations

- Collaborative SDG research stands out in the US, relative to the world in all fields and/or comparators in:
  - Collaborations with researchers from LICs
  - Multidisciplinary collaborations
  - Public-private partnerships relative to other countries in all SDGs
- Potential improvement opportunities:
  - Increasing US co-publications with LMICs and LICs, especially in the Planet and Prosperity thematics
  - Reversing the decreasing trend in the US share of co-publications with LICs in SDG 14
  - Expanding multidisciplinarity achievements to other SDGs, especially in SDG 15

Conclusions/Limitations

- Bibliometrics enables monitoring of research trends at scale
- It does not tell us why collaboration is important towards achieving the SDGs, nor what the barriers/enablers are for successful collaboration in this context
  - Such information must be sought through complementary methods (e.g., desk research, interviews, surveys)
  - A good starting point is to listen to SDG experts with field experience…

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Thank you