Anticipatory skill and structural biases of a major global risk assessment

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Abstract *(245 words)*
Calls to navigate the global polycrisis have multiplied, yet one of the most visible systemic risk assessments—the World Economic Forum's Global Risks Reports (GRRs)—has not been evaluated, particularly with regard to their predictive value. We analyse all GRRs from 2006–2024 by reconstructing and comparing survey-based risk likelihoods with a multi-decadal database of national shocks, and by tracing how surveys are translated into the reports' narratives. Despite increasing concerns for environmental risks, we find that GRRs show limited and uneven prospective alignment with observed shock frequency across categories, and that only geopolitical conflicts demonstrate clear anticipatory skill. Alignment is also consistently stronger for high-income than for lower-income regions, suggesting a potential regional bias. In parallel, we document a transcription bias, as the reports selectively and significantly downplay themes linked to poverty, inequality, biodiversity, and conflict, while foregrounding economic growth, simplification, and weaker understandings of sustainability relative to the surveys they rest on. We also note a framing bias in the way GRRs increasingly portray risks as negative, complex and regulatory challenges, hinting at a shift in the target audience over the years towards a technical policy and business one. Our findings suggest that GRRs are informative as a barometer of elite concerns, but cast doubt on their use as input to foresight and preparedness exercises, or early-warning systems. We conclude by proposing that global risk governance uses assessments that are system-based, grounded in empirical data, transparent regarding uncertainties, and developed through pluralistic and accountable processes.

Significance *(120 words)*
The World Economic Forum's Global Risks Reports are used by governments, businesses, and media as maps of global threats. Yet, little is known about the properties that may condition their influence. In the first evaluation of their properties, we show that, over nearly two decades, the reports align only weakly with subsequent shocks, with clear anticipatory skill limited to conflicts, and stronger alignment for shocks recorded in high-income countries. We also find that report narratives systematically reweight survey content toward economic aspects while downplaying social and environmental concerns. These findings reveal undocumented asymmetries that may shape how global risks are understood and prioritized. We outline principles for more transparent, plural, and accountable assessments and call for an independent systemic-risk capacity.

Keywords
Global risks; World Economic Forum; time series analysis; thematic analysis; linguistic analysis.

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Introduction

Global crises are colliding. Climate extremes, disease outbreaks, geopolitical tensions, and economic turmoils, among other disruptions, interact with one another, heightening impacts and governance challenges in what has been termed a global 'polycrisis' (Søgaard Jørgensen et al., 2023; Lawrence et al., 2024; Delannoy et al., 2025a, 2025b; Liu & Renn, 2025; Mark et al., 2025; Rakowski et al., 2025). In such a context, decision makers in politics, business, and civil society alike seek information on global systemic risks, to anticipate where the next destabilising turn might emerge, and prepare for it.

The World Economic Forum's Global Risks Reports (GRRs) have become one of the most prominent institutional accounts of global systemic risks (Sharma & Soederberg, 2019; Garschagen et al., 2020; Aven, 2025). Since 2006, the GRRs have been built around the Global Risks Perception Survey (GRPS), an annual survey now involving over 1,300 respondents from academia, business, and government, who rate the likelihood, impact, and interconnection of an evolving list of global risks over short-, medium-, and long-term horizons (Aven, 2025; WEF, 2025; 2026a). Survey results are then refined with stakeholder consultations, and interpreted with risk matrices (plotting risks by likelihood and severity) and interconnection maps (linking risks according to respondents' perceived connections).

The GRRs have important reach across scientific, public, policy, and professional arenas, creating several pathways through which they may shape global-risk agendas. In science, their categories, rankings, and interconnection data are not only cited (e.g., Helbing, 2013) but reused to construct quantitative risk-network models and derivative analyses (Szymanski et al., 2015; Lin et al., 2017; Zuo & Wei, 2017; Niu et al., 2018; 2019; Brende, 2019; Brissette et al., 2021; Costola et al., 2022; Tokunaga et al., 2022; Kryvovyazyuk et al., 2025; Qazi, 2025; Yazo-Cabuya et al., 2025). They have also become a benchmark for alternative assessments, such as the Future Earth–ISC Global Risks Scientists' Perceptions survey (Garschagen et al., 2020; Wynes et al., 2022). In public and policy arenas, the reports are referenced in thousands of news (e.g., Al Jazeera, 2026; CGTN, 2026; CNN, 2026; The Guardian, 2026—see Fig. S1), and used to frame governmental and think-tank reports (e.g., IRGC, 2015; House of Commons Defence Committee, 2023; EEAS, 2024; CDRF, 2025; UK-GOS, 2026). Their concepts and methods are also adopted or adapted in practice. Switzerland's national risk analysis considers the GRR among the sources used to identify emerging hazards (FOCP, 2026), whereas Ireland's National Risk Assessment follows a model akin to the GRRs (OECD, 2025). The Institute of Risk Management likewise draws on the GRR's interconnection map in guidance on emerging-risk identification and management (IRM, 2023), and the GRR framework has been adapted in several sectoral and regional assessments (Asgary & Ozdemir, 2019; Asgary et al., 2020; AURG, 2025; Calixte et al., 2026).

Potential influence may also arise through the wider institutional interactions surrounding the reports, notably expert workshops, advisory networks, and exchanges with participating communities. More broadly, the influence of GRRs is relational and specific to each user. It emerges through interactions between processes, products, and users, and ultimately depends on how specific audiences perceive it as relevant, credible, and legitimate (Cash et al., 2003; Mitchell et al., 2006; Riousset et al., 2017; Wyborn et al., 2018). The effects of GRRs, however, depend on another key element besides influence: the properties of the assessment itself. The methodological and narrative choices made by the WEF determine what information users have access to and may therefore affect not only how the reports are perceived and used, but also the broader appraisal and responses to systemic risks.

GRRs have come under scrutiny on three dimensions of their design and content, related to *how* risks are conceptualized, *who* is asked to evaluate them, and *which* vision of risk is foregrounded in the reports. First, the GRRs have been criticised for vague or missing definitions of likelihood, severity, interconnection, or the risks themselves (Aven & Cox, 2016; Aven, 2017a; 2017b; 2020; 2025); the way risks are classified; limited attention to feedback dynamics (Cutter et al., 2015; Erisman et al., 2015; Yanitsky, 2017); weak handling of uncertainty or knowledge confidence (Aven, 2025); and limited consideration to the drivers of risks (Evans et al., 2017). Second, the surveys on which the GRRs rest rely disproportionately on men aged 40-60 from the private sector and from Europe and North America (Aven, 2025). This sample composition is problematic as it may give undue weight to a particular worldview and thus narrow the scope of the analysis. For example, surveying sustainability scholars instead led to several environmental and societal risks being rated significantly higher in terms of likelihood and severity (Garschagen et al., 2020; Wynes et al., 2022). Third, the GRRs are said to adopt a business-centred view of the world, primarily framing risks as threats to growth or investment, with corporations positioned as key problem-solvers and public policy steered toward protecting markets (Sharma & Soederberg, 2019; Taylor, 2021; Pasula, 2024). Migration is, for example, recast as a global risk to be monitored and managed, while migrants are simultaneously portrayed as a flexible resource for competitiveness (Domingo, 2015).

Despite the above critiques, no evaluation of the properties of the GRRs exists, particularly with regard to their predictive value. Investigations focus on specific thematic framings (Domingo, 2015; Garsten & Sörbom, 2016; Pasula, 2024; Gössling & Scott, 2024) or individual editions, including those published in 2014, 2017, 2019, 2021, 2024, and 2026 (Evans et al., 2017; Silva de Amorim et al., 2018; Taylor, 2021; Qazi & Al-Mhdawi, 2022; Aven, 2025; Ganson, 2026). They do not test whether risks align with historical events across years and regions, whether surveys are preserved in reports narratives, or how the GRRs frame risks relative to other institutional assessments. This is a critical gap because these properties may condition—without determining—how different users perceive the reports' salience, credibility, and legitimacy, and therefore how they interpret and use them. It is furthermore important given that the WEF acts as a prominent policy broker well beyond the GRRs, e.g., in global plastics governance through the Global Plastic Action Partnership (GPAP) (Taggart et al., 2026), while its role remains understudied (Garsten & Sörbom, 2014; 2018). Examining how it constructs global risk therefore contributes not only to evaluating the GRRs or the role of scientific assessments, but also to broader debates on governance of influential actors at the science–policy interface.

In this paper we aim to fill this gap by performing three analyses across all reports from 2006–2024 (see *Materials and Methods*). First, we carry a predictive analysis, by extracting short-term risk likelihoods from GRRs and comparing them with a multi-decadal database of national shocks in eight categories (geophysical, climate, disease outbreaks, food, economic, conflict, terrorism, and technology) to quantify how well the reports track past events and anticipate future ones. Second, we undertake a thematic analysis, by comparing the GRRs and the GRPS across social, environmental, and economic dimensions, to detect potential differences in how risks are (de-)emphasised as they move from survey to report narrative. Third, we conduct a linguistic analysis, by evaluating the language characteristics of the GRRs and benchmark it against reports from other major international organisations, in order to characterise how risks are framed and for whom GRRs appear to be written. Our overarching question is how the GRRs perform along selected upstream dimensions relevant to their use: prospective alignment with recorded shocks, the geographical patterning of that alignment, survey-to-report translation, and institutional framing.

Results

Predictive analysis

To examine whether GRR likelihood scores contain forward-looking information, we compare the 2006–2021 short-term annual risk likelihoods with recorded shock frequencies from the Delannoy et al. (2025b) database. The shock records are not treated as ground truth or as a perfect representation of global systemic risk (see *Materials and Methods* and *Discussion*). Like the GRR scores, they are constructed measures subject to reporting, geographical, classification, and threshold effects. They nevertheless provide an independent observational criterion for risk categories that can be matched to recorded events. We test whether higher perceived likelihoods in year y are associated with more frequent shocks over the following one to five years, and whether these prospective associations are stronger than those with shocks over equivalent retrospective windows. For eight shock categories, we estimate ordinary least-squares regressions linking annual risk scores to average shock occurrence in years $y-\ell$ or $y+\ell$ ($1 \leq |\ell| \leq 5$), and contrast the resulting coefficients with those obtained from 1500 Monte Carlo–randomised shock simulations.

We find that regression coefficients between risk likelihood and shock frequency vary considerably across categories (Fig. 1). Diseases, conflicts, and terrorism show clear positive associations with future shock windows, whereas geophysical, climate, food, economic, and technological categories show negative, weak, or near-zero future coefficients. In seven of eight categories, the strongest association is with past rather than future shocks. Conflicts are the only category for which at least one forward-looking coefficient exceeds all coefficients in the preceding five-year windows. Disease risks, and to a lesser extent economic risks, show the clearest pattern of adjustment to recent events, as illustrated by the low likelihood assigned to infectious diseases in the 2019 and 2020 GRRs before the risk was reassessed upward after the COVID-19 pandemic (Fig S2).

To assess forward-looking performance relative to retrospective association, we define predictive capacity as the maximum regression coefficient across positive horizons (+1 to +5 years). We define anticipatory skill as this predictive capacity minus the coefficient from the corresponding retrospective horizon (Fig. 2, bottom). Globally, predictive capacity is highest for conflicts (0.98), terrorism (0.90), and diseases (0.78), with all other categories showing near-zero or negative capacities. Once compared with the equivalent retrospective association, however, conflicts are the only category with clearly positive global anticipatory skill (1.25; Fig. 2, top left). Other categories show lower or more ambiguous skill: food (0.41) and climate (0.31) are positive despite weak or negative predictive capacity, diseases have positive predictive capacity but modest skill, terrorism has high predictive capacity but near-zero skill, and economic shocks show negative skill (−0.36). Thus, GRR risk scores often align as much with recent events as with subsequent shocks.

Individual GRR editions contribute unevenly to aggregate alignment, with large positive and negative annual components across categories (Fig. S7). This temporal heterogeneity is also reflected in the uncertainty analyses: coefficient-draw and Monte Carlo intervals indicate that predictive capacity is generally more stable than anticipatory skill, which is more sensitive to the corresponding retrospective association (Figs. S10 and S11). Global predictive capacity rises after 2011, peaks in 2015, and remains positive through the late 2010s and early 2020s, whereas anticipatory skill shows no comparable sustained improvement and reaches its highest value in the first edition (Fig. S9). Improvements are concentrated in specific categories, most clearly climate shocks (Fig. S8). Food shocks show strong but coverage-limited positive alignment before the shock series ends, while economic and technological shocks show late increases in predictive capacity without comparable anticipatory skill. Later GRRs therefore do not perform uniformly better.

Among the four shock categories with positive global predictive capacity—climate, disease outbreaks, geopolitical conflicts, and terrorism—high-income countries (HICs) rank highest in both predictive capacity and anticipatory skill (Fig. S12). Income-group differences are significant for both metrics when shock category is treated as the paired block, with predictive capacity differing across HICs, UMCs, LMCs, and LICs (Friedman $\chi^2 = 8.4$, df = 3, $P = 0.038$) and anticipatory skill showing the same pattern ($\chi^2 = 8.1$, df = 3, $P = 0.044$; Fig. S13). Food shocks remain the main exception, with the highest anticipatory skill in LICs, but lack positive global predictive capacity (Fig. 2, top left).

The time horizons at which anticipatory skill peaks also cluster more strongly by shock category than by region. Disease outbreaks are most strongly aligned with shocks five years ahead across income groups, conflicts at four years, and climate shocks at two years. By contrast, the few positive anticipatory-skill estimates for other categories are scattered across horizons: 1–2 years for terrorism, 1–3 years for geophysical shocks, 1–4 years for technological shocks, and 1–5 years for food and economic shocks. Overall, these results indicate that prospective alignment is limited and domain-specific, and—where positive—is strongest for shocks recorded in high-income countries.

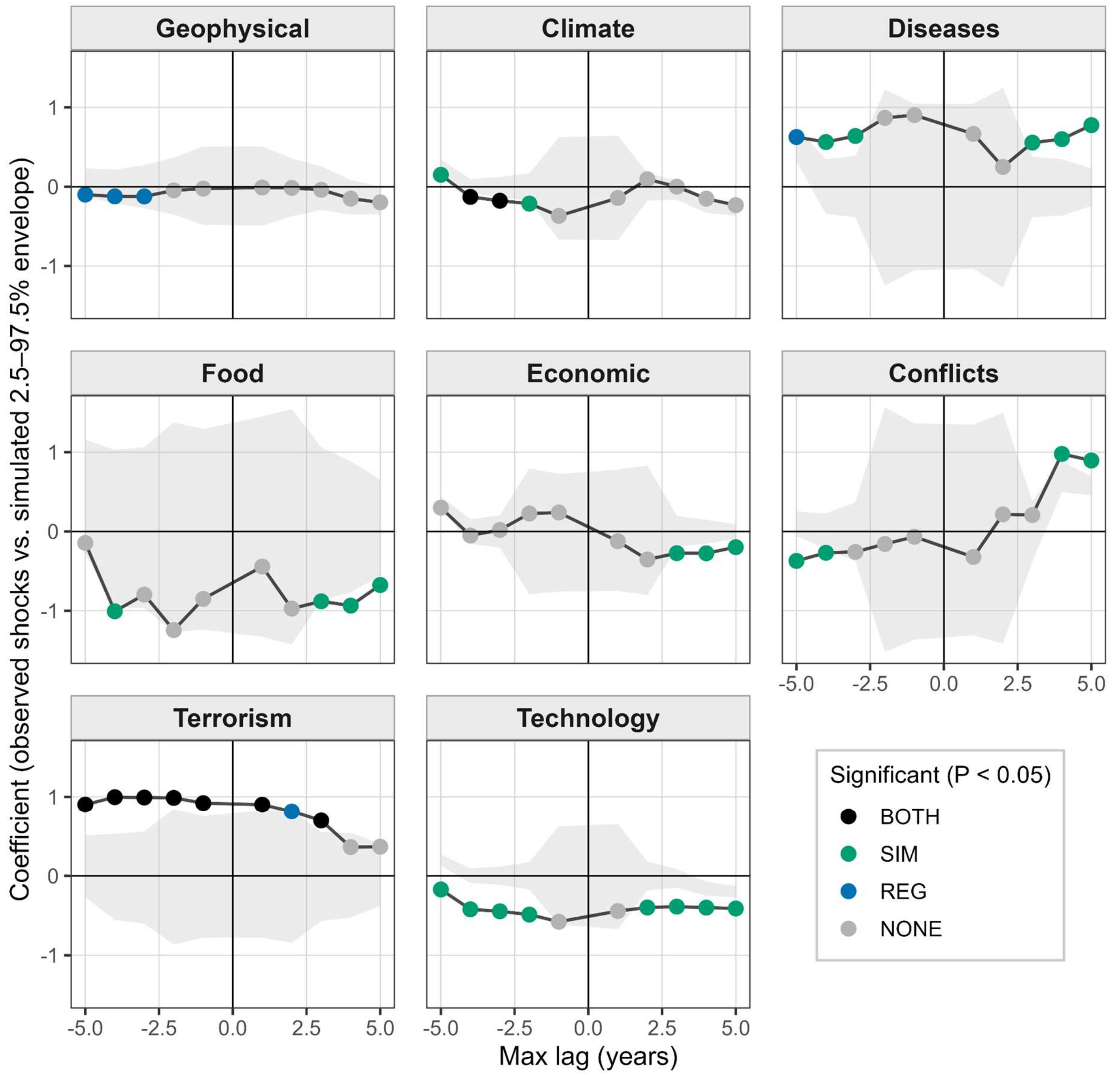


Figure 1 | Retrospective and prospective alignment between GRR risk scores and observed shocks. Regression coefficients relate GRPS-derived risk scores to observed shock frequency across windows extending up to five years before or after each GRR year. Negative lags indicate retrospective windows; positive lags indicate prospective windows. Grey bands show the 2.5–97.5% range from 1500 Monte Carlo-randomised shock simulations. Point colours indicate significance against the parametric baseline, simulation baseline, both, or neither. Regression coefficients are not bounded between −1 and 1.

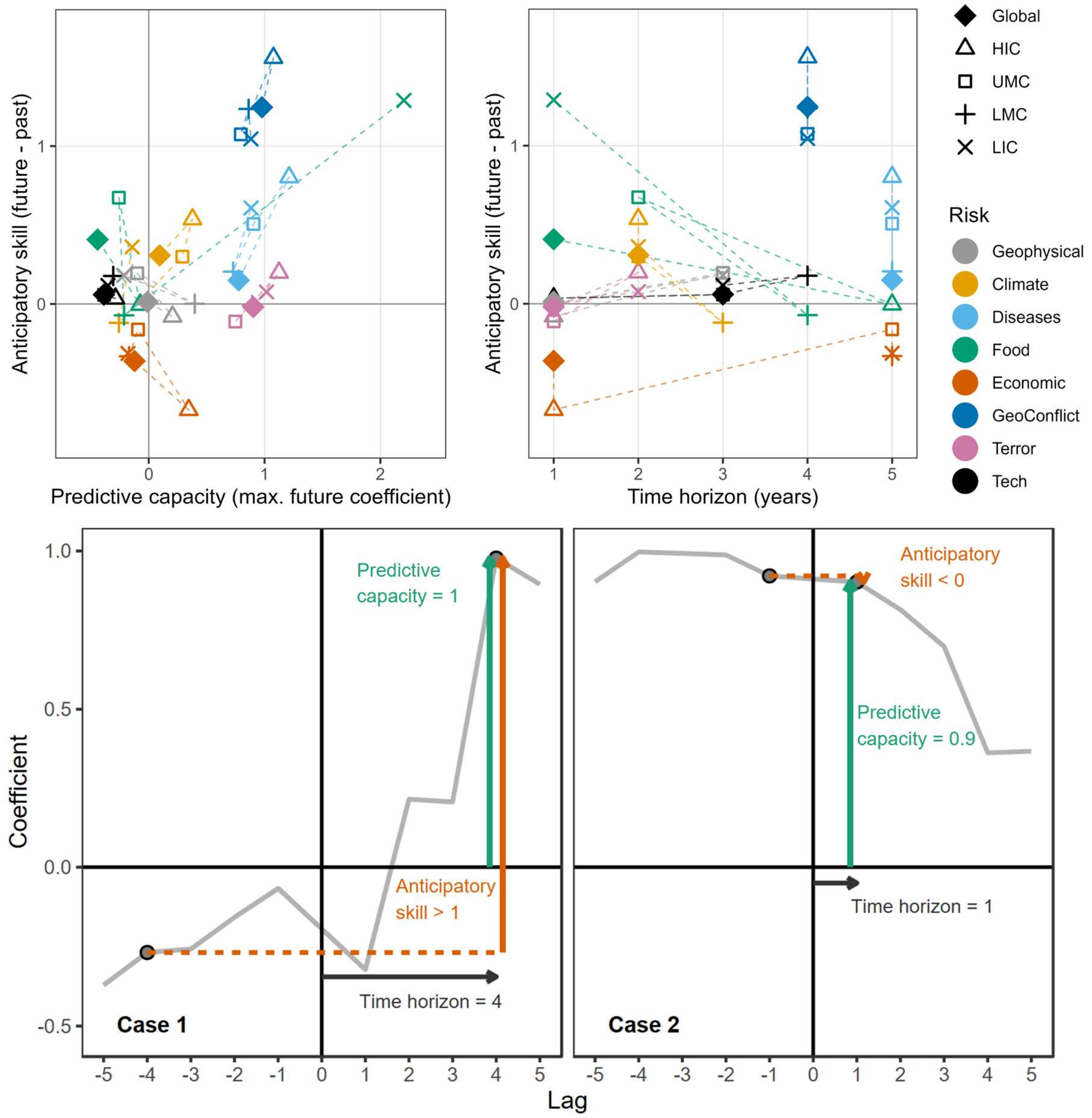


Figure 2 | Top left: scatterplot of anticipatory skill (future–past regression coefficient) against predictive capacity (maximum forward-looking coefficient) for each combination of shock categories and income group. Top right: anticipatory skill as a function of the time horizon (years ahead) at which predictive capacity is maximised. Point shapes denote income groups (Global, high-income countries, upper-middle-income, lower-middle-income, and low-income countries), and colours denote shock categories. Below: exemplification of the predictive capacity, anticipatory skill, and time horizon definitions.

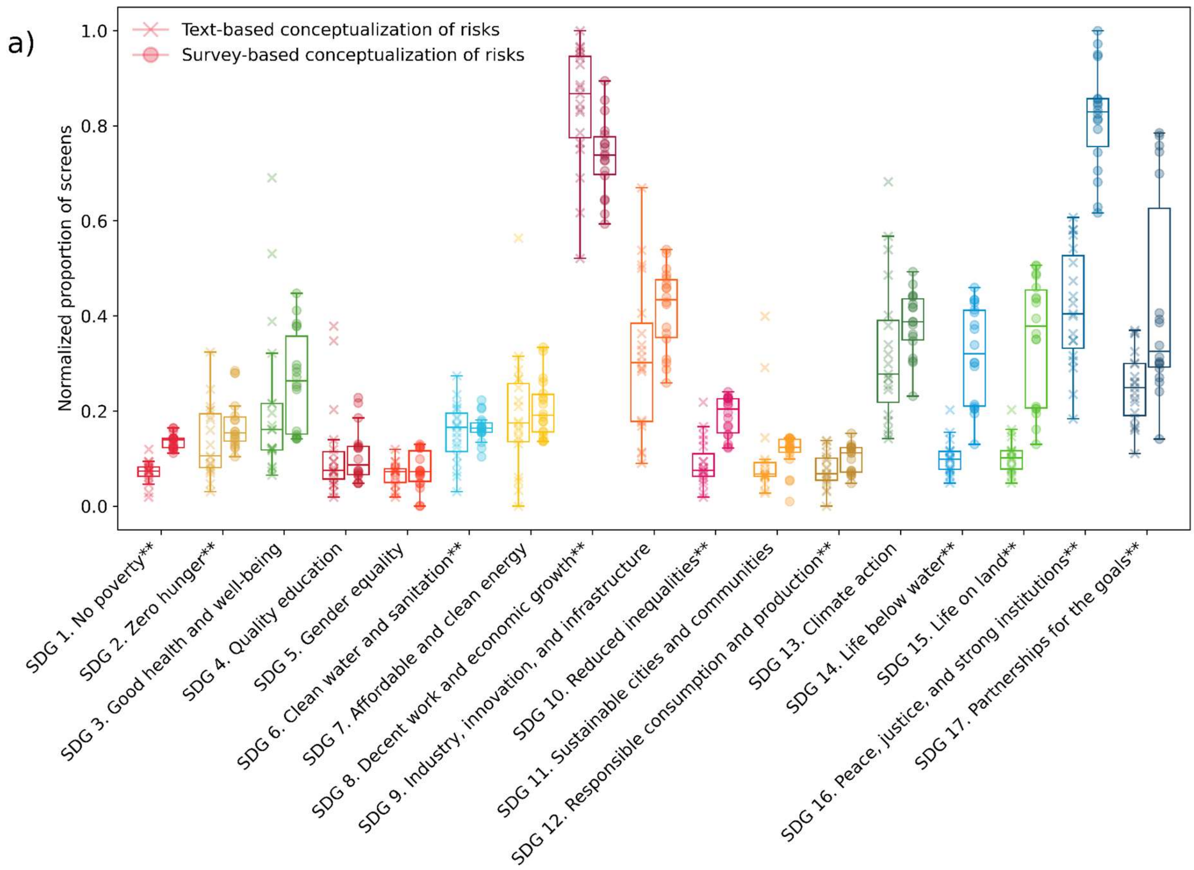
Thematic analysis of GRRs

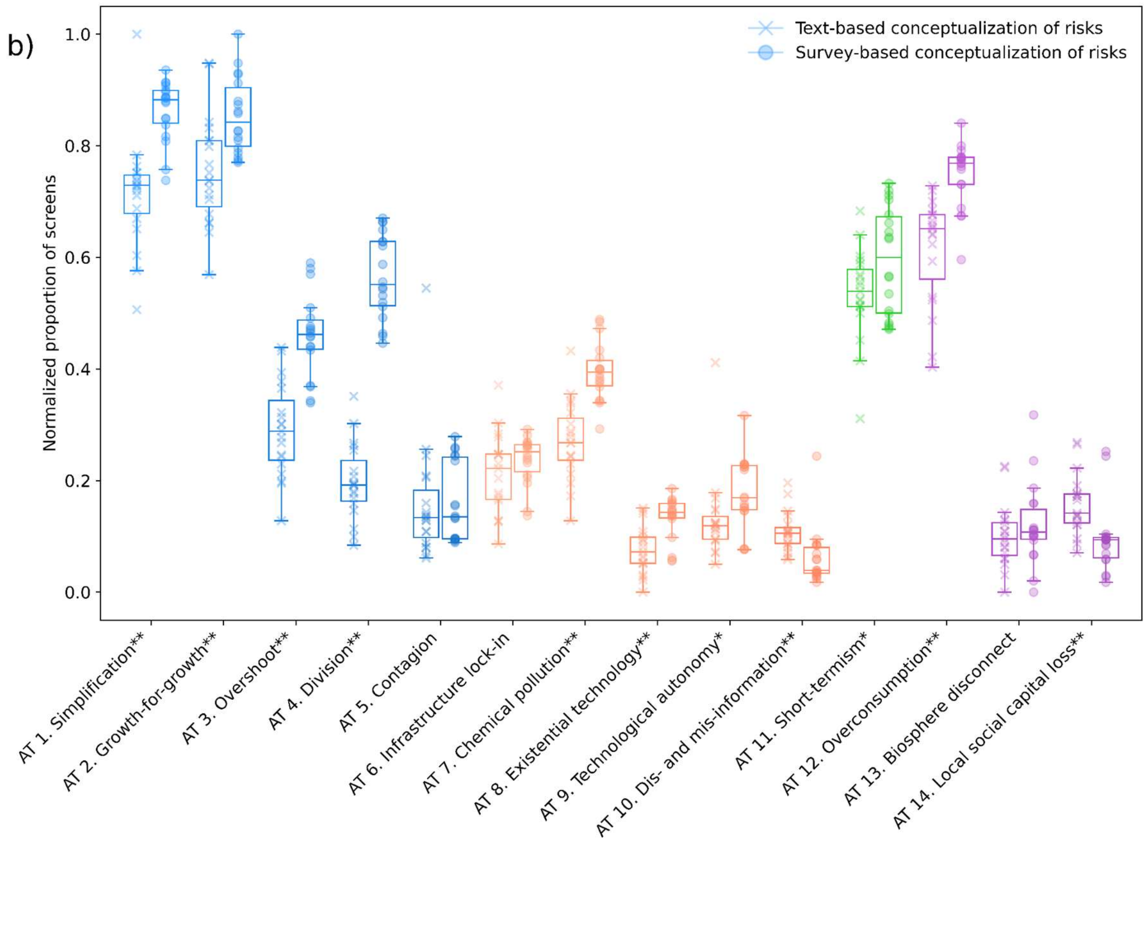
To capture what is emphasised in the reports relative to the surveys, we systematically screen both the GRRs and surveys texts (see *Materials and Methods*) through three frameworks: the Sustainable Development Goals (SDGs), the Anthropocene Traps (ATs; Søgaard Jørgensen et al., 2023, 2026), and the Corporate Sustainability Spectrums (CSSs; Landrum & Ohsowski (2017).

Screening against the SDGs reveals an overall focus on economic growth in both text and surveys, but a marked imbalance in how social and environmental goals are represented (Fig. 3a). SDG 8 (economic growth) is the most frequently referenced goal, with mean normalised proportions of 0.84 in text and 0.74 in surveys. SDG 16 (peace, justice and strong institutions) is the second-most common theme (0.42 vs. 0.82), implying that conflict and institutional stability are more prevalent in survey responses than in the GRRs text. The gaps are even larger for SDGs associated with poverty, inequality and biodiversity: SDG 1, 10, 14 and 15 show absolute differences of 0.07 (63%), 0.10 (71%), 0.22 (104%) and 0.25 (107%), respectively, with these themes far more prominent in the surveys than in the written reports (see statistical significance tests in the supporting information material). By contrast, SDGs 4, 6 and 7 (education, water, and energy) show only small differences (4–8%), indicating more balanced treatment. Over time, gaps widen for several SDGs, notably 9, 14 and 15, while they narrow for others such as SDG 5 and 17 (Table S11).

The Anthropocene Traps screening uncovers a narrowing view of crisis-generating processes (Fig. 3b). The GRRs foreground risks related to simplification of supply chains (AT1), institutional lock-ins (AT2), short-termism (AT11), and overconsumption (AT12), with mean normalised screening values of 0.79, 0.80, 0.56 and 0.68, respectively. They comparatively focus less and systematically underrepresent material overshoot (AT3), division and conflicts (AT4), and pollution (AT7), with gaps in the text compared with the surveys of 0.17, 0.37, and 0.12, respectively. Some of these differences shrink over time, but others grow. For example, AT11 and AT13 (biosphere disconnect) show converging text–survey patterns, whereas AT1, AT3 and AT9 (technological autonomy) display increasing gaps (Table S12).

The Corporate Sustainability Spectrums lens shows that the GRRs shift the implied locus of responsibility, moving away from the survey's more systemic framing toward business-centred and incremental conceptions of sustainability (Fig. 3c). Notably, we find a predominance of weak-to-intermediate conceptions of sustainability in texts, whereas survey responses concentrate on more systemic responsibility. For instance, the GRRs rank first the incremental corporate responsibility (CSS2, 0.85), while surveys place their peak on systemic responsibility (CSS3; 0.86). GRRs also devote non-negligible attention to both very weak/voluntary (CSS1; 0.15) and very strong, justice-oriented conceptions of sustainability (CSS5; 0.14), whereas these extremes are almost absent from the surveys (0.03 and 0.02). Over time, the text shifts further toward CSS2 at the expense of CSS3, and its earlier emphasis on CSS5 declines toward zero (Table S13). The report narratives therefore do not simply reproduce the underlying survey content, but systematically reweight it toward economic growth and incremental, business-centred responses while giving less prominence to several social and environmental concerns.


a)
Text-based conceptualization of risks
Survey-based conceptualization of risks
Normalized proportion of screens
0.0
0.2
0.4
0.6
0.8
1.0
SDG 1. No poverty**
SDG 2. Zero hunger**
SDG 3. Good health and well-being
SDG 4. Quality education
SDG 5. Gender equality
SDG 6. Clean water and sanitation**
SDG 7. Affordable and clean energy
SDG 8. Decent work and economic growth**
SDG 9. Industry, innovation, and infrastructure
SDG 10. Reduced inequalities**
SDG 11. Sustainable cities and communities
SDG 12. Responsible consumption and production**
SDG 13. Climate action
SDG 14. Life below water**
SDG 15. Life on land**
SDG 16. Peace, justice, and strong institutions**
SDG 17. Partnerships for the goals**


b)
Text-based conceptualization of risks
Survey-based conceptualization of risks
Normalized proportion of screens
0.0
0.2
0.4
0.6
0.8
1.0
AT 1. Simplification**
AT 2. Growth-for-growth**
AT 3. Overshoot**
AT 4. Division**
AT 5. Contagion
AT 6. Infrastructure lock-in
AT 7. Chemical pollution**
AT 8. Existential technology**
AT 9. Technological autonomy*
AT 10. Dis- and mis-information**
AT 11. Short-termism*
AT 12. Overconsumption**
AT 13. Biosphere disconnect
AT 14. Local social capital loss**

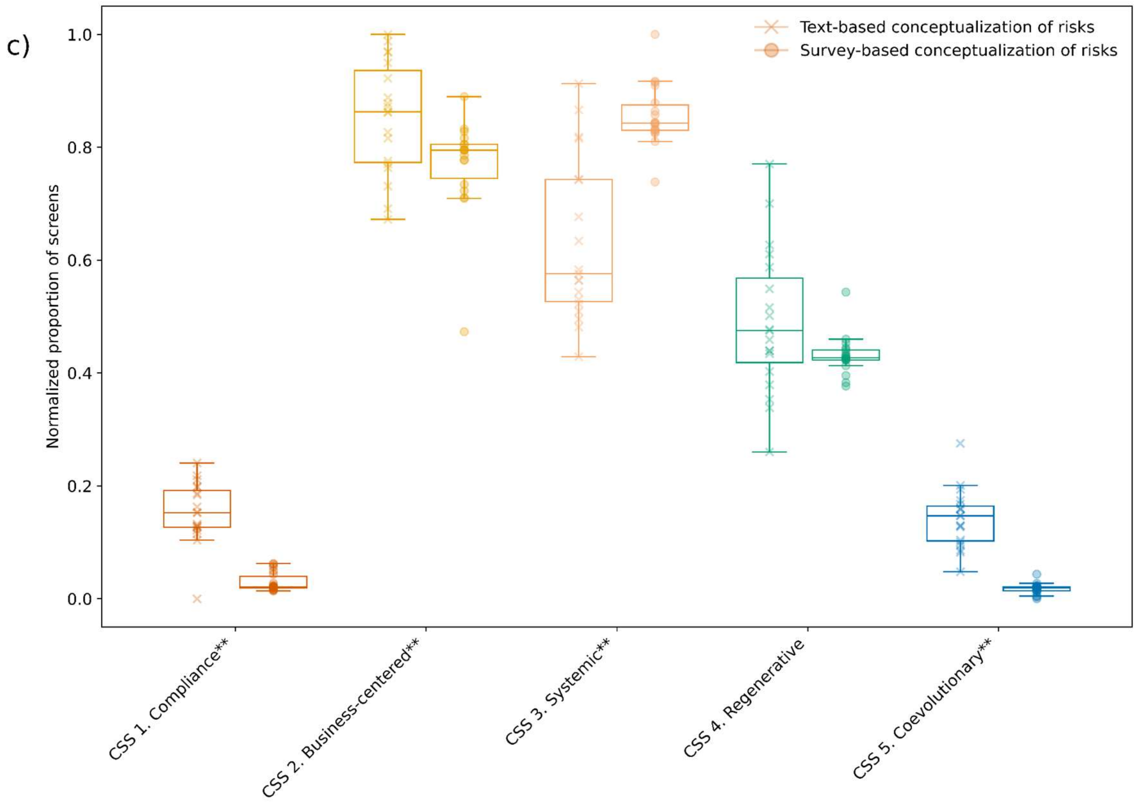


Figure 3 | Text and survey-based conceptualizations of global risks in relation to (a) Sustainable Development Goals, (b) Anthropocene Traps, and (c) Corporate Sustainability Spectrums. Proportions of screens are normalized (See *Materials and Methods*). ** indicates a difference statistically significant at $p < 0.05$ in both t-test and Wilcoxon; * indicates a difference statistically significant in one of the tests; no symbol indicates no significant difference.

Linguistic analysis of GRRs

Our analysis of GRRs across six linguistic dimensions shows that the reports have become increasingly negative, regulatory, and difficult to read over time (Fig. 4). On a 0–1 scale, they rely heavily on negative (mean = 0.71) and uncertainty-related terms (0.64). Negative wording increases while uncertainty-related wording declines, suggesting that GRRs increasingly frame global risks in more negative but more explicitly certain terms. Constraining vocabulary (e.g., “required”, “comply”; mean = 0.50) and litigious language (e.g., “legislation”, “regulation”; mean = 0.46) are used at moderate but rising levels, indicating a growing emphasis on rule-setting, compliance, and institutional response. At the same time, readability drops, suggesting that the GRRs increasingly address a technical policy and business audience rather than a broad public.

Relative to international-organisation reports that address different facets of global risk (Table S3), the GRRs occupy a distinct niche. They show the largest mean Euclidean distance of any report set analysed (0.84; Fig. S14), indicating the strongest overall divergence in linguistic profile. Notably, the GRRs sit closest not to climate, humanitarian, food, water, or technology reports, but to the Bank for International Settlements (BIS) annual reports (0.66). This further suggests that the GRRs place an emphasis on economic aspects. Overall, the GRRs thus exhibit a distinctive and increasingly technical regulatory profile, consistent with an orientation toward policy, business, and macro-financial audiences.

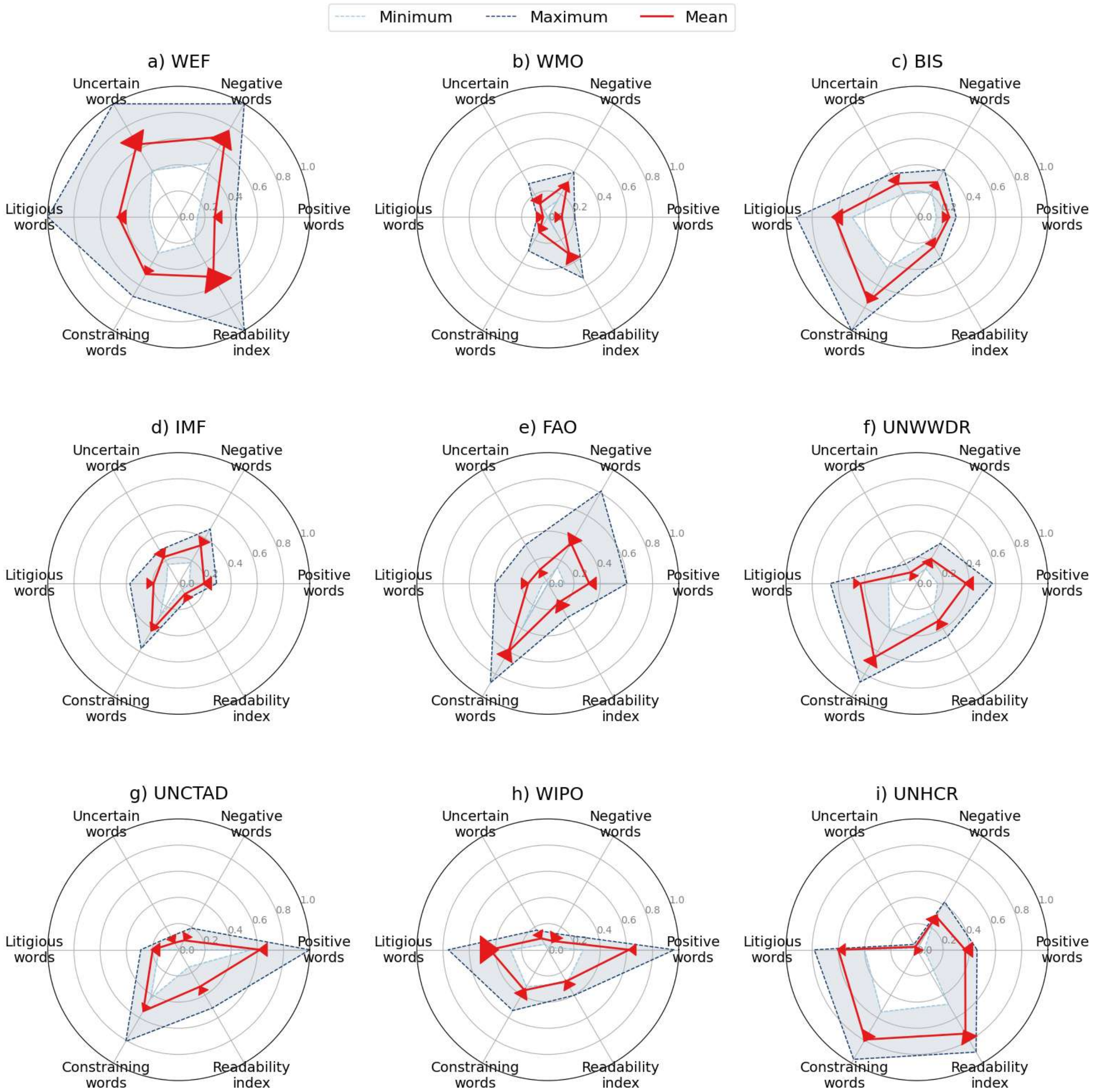


Figure 4 | Linguistic profile of GRRs relative to international-organisation reports. Radar plots show normalised scores for positive, negative, uncertainty-related, litigious, and constraining language, and Gunning Fog readability. Points show minima, means, and maxima across each report series. Red arrows indicate change from early to recent reports. Report abbreviations are defined in Table S3.

Discussion

Processes behind the emergence of biases

Across 19 years of GRRs, our analyses reveal four systematic biases (i.e., a systematic emphasis or inclination towards a certain perspective over others) in what the reports anticipate, prioritize, and communicate. First, an anticipatory bias: likelihood scores generally align weakly with subsequent shock frequency, except for conflict-related risks, limiting their value as broad early-warning signals. Second, a potential regional bias: where positive future alignment exists, it is consistently strongest for high-income countries, suggesting that the reports better capture shocks as recorded in wealthier regions. Third, a transcription bias: relative to the underlying surveys, report narratives downplay poverty, inequality, biodiversity, and conflict while foregrounding economic growth, simplification, and short-term stability, thereby reshaping which risks appear most salient. Finally, a comparative framing bias: relative to other institutional reports, the GRRs increasingly present risks as complex regulatory and compliance challenges for technical policy and business audiences, narrowing how risks and possible responses are framed. These asymmetries suggest that the GRRs are better understood as situated records of elite concern and prioritization rather than as early-warning systems as claimed by the WEF (2026b).

Our findings clarify which earlier critiques are supported, how far they extend, and what is newly revealed. The anticipatory bias is, to our knowledge, newly identified: no previous study has compared GRR likelihood scores with subsequent recorded shocks while distinguishing prospective from retrospective alignment. The potential regional bias is also novel and extends concerns about the geographical composition of respondents. The transcription bias provides the first systematic and statistically significant evidence that previously noted business-centred and socially narrow framings are not confined to individual editions, but emerge through the translation of survey priorities into report narratives and persist across nearly two decades. Finally, the comparative framing analysis confirms earlier qualitative critiques of the GRRs' technical and business orientation, while extending them by revealing an increasingly distinctive emphasis on regulatory complexity and compliance relative to other institutional reports.

Our study has several methodological limitations that should inform interpretation of the results. Although these likely affect only a subset of risks or specific trends, they illustrate the difficulty of evaluating risk assessments. The predictive analysis is subject to four main effects: reporting, geographical coverage, hazard matching, and thresholds. Reporting effects arise when recorded shocks increase over time because data collection improves (Wyatt et al., 2023), but are unlikely to be substantial over our relatively recent 25-year period. Geographical effects arise from uneven reporting across locations and spatial scales. Underreporting of events in low- and middle-income countries could make correctly anticipated risks appear to have low anticipatory skill, while national-level data may count a single regional event multiple times. This latter issue is more likely to inflate records for high-income countries, which generally have greater reporting capacity, but is less likely to explain differences between the two middle-income groups. Hazard effects arise from imperfect correspondence between GRR risk categories and recorded events. This reflects changes in risk labels over time, which reduces matching precision and may weaken observed associations. We mitigated this through a structured matching procedure (Fig. S5). Threshold effects arise because databases selectively include more severe events and apply different inclusion criteria (Wyatt et al., 2023). Technological risks illustrate this problem: recorded shocks include industrial fires, train accidents, and oil spills, which only partly correspond to GRR categories such as "breakdown of critical infrastructure and networks", "lack and failure of public infrastructure", and "human-made environmental damage and pollution". This may partly explain the low coefficients for technological shocks, although the generally low likelihood assigned to these risks reduces its influence. We further limited threshold dependence by analysing shock occurrence rather than severity, which is more sensitive to inclusion thresholds and damage estimates (Delannoy et al., 2025b)

Several other underlying processes can be involved in generating the biases identified above. GRRs likelihoods may capture judgments about whether major events seem plausible, important, and potentially disruptive. They may therefore reflect assessments of notable events rather than expectations about how often shocks will occur in a given year. As Wynes et al. (2022) suggest, this points to a possible mismatch between what the GRPS elicits and how risk likelihoods are often interpreted in the GRRs or by external audiences. Moreover, risk perceptions are influenced by recent events. Respondents may assign higher likelihoods to several risks because recent disruptions make them more cognitively available and salient (Tversky and Kahneman, 1974; Di Baldassarre et al., 2021). This effect is especially relevant for the aspects outside respondents' own domain of expertise, and could be key in the GRRs given the large spectrum of risks surveyed (Won et al., 2025).

The biases also point to the importance of the institutional context in which the GRRs are produced. The reports are prepared by the WEF, a Swiss foundation sustained through corporate membership and partnerships, and influential through its convening of business leaders and decision-makers at Davos (Pigman, 2002; Graz, 2003; Pigman, 2007; Fougner, 2008; McNeill, 2023). Two features of this organization are relevant for interpreting our results. First, the WEF exercises a discretionary governance, in which access, roles, and agendas are shaped through curated participation. Access to the Forum communities is thus mediated by invitation and fees, stabilising a transnational elite club whose horizons extend beyond national polities and blend corporate, financial, philanthropic, and policy interests—often summarised as "Davos Man" (Nauta, 2015; Navidi, 2017; Stefán, 2023; Kaplan, 2024). Second, the WEF operates with a "liquid mandate", moving across policy domains without a fixed remit (Garsten & Sörbom, 2014; 2018; 2021). While curated participation may give greater weight to business and policy views than others (Garsten & Sörbom, 2019b; Wynes et al., 2022), the Forum's liquid mandate may make different issues comparable by recasting them as problems of coordination, resilience, innovation, and public–private partnership (Garsten & Sörbom, 2017; Soederberg, 2016; Sharma & Soederberg, 2019). Risks rooted in poverty, inequality, biodiversity loss, or ecological overshoot are less likely to be foregrounded, as they imply more redistributive and ecological interventions (Giridharadas, 2018; Garsten & Sörbom, 2019a; Calmettes & Pfister, 2025). Interestingly, similar patterns appear within WEF initiatives on gender, competitiveness, Artificial Intelligence, COVID-19, climate, so-called inclusive growth, and the Fourth Industrial Revolution (Elias, 2013; Nam & Nam, 2021; Moll, 2022; Saqer, 2022; Francisco & Linnér, 2023; Pal, 2023; Woodworth, 2023; Pasula, 2024; Bergsteiner & Avery, 2026).

These institutional features do not determine how particular users interpret or act on the GRRs, but they shape the information and framings users encounter and may therefore condition judgments of salience, credibility, and legitimacy (Mitchell et al., 2006; Riousset et al., 2017; Wyborn et al., 2018). Whether these properties subsequently alter agendas, decisions, or outcomes remains a separate empirical question.

Improving global systemic risks assessment and governance

Improvement must begin with how GRRs are interpreted and used. Their visibility and uptake do not mean that they should be treated as neutral, comprehensive, or uniformly predictive maps of global risk. Users should instead regard them as situated assessments whose relevance varies across sectors, regions, and purposes, and should combine them with other evidence and forms of knowledge.

If the GRRs are intended to support foresight and preparedness or even early-warning systems, our findings also identify several design improvements. All assessments are necessarily selective, incomplete, and shaped by institutional choices; neutrality and comprehensiveness are therefore neither realistic nor useful standards. This does not remove the need for improvement. Rather, assessments should be judged by whether their selections are transparent, empirically justified, fit for purpose, and open to contestation. The GRR process should consequently be plural enough for different assumptions, biases, and risk priorities to be made visible. This requires balancing business and policy perspectives with other forms of expertise and experience, including institutions in highly exposed regions, humanitarian agencies, sustainability scholars, public-health experts, heterodox economists, labour organisations, grassroots and Indigenous communities, and critical-infrastructure practitioners. Such plurality should be embedded in a structured co-production process (Hochrainer-Stigler et al., 2024). The biases we document also point to clearer procedures for disclosing sampling choices, uncertainty treatment, editorial decisions, and the criteria used to select and prioritise risks (Baybutt, 2015; Aven, 2020; 2025).

Yet the institutional context of the WEF suggests that improving the GRRs alone may not be sufficient to represent global systemic risks adequately. Scientific assessments are shaped not only by their methods and content, but also by their mandate, governance, intended users, and links to decision-making (Mitchell et al., 2006; Alcamo, 2017; Jabbour & Flachsland, 2017; Riousset et al., 2017; Wyborn et al., 2018). We therefore echo the call from Gambhir et al. (2026) for a standing assessment capacity for systemic risks that would complement existing public, private, and intergovernmental assessments. Unlike another periodic report, such a capacity would have a clear public-interest mandate, stable resources, institutional independence, and the ability to update its analyses as risks, vulnerabilities, and knowledge evolve. It would also contribute to a more diverse assessment ecosystem, in which different approaches serve different users and purposes while remaining open to comparison, scrutiny, and revision (Kowarsch et al., 2016; Bennett et al., 2026).

The mandate of this standing capacity must be reflected in its analytical and procedural design. It should begin from critical systems, vulnerabilities, and propagation pathways rather than predefined risk labels, linking risks to observable drivers and mechanisms of disruption (Schweizer, 2019; Schweizer et al., 2021; Wassénius & Crona, 2021; Wernli et al., 2023; Ahlström et al., 2024; Sjåfjell & Cornell, 2024; Schweizer & Juhola, 2024; Ciullo et al., 2025). Catastrophic and existential risks should be treated separately, as conventional rankings can imply spurious precision for low-probability, high-impact events (Bhowmik et al., 2022; Burgess et al., 2022; Kemp et al., 2022a; Arnscheidt et al., 2025; GCF, 2026). The process should also make uncertainty, knowledge gaps, value judgements, and prioritisation criteria explicit, while drawing on sufficiently diverse expertise and experience to expose regional and thematic blind spots and strengthen credibility, legitimacy, and salience across users (Visser et al., 2020; Galaz, 2017; 2022; Kreienkamp & Pegram, 2020; Studzinski et al., 2025; Aven et al., 2026). It could build on the UN Global Risk Report and emerging deliberative approaches that have begun to broaden participation and strengthen systemic analysis (Blue, 2016; Renn et al., 2020; UN, 2025; Gambhir et al., 2025; Richardson et al., 2026; Daw et al., 2026). Such a capacity would help decision makers anticipate where crises may emerge, how they may propagate, whom they may affect, and which responses remain available.

Materials and methods

Predictive analysis

We assessed the extent to which GRPS-derived risk scores in the World Economic Forum Global Risks Reports are statistically associated with the empirical occurrence of shocks across multiple categories. The predictive analysis uses the comparable annual risk-score series for 2006–2021. Later reports are analysed in the thematic and linguistic parts of the study, but are excluded from the predictive analysis because the GRPS methodology changed substantially after 2021.

First, we retrieved from the GRRs the short-term (1–5 years) likelihood (Fig. S2) and severity (Fig. S3) of each risk. Due to data availability constraints, values were manually extracted from risk matrices using WebPlotDigitizer when tabulated values were unavailable. To assess the robustness of this extraction method, values obtained via the software were compared against available data for 2024 (Table S1). We then associated risks with shocks from the database of Delannoy et al. (2025b) through an interactive and structured process (Fig. S5, Table S2). This database documents the frequency, impact, and co-occurrence of shocks across 170 countries from 1970 to 2019 in six categories: climatic, geophysical, ecological, economic, technological, and conflict-related shocks. In the working files used here, harmonised extensions were available for some categories, while other categories ended earlier because of source-data limitations. We therefore imposed category-specific end years before aggregation: food-related ecological shocks, 2013; disease outbreaks, 2022; climate, geophysical, and technological shocks, 2024; terrorism, 2020; geopolitical conflicts, 2023; and economic shocks, 2019. Years outside category-specific coverage were not treated as observed zero-shock years. When several GRR risks mapped to the same empirical shock category in a given year, we aggregated their normalised scores into a single category-level score using mean values.

Second, shock counts were aggregated regionally or globally and standardised using a category-first approach. Region grouping follows the 2024 World Bank classification, distinguishing low-, lower-middle-, upper-middle-, and high-income countries. For each region j, shock category r, and year t, raw annual shock counts were scaled by the temporal variability specific to that region–category series:

$$S_{jrt} = \frac{C_{jrt}}{sd(C_{jr})} \quad (1)$$

where C_{jrt} is the raw shock count and $sd(C_{jr})$ is the standard deviation of annual counts for region j and shock category r. Global standardisation was performed analogously using global shock counts. This procedure makes shock occurrence comparable across categories that differ substantially in frequency and reporting intensity.

Third, for each shock category r, region j, GRR year y, and lag $\ell \in \{-5,\ldots,-1,0,1,\ldots,5\}$, we computed average standardised shock occurrence in the corresponding retrospective, contemporaneous, or prospective window. In the current specification, windows are inclusive of the GRR assessment year. For ℓ>0, the prospective window covers years y to y+ℓ; for ℓ<0, the retrospective window covers years y+ℓ to y; and for ℓ=0, the window corresponds to year y. We then estimated ordinary least squares regressions of the form:

$$\bar{S}_{jry}(\ell) = \alpha_{jr\ell} + \beta_{jr\ell} \times R_{ry} + \varepsilon_{jry\ell} \ (2)$$

where R_{ry} is the GRPS-derived risk score for shock category r in GRR year y, and $\beta_{jr\ell}$ measures the association between risk scores and shock occurrence at lag ℓ. Negative lags estimate retrospective association; positive lags estimate prospective alignment. Lag zero was estimated and shown for comparison, but was not used to define predictive capacity or anticipatory skill. Regressions with fewer than five paired observations were not estimated.

To test robustness, we generated 1500 Monte Carlo randomisations by expanding the shock data to a complete country × shock-category × year grid within valid category coverage, filling observed absences with zeros, and permuting annual shock counts within each country–shock-category series. The permuted counts were then reaggregated to regional and global totals, restandardized, and analysed using the same lag-regression procedure. This preserves each country–category marginal distribution while breaking temporal alignment between shocks and GRPS-derived risk scores. The simulation envelope used for lag-level classification is the 2.5–97.5% range of simulated coefficients. Separately, uncertainty in predictive-capacity and anticipatory-skill metrics was assessed using 10,000 coefficient draws from normal distributions centred on the estimated lag-regression coefficients and scaled by their standard errors.

From this analysis, we defined predictive capacity *PC* as the maximum prospective regression coefficient across horizons h = 1,…,5:

$$PC_{jr} = \max \beta_{jr\ell}\ ;\ \ell \in \{1, \dots, 5\} \ (3)$$

The predictive time horizon is:

$$\ell *_{jr} = \arg\max \beta_{jr\ell}\ ;\ \ell \in \{1, \dots, 5\} \ (4)$$

Anticipatory skill *AS* is defined as predictive capacity minus the coefficient from the corresponding retrospective window:

$$AS_{jr} = PC_{jr} - \beta_{jr,-\ell *_{jr}};\ \ell \in \{1, \dots, 5\} \ (5)$$

To test income-group differences, we used Friedman omnibus tests with risk category as the paired block and income group as the repeated factor. The main test was restricted to the four risk categories with positive global predictive capacity—climate shocks, disease outbreaks, geopolitical conflicts, and terrorism—because anticipatory skill is mostly substantively interpretable when there is at least some positive global future alignment. Pairwise income-group contrasts were not used as the main inferential target because the targeted test contains only four category-level blocks, giving very low power and coarse exact P-value resolution.

Thematic analysis

We collected PDF files of the Global Risks Report from 2006 to 2024 from the WEF website and converted them to .txt format. Once textual and survey data were collected, we performed a systematic thematic analysis of both data against (i) the Sustainable Development Goals (SDGs), (ii) Anthropocene Traps (ATs), and (iii) Corporate Sustainability Spectrums (CSSs) (Fig. S15). We selected these three typologies as they represent different and complementary aspects of the conceptualization of risks, with the ATs, SDGs, and CSSs respectively answering (i) *what* type of risks are assessed, (ii) *how* are the risks believed to impact human societies (i.e., transgressing what SDG?), (iii) *who* is framed as shaping global risks, and specifically to what extent corporate actors are implicated? A thematic analysis is an effective way of assessing the various relevant dimensions of a concept. For example, it has been used to study how interpretations of the 'green economy' vary according to the sets of indicators proposed to monitor its progress (Merino-Saum et al., 2018).

For each report, we extracted a frequency-weighted vocabulary after applying a stop-word list and removing non-informative terms and closely co-occurring terms that would otherwise double-count the same concept. Survey material was screened separately from the report text; because survey entries mainly consist of risk labels and short definitions, this screening captures the conceptual content of the surveyed risks more directly, but with less contextual information than the full reports. Each word or survey response was categorized according to the most related of the 17 SDGs, 14 ATs, and 5 CSSs, considering all potential categories. The screening process consistency was ensured through an individual screening, a collective screening, an internal consistency check across all screens, and a screening against a fourth framework (the environmental, social, and governance (ESG) factors) using the dictionary from Baier et al. (2020). As a rule, we determined the most pertinent category for each indicator and each typology, but for the typologies made of non-exclusive categories (SDGs and ATs), the same indicator could be classified by referring to more than one category. For instance, the 2013 risk “Diffusion of weapons of mass destruction” was screened against SDG 16 (Peace, Justice and Strong Institutions) but against AT 4 (Division) and AT 8 (Existential Technology).

We then normalized screens to ensure comparability and consistency across the three dimensions and the 19 years of reports. To do so, we employed "z-score" normalization:

$$z = \frac{x - \mu}{\sigma} \quad (6)$$

where z is the standardized value, x is the original value, μ is the mean of the considered year, and σ is the standard deviation of the considered year. The normalization process involves subtracting the mean of each year from its respective data points and then dividing by the standard deviation of the same year. This transformation produces a distribution with a mean of zero and a standard deviation of one, standardizing the data for meaningful comparisons. Following normalization using the z-score method, the resulting values were rescaled to a range of 0 to 1 to enhance the readability and interpretability.

Linguistic analysis

First, we collected annual reports from various international organizations that were selected for their coverage of global issues discussed in the GRRs, yearly availability, and institutional reputation (Table S3). We then assessed the linguistic patterns from the GRRs through Python coding six different linguistic criteria throughout the text of each report: the percentage of words classified as positive, negative, constraining, litigious, and uncertain, as well as the overall readability of the text. The identification of words classified as positive, negative, constraining (*required*, *comply*, etc.), litigious (*legislation*, *regulation*, etc.), and uncertainty-related (*indefinite*, *fluctuate*, etc.) is conducted using the February 2024 version of the dictionary of words of Loughran & McDonald (2011; 2023). The readability is computed through the Gunning Fog Index (GFI), which is commonly used to evaluate how easily text can be read by its intended audience:

$$GFI = 0.4\left(\frac{number\ of\ words}{number\ of\ sentences} + 100\left(\frac{number\ of\ complex\ words}{number\ of\ words}\right)\right) \quad (7)$$

Complex words are words with 3 syllables or more that are not compound words, and compound words are a combination of 2 or more smaller words (for example, "multinational", which is made up of the words "multi" and "national"). The compilation of the Gunning Fog Index for all reports is done through a slightly modified version of the open-source code of Anusha (2024). The values reported for the six different linguistic criteria are then normalized between 0 and 1 to ensure comparability (0 being the lowest value of the indicator across all reports from all organizations and 1 the highest).

Future development

Future work could extend our analysis in several directions. The predictive analysis could be extended to severities and mid- and long- term horizons of risks, to assess whether biases appear across the impacts of the shocks. Exploiting higher-resolution geocoded shock data could also strengthen the analysis, but faces issues of data availability. Future work could also evaluate whether perceived interdependencies in the GRRs correspond to empirical patterns of shock co-occurrence, but faces the potential differences in “interconnection” interpretation by the survey respondents. On the textual side, more fine-grained linguistic features (including sentiment analysis at sentence level, rhetorical framing devices, or topic models) could complement the broad indicators used here. Finally, direct collaboration, including semi-structured interviews with GRRs organizers and contributors would allow a more detailed evaluation of survey design and institutional incentives, and thus a more elaborate understanding of how biases might arise, and potential capacity to address them. Such work could also identify the conditions under which risk assessments become actionable, as risk information does not translate automatically into preventive responses but instead depends on the perceived efficacy and feasibility of available measures, the capacity and authority to implement them, and trust in the assessment and its producers (Lindell & Perry, 2011; Wood et al., 2011; Bubeck et al., 2012; Zhu et al., 2021; Delannoy et al., 2026).

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Author Contributions

Louis Delannoy: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing – original draft, Writing – review & editing. **Mélis Busson**: Data Curation, Investigation, Methodology, Visualization. **Peter Søgaard Jørgensen**: Conceptualisation, Formal analysis, Methodology, Supervision, Visualization, Writing – original draft, Writing – review & editing.

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Conflicts of Interest declarations

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability statement

Data and code for the analysis, as well as figures, can be accessed from the following repository: https://github.com/LouisD-KVA/WEF-GRR-analysis

Declaration of AI use

We have used AI-assisted technologies (Chat-GPT 5.4 and 5.5) for spellchecking, code checking, and as inspiration for rewording individual sentences. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Supporting Information

A. Coverage of the Global Risks Reports

- **Figure S1 |** Distribution of news articles referencing 'Global Risks Report' in 2023, as documented in InfoMedia.

B. Extracted risks likelihood and severity (normalized) from the Global Risks Reports.

- **Figure S2 |** Surveyed likelihood of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2021. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity multiplied by likelihood.
- **Figure S3 |** Surveyed severity of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2021. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity multiplied by likelihood.
- **Figure S4 |** Surveyed severity times likelihood of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2024. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity times likelihood.
- **Notes S1 |** Methodological details for risk likelihood extraction process.
- **Table S1 |** Long-term surveyed severity of risks in the 2024 Global Risks Report, as provided by the WEF or extracted from the risk matrices using the WebPlotDigitizer software.

C. Association between risks and shocks.

- **Figure S5** | Association process between risks from the Global Risks Reports and the shocks from the database of Delannoy et al. (2025b).
- **Table S2** | Association of risks from the Global Risks Reports against the shocks from the database of Delannoy et al. (2025b). Year range refers to the years these risks were available for extraction in the GRRs.

D. Predictive analysis.

- **Figure S6** | Regional lag-regression results. Regression coefficients relate GRPS-derived risk scores to observed shock frequency across lags from −5 to +5 years, by shock category and income group. Bands show Monte Carlo-randomised simulation envelopes. HIC, high-income countries; UMC, upper-middle-income countries; LMC, lower-middle-income countries; LIC, low-income countries.
- **Figure S7** | Year-level contributions to predictive capacity and anticipatory skill by shock category.
- **Figure S8** | Seven-year rolling estimates of predictive capacity and anticipatory skill by shock category.
- **Figure S9** | Edition-level all-risk GRR performance through time. For each GRR year and region, predictive capacity is the largest prospective regression coefficient across horizons of one to five years. Anticipatory skill subtracts the retrospective coefficient at the same horizon. Labels mark the year in which each metric reaches its maximum within a panel; h denotes that selected horizon.
- **Figure S10** | Observed predictive-capacity and anticipatory-skill metrics with 95% coefficient-draw intervals.
- **Figure S11** | Observed predictive-capacity and anticipatory-skill metrics against 95% Monte Carlo null intervals.
- **Figure S12** | Income-group ranks for risk categories with positive global predictive capacity.
- **Figure S13** | Income-group differences in predictive capacity and anticipatory skill for risk categories with positive global predictive capacity.

E. Linguistic analysis.

- **Table S3 |** Reports from international organizations that were selected for the linguistic analysis comparison with the GRRs. WMO = World Meteorological Organization: State of the Climate Reports; BIS = Bank for International Settlements: Annual Reports; IMF = International Monetary Fund: World Economic Outlooks; FAO = Food and Agriculture Organization: The State of Food Insecurity in the World Reports; UNWWDR = The United Nations World Water Development Reports; UN Technology = UN Conference on Trade and Development: Technology and Innovation Reports; WIPO = World Intellectual Property Organization Reports; UNHCR = The UN Refugee Agency Global Reports.
- **Table S4 |** List of "stop" words.
- **Figure S14 |** Euclidean distances among reports from international organizations, assessed over six linguistic criteria.

F. Thematic analysis

- **Table S5 |** Sustainable Development Goals description.
- **Table S6 |** Anthropocene Traps description. Relying on Søgaard Jørgensen et al. (2023, 2026).
- **Table S7 |** Corporate Sustainability Spectrum description. Relying on Landrum & Ohsowski (2017).
- **Notes S2 |** Methodological details for screening.
- **Figure S15 |** Heuristic cube of the thematic analysis. Source: own elaboration, inspired by Merino-Saum et al. (2018).
- **Figure S16 |** Normalized proportion of screens screened against Sustainable Development Goals (SDGs) for words (top) and surveys (bottom).
- **Figure S17 |** Normalized proportion of words systematically screened against Anthropocene Traps for words (top) and surveys (bottom).
- **Figure S18 |** Normalized proportion of words systematically screened against Corporate Sustainability Spectrums for words (top) and surveys (bottom).
- **Figure S19 |** Sankey diagram representing the interconnections between (left) words of the GRRs, and screens against (middle left) Sustainable Development Goals, (middle right) Corporate Sustainability Spectrums, (right) Anthropocene Traps.

G. Statistical significance tests.

- **Figure S20 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Sustainable Development Goals.
- **Table S8 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Sustainable Development Goals. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.
- **Figure S21 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Anthropocene Traps.
- **Table S9 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Anthropocene Traps. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.
- **Figure S22 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Corporate Sustainability Spectrums.
- **Table S10 |** P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Corporate Sustainability Spectrums. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.

H. Evolution of the screening proportions per year.

- **Table S11 |** Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Sustainable Development Goals.

- **Table S12 |** Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Anthropocene traps.
- **Table S13 |** Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Corporate Sustainability Spectrums.

A - Coverage of the Global Risks Reports

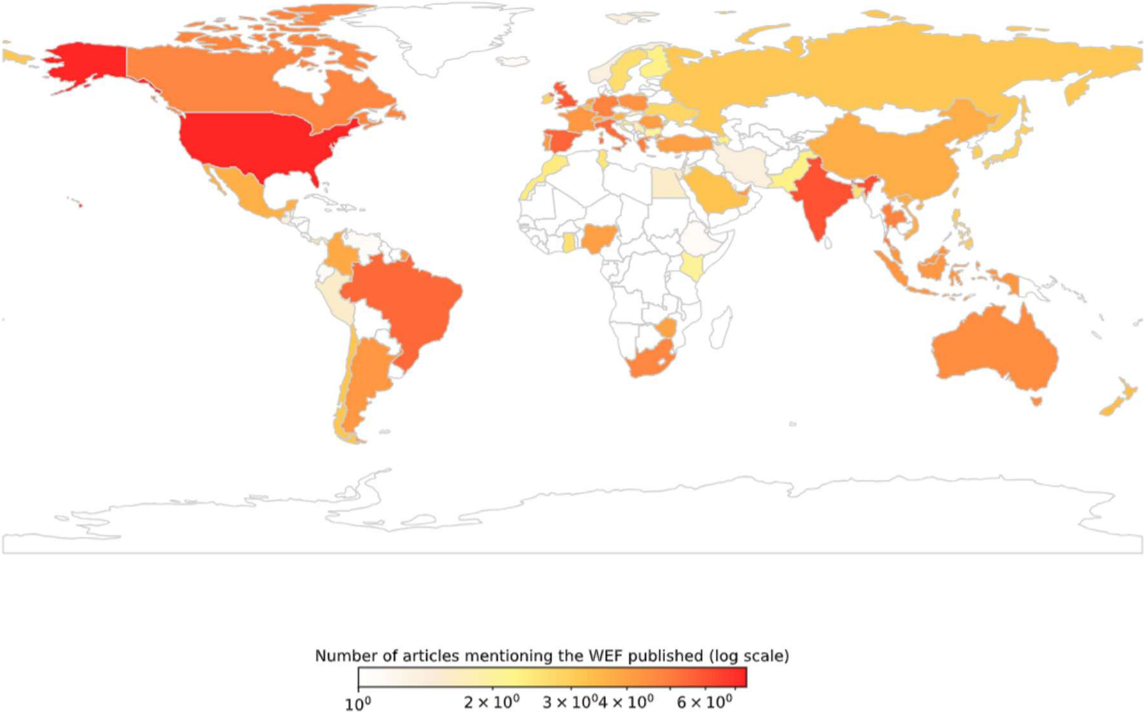


Figure S1 | Distribution of news articles referencing 'Global Risks Report' in 2023, as documented in InfoMedia.

B - Extracted risks likelihood and severity (normalized) from the Global Risks Reports.

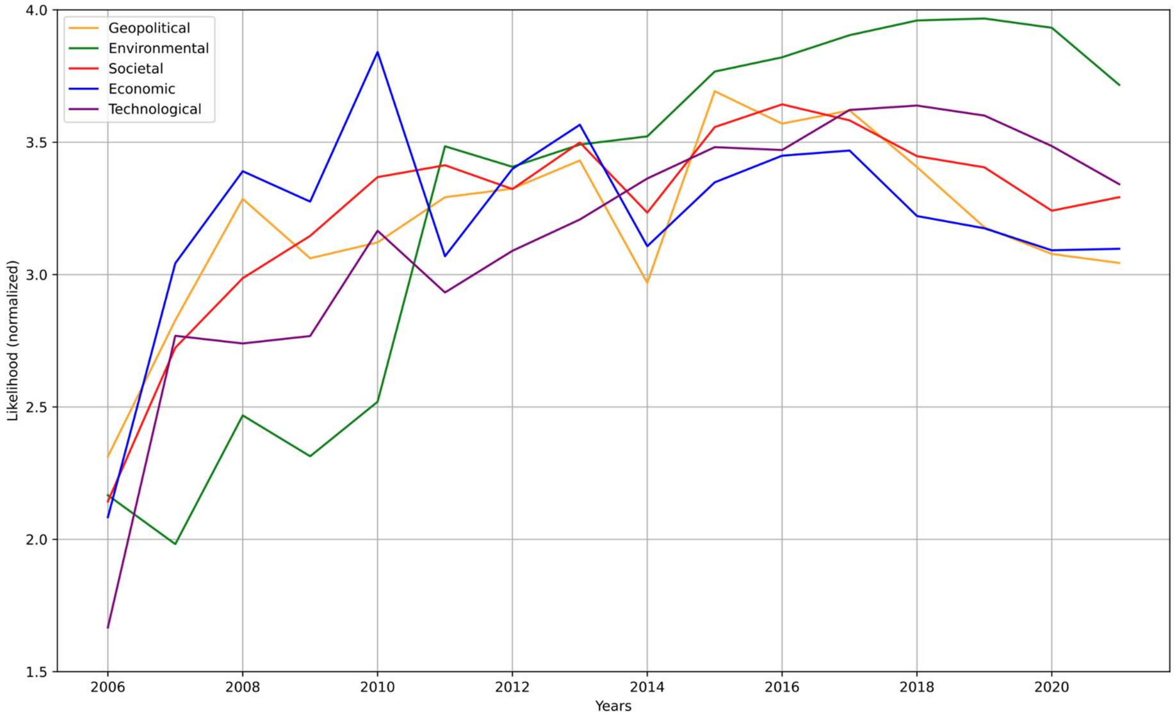


Figure S2 | Surveyed likelihood of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2021. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity multiplied by likelihood.

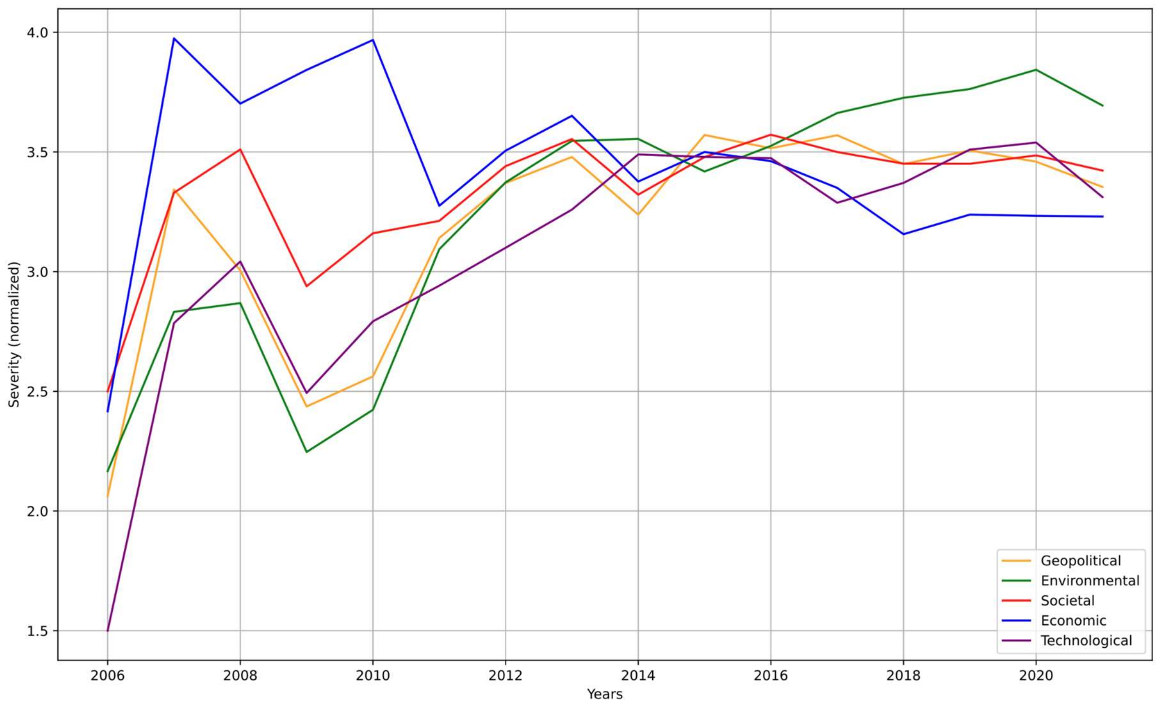


Figure S3 | Surveyed severity of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2021. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity multiplied by likelihood.

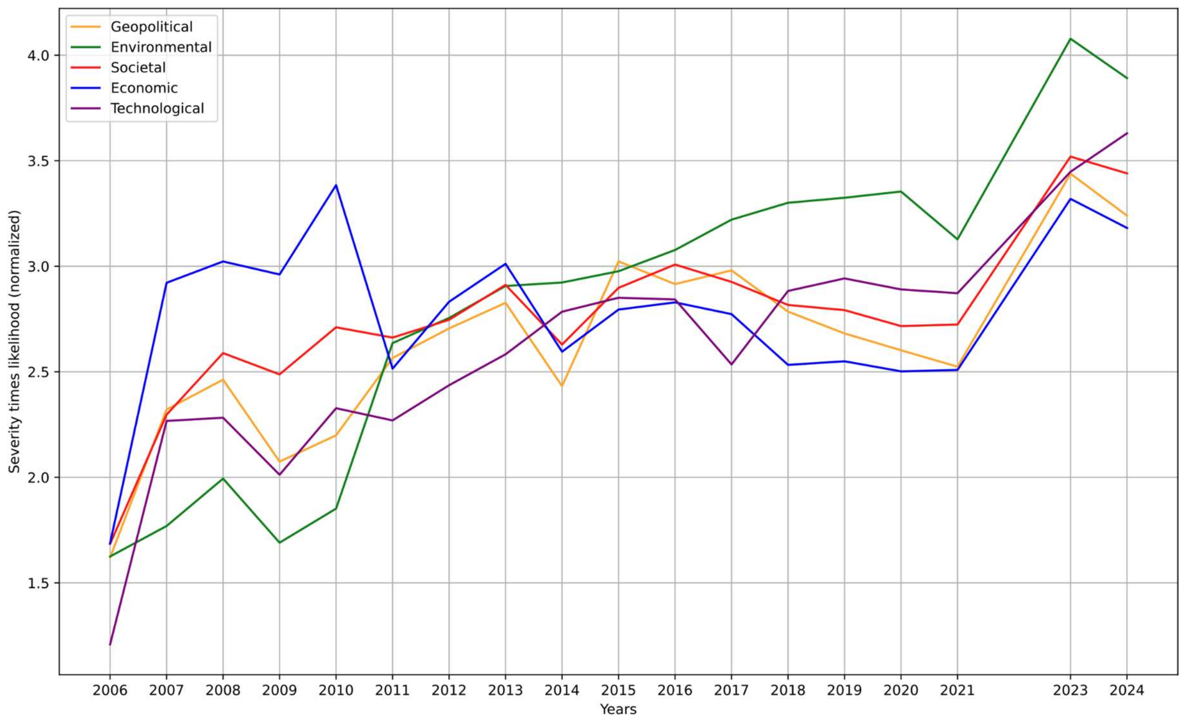


Figure S4 | Surveyed severity times likelihood of global risks (normalized from 1 to 5), by category of risks, in GRRs from 2006 to 2024. Note that the 2022 Global Risk Report did not include a risk survey, and the 2023 and 2024 reports only show severity times likelihood.

Notes S1 | Methodological details for risk likelihood extraction process.

To retrieve the primary results from the Global Risks Perception Survey (GRPS), we extract from the risk matrix of each GRR and with the ”WebPlotDigitizer” software, the likelihood and short-term (1-5 years) severity for each risk from 2006 to 2021. In 2022, the WEF adopted a distinct methodology for measuring risk likelihood and severity: likelihood was assessed as the percentage of respondents anticipating the risk to occur within a 5-10-year horizon, while severity was quantified using a "number of points" system. Due to the significant methodological deviation from the approach employed in other years (2006–2024), survey data from 2022 were excluded from subsequent analyses to ensure methodological consistency and comparability across the study period. In 2023 and 2024, the WEF introduced a measure termed "long-term severity," which, as confirmed through email correspondence with the WEF in April 2024, represents a composite of both long-term likelihood and severity. Values of likelihood and severity of risks across each year are then normalized on a 1 to 5 scale (1 being the lowest, 5 the highest), with the following caveats:

- 2006: No graphical representation of risks was provided, but the appendix included a list of risks with likelihood and severity values under four scenarios: "Short-term Base," "Short-term Worst," "Long-term Base," and "Long-term Worst." The average of the "Long-term Base" and "Long-term Worst" values was used to maintain consistency with other years referencing long-term projections.
- 2007–2010: Likelihood was expressed as a percentage, and severity was quantified in US dollars. However, the appendices included a correspondence between these metrics and scales ranging from 1 to 5, allowing both axes to be standardized on this scale.
- 2011: A unique approach was needed due to differences in the likelihood (percentage) and severity (US dollars) scales compared to previous years. First, the average likelihood and severity values from 2010 and 2012 were calculated and used as reference averages for 2011. The WebPlotDigitizer software was then employed to extract the coordinates of all points on the 2011 risk matrix using an arbitrary axis calibration. The extracted values were adjusted with a correction factor to align their averages with the reference values.
- 2013: Values for this year were directly available in the report appendix, eliminating the need for software-based extraction.
- 2012–2021: Risk values were represented on scales ranging from 1 to 5 or 1 to 7. These values were extracted using the WebPlotDigitizer software and standardized to a 1–5 scale to facilitate comparisons across years.
- 2022: This year was excluded from the study due to methodological differences, as explained previously.
- 2023–2024: For these years, only a combined measure of likelihood and severity was provided, expressed on a scale of 1 to 5. To enable comparisons with earlier years, the likelihood and severity values for each risk from 2006 to 2021 were multiplied and normalized to the same 1–5 scale. For 2024, data was directly available from the WEF website.

Table S1 | Long-term surveyed severity of risks in the 2024 Global Risks Report, as provided by the WEF or extracted from the risk matrices using the WebPlotDigitizer software.

Risk	**Category**	**WEF (2024)**	**WebPlotDigitizer**
Adverse outcomes of AI technologies	Technological	5.3	5.277799665
Adverse outcomes of frontier technologies	Technological	4.4	4.374618339
Asset bubble bursts	Economic	4.1	4.122426869
Biodiversity loss and ecosystem collapse	Environmental	5.7	5.734216488
Biological, chemical or nuclear hazards	Geopolitical	4.4	4.355953905
Censorship and surveillance	Technological	4.7	4.69206146
Chronic health conditions	Societal	4.5	4.467792771
Concentration of strategic resources	Economic	4.8	4.798187728
Critical change to Earth systems	Environmental	5.9	5.936718211
Cyber insecurity	Technological	5.2	5.138924456
Debt	Economic	4.6	4.57815424
Disruptions to a systemically important supply chain	Economic	4.4	4.339456318
Disruptions to critical infrastructure	Economic	4.4	4.382941003
Economic downturn	Economic	4.2	4.175514626
Erosion of human rights	Societal	4.6	4.550034473
Extreme weather events	Environmental	6	6.002708559
Geoeconomic confrontation	Geopolitical	4.6	4.627302275
Illicit economic activity	Economic	4	4.003151778
Inequality or lack of economic opportunity	Societal	4.6	4.900325027
Infectious diseases	Societal	4.5	4.467054073
Inflation	Economic	3.9	3.914508027
Insufficient public infrastructure and services	Societal	4.4	4.423766374
Interstate armed conflict	Geopolitical	4.7	4.660888407
Intrastate violence	Geopolitical	4.4	4.388555107
Involuntary migration	Societal	5.2	5.140057126
Labour shortages	Economic	4.2	4.136018911
Misinformation and disinformation	Technological	5.3	5.291046981
Natural resource shortages	Environmental	5.4	5.42992219
Non-weather related natural disasters	Environmental	3.9	3.92056535
Pollution	Environmental	5	4.999507535
Societal polarization	Societal	5.2	5.138185758
Technological power concentration	Technological	4.9	4.89446469
Terrorist attacks	Geopolitical	3.8	3.76553728
Unemployment	Societal	4.2	4.193538856

C - Association between risks and shocks.

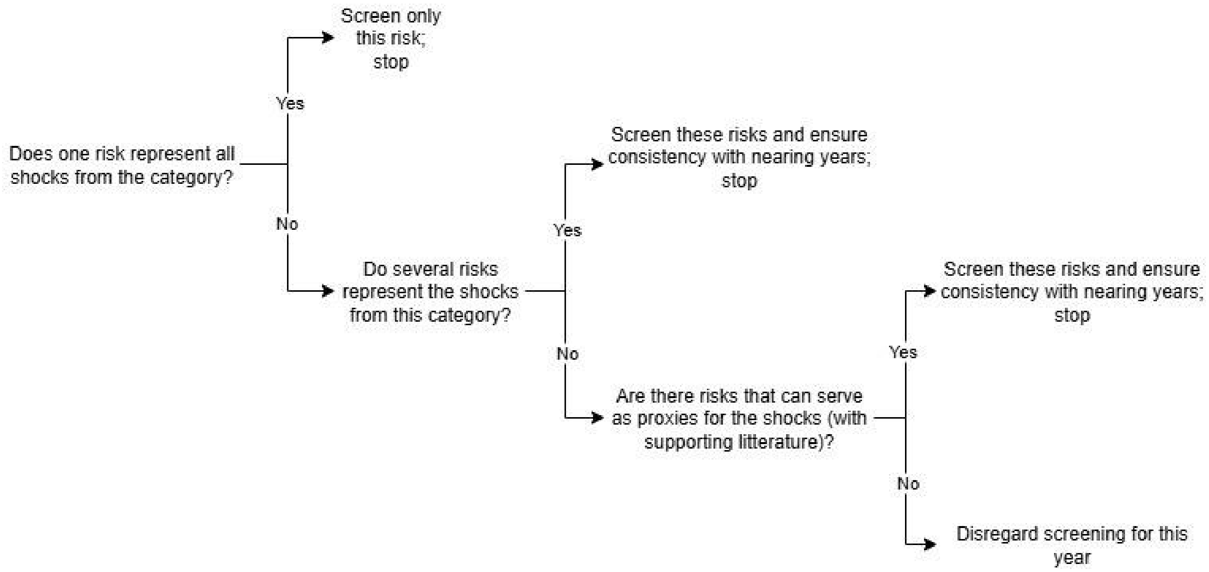


Figure S5 | Association process between risks from the Global Risks Reports and the shocks from the database of Delannoy et al. (2025b).

Table S2 | Association of risks from the Global Risks Reports against the shocks from the database of Delannoy et al. (2025b). Year range refers to the years these risks were available for extraction in the GRRs.

Risk	**Shocks category**	**Year range**
Extreme weather events from climate change	Climatic	2006–2021
Earthquake / volcanic eruptions / major geophysical disasters	Geophysical	2007-2021
Biodiversity loss / ecosystem collapse	Ecological - food	2006; 2009-2021
Food insecurity / shortages	Ecological - food	2009-2021
Loss of freshwater services	Ecological - food	2007-2015
Commodity shock (energy or food)	Ecological - food	2006-2021
Infectious disease / pandemics	Ecological - diseases	2006–2021
Asset bubbles / liquidity crises	Economic	2006-2021
Fiscal / debt crises	Economic	2006–2021
Failure / collapse of a major financial institution or currency	Economic	2011-2021
Breakdown of critical infrastructure or networks	Technological	2006-2021
Lack / failure of public infrastructures	Technological	2009-2021
Human-made environmental damage / pollution	Technological	2012-2021
Large-scale terrorist attacks	Geopolitical - terrorist attacks	2006–2021
Critical fragile / failing / collapsing states	Geopolitical - conflicts	2007-2008; 2011–2021
Interstate conflicts and civil wars	Geopolitical - conflicts	2007-2008; 2011–2021

D - Time-series simulation results.

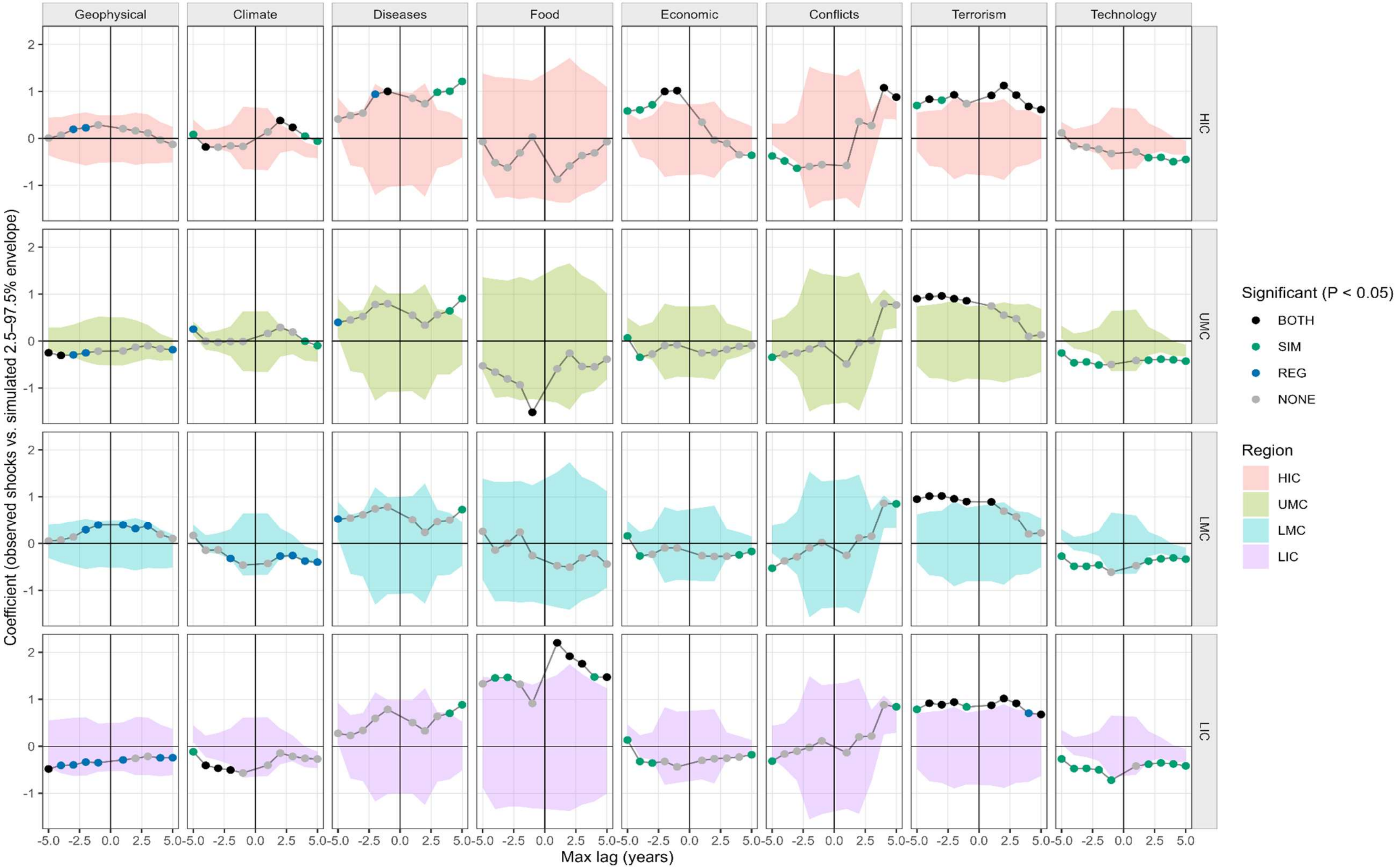
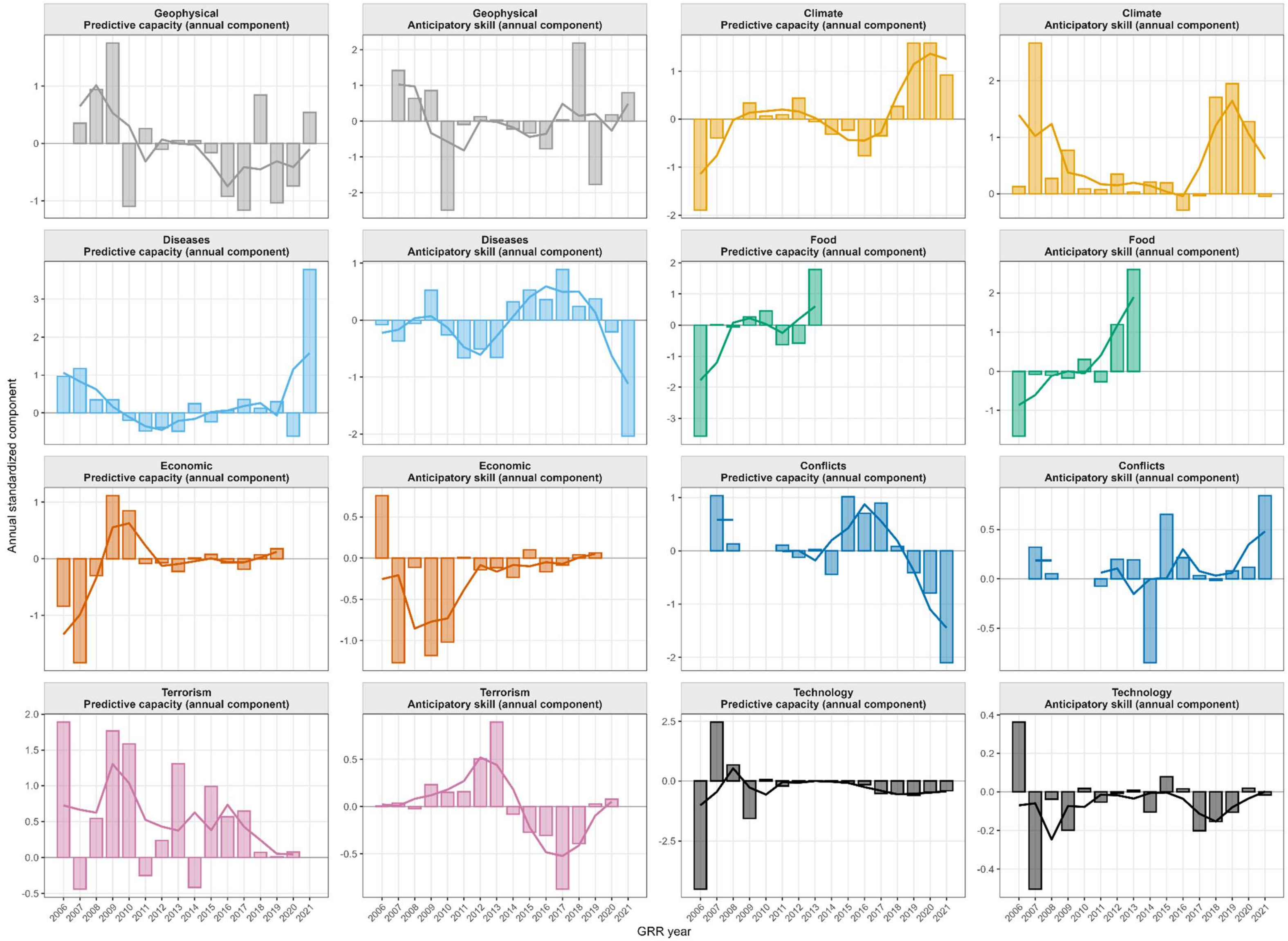


Figure S6 | Regional lag-regression results. Regression coefficients relate GRPS-derived risk scores to observed shock frequency across lags from −5 to +5 years, by shock category and income group. Bands show Monte Carlo-randomised simulation envelopes. HIC, high-income countries; UMC, upper-middle-income countries; LMC, lower-middle-income countries; LIC, low-income countries.



1233
1234 **Figure S7** | Year-level contributions to predictive capacity and anticipatory skill by shock category.

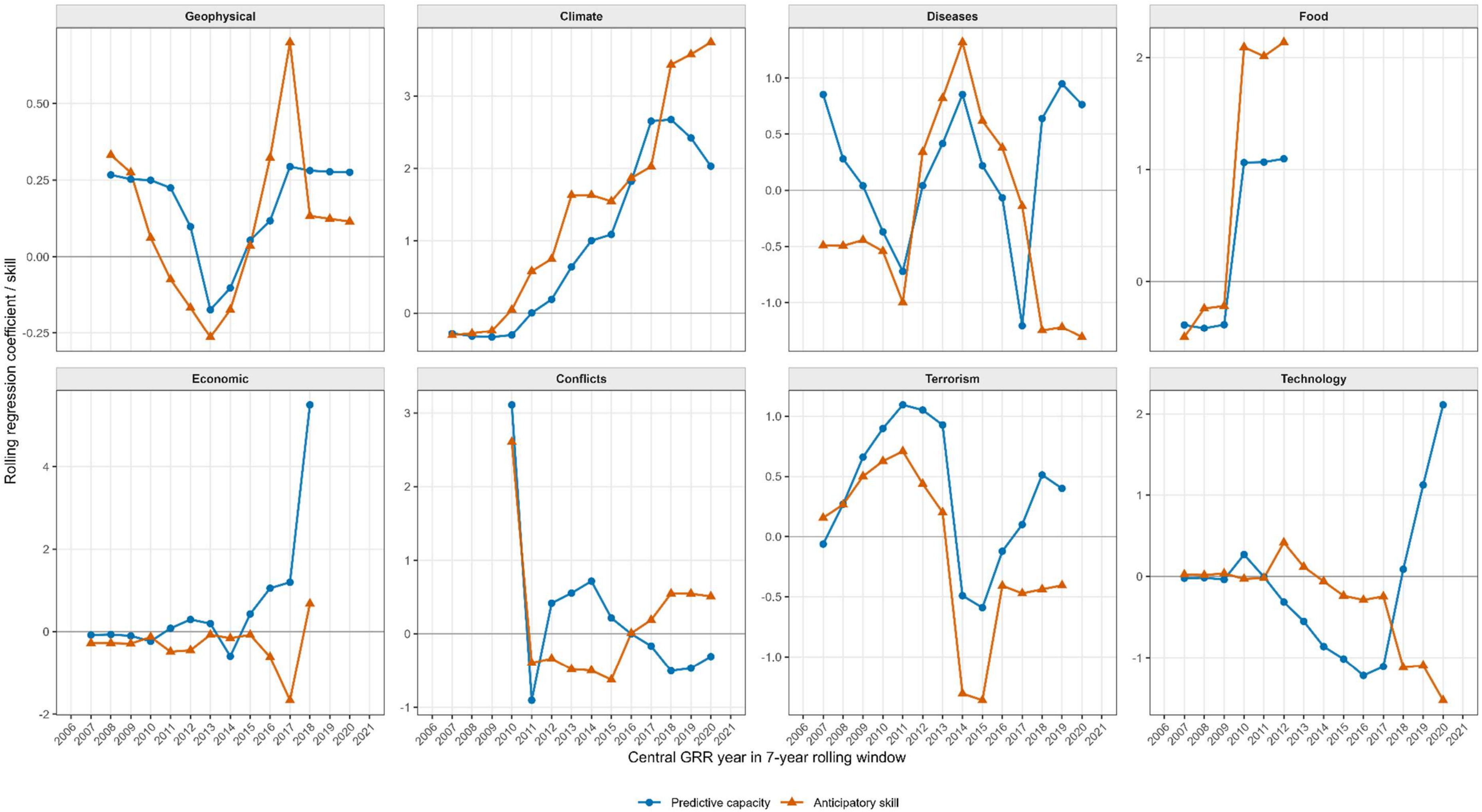


Figure S8 | Seven-year rolling estimates of predictive capacity and anticipatory skill by shock category.

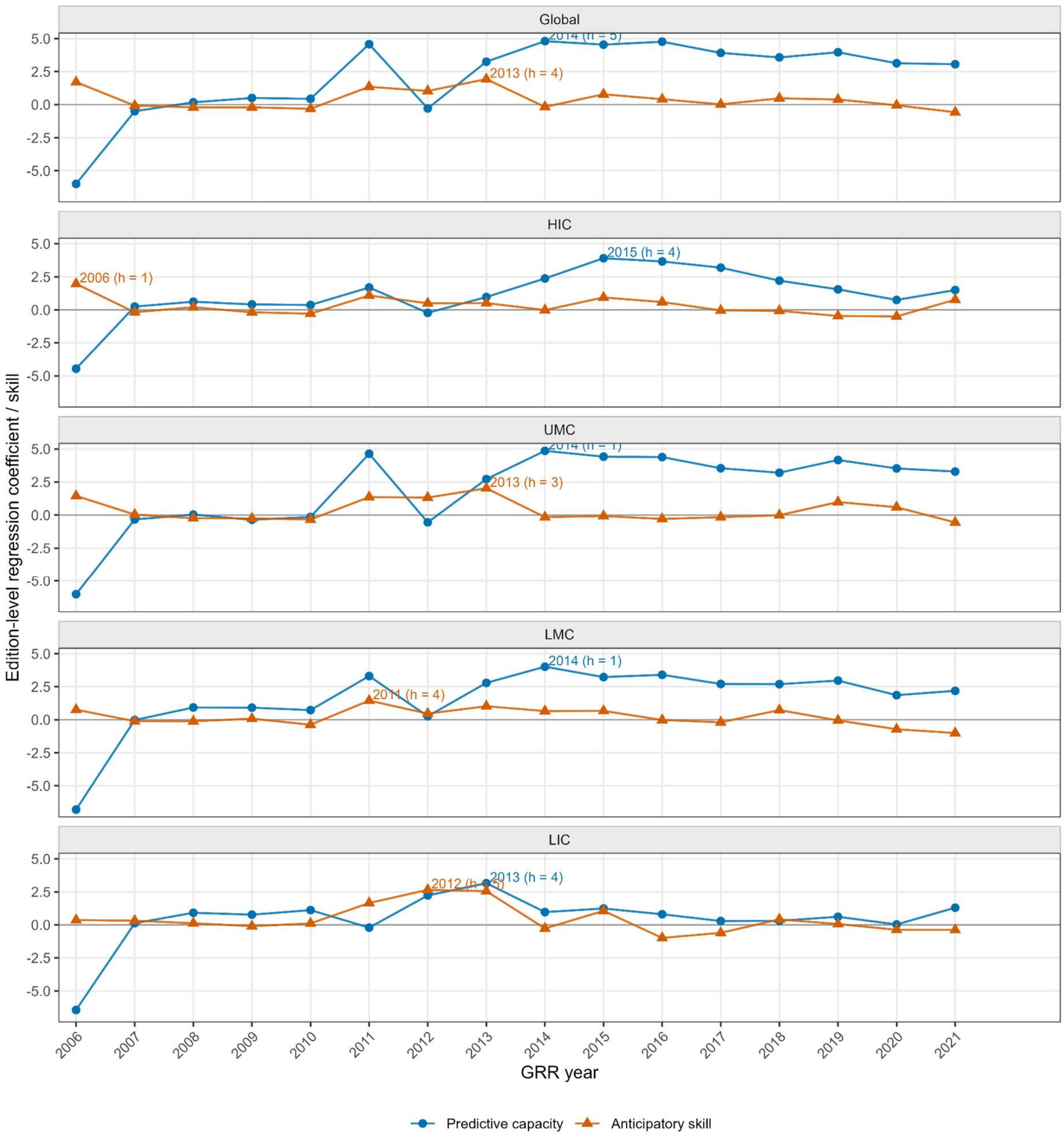


Figure S9 | Edition-level all-risk GRR performance through time. For each GRR year and region, predictive capacity is the largest prospective regression coefficient across horizons of one to five years. Anticipatory skill subtracts the retrospective coefficient at the same horizon. Labels mark the year in which each metric reaches its maximum within a panel; h denotes that selected horizon.

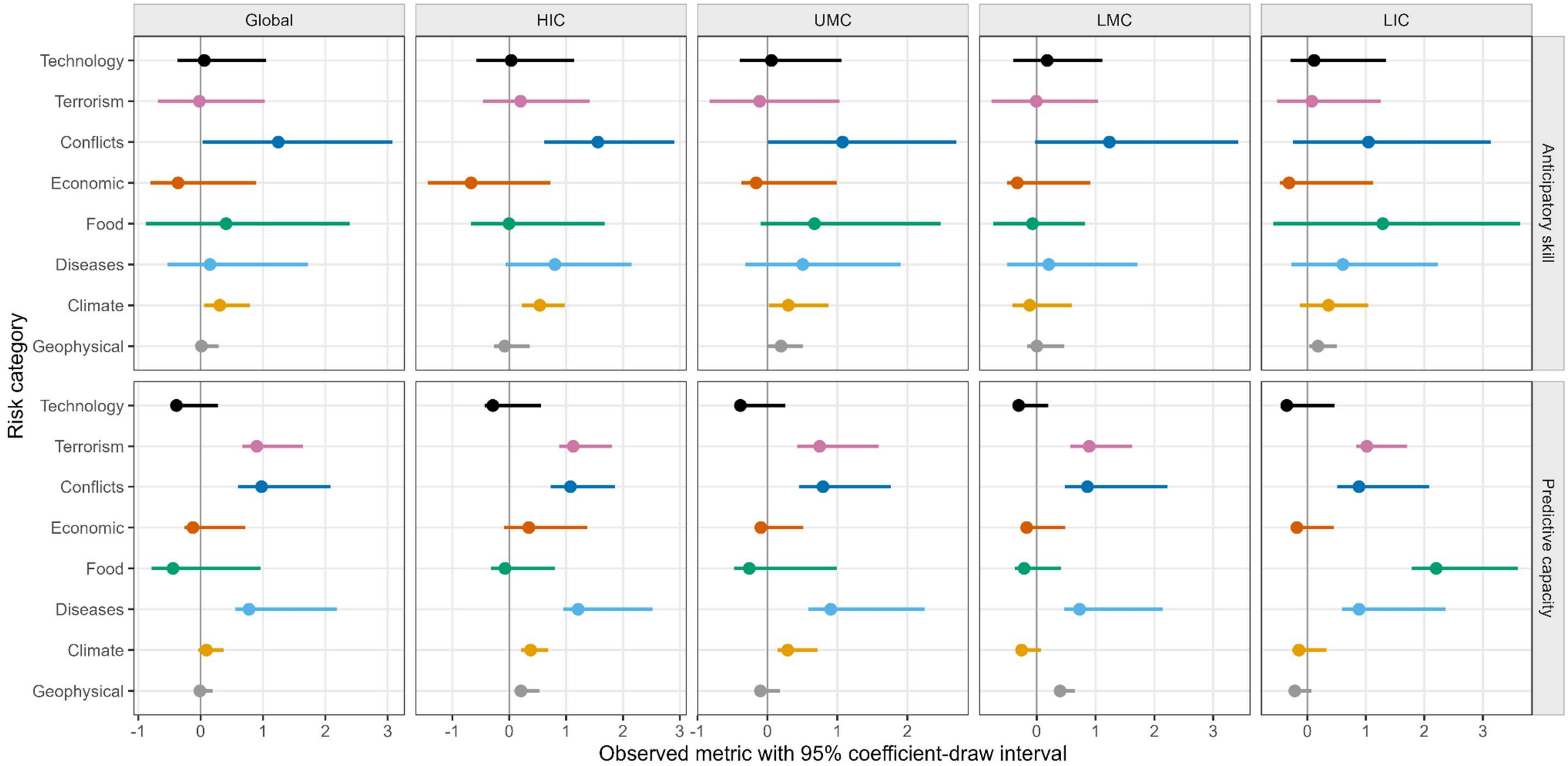
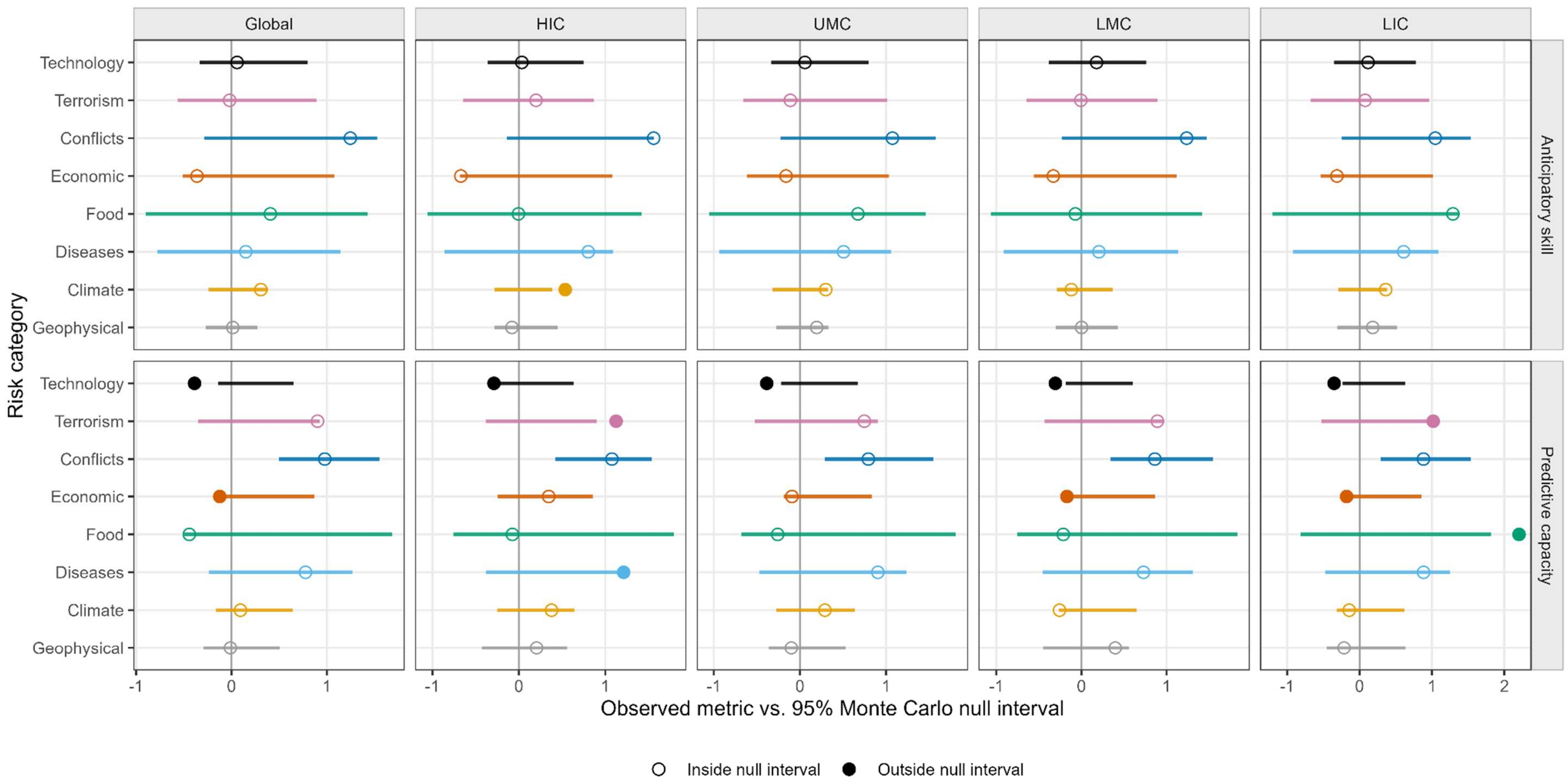
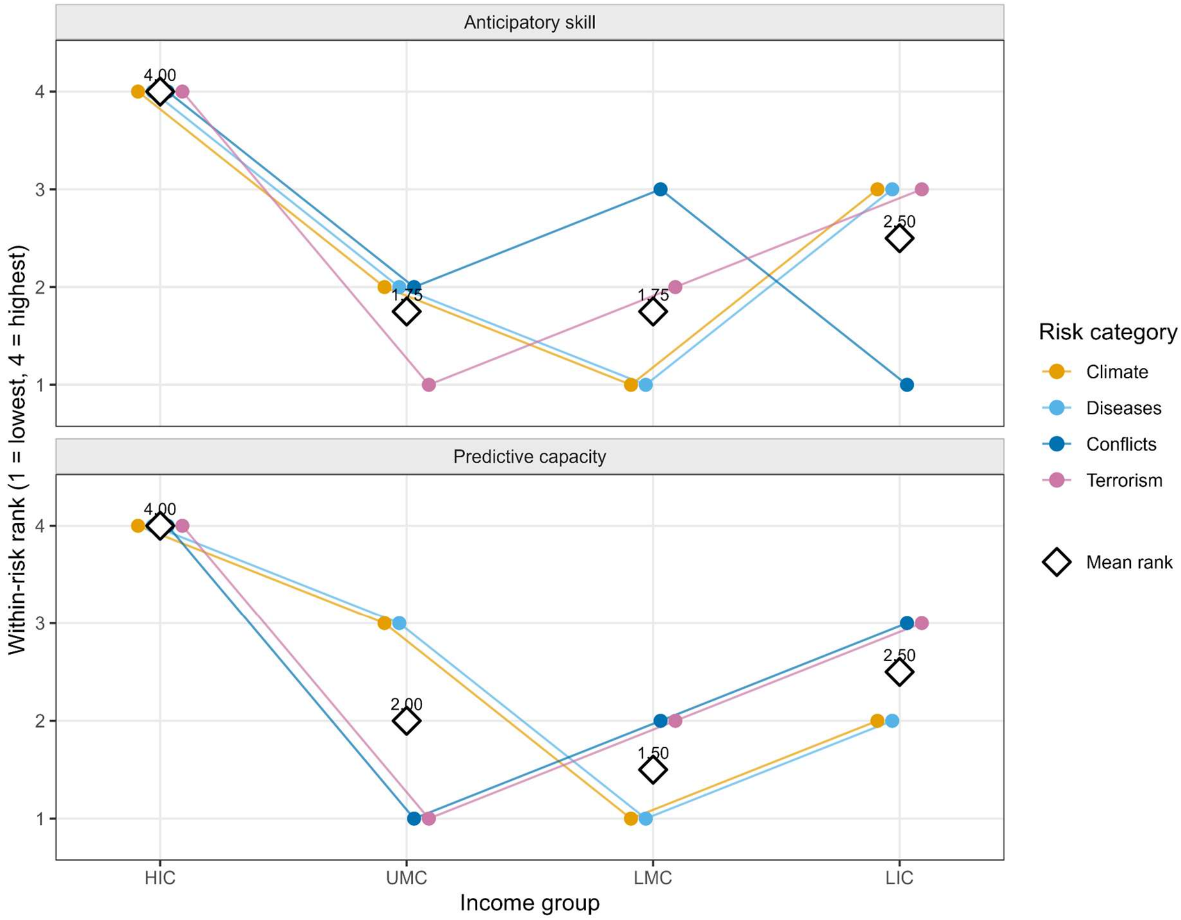


Figure S10 | Observed predictive-capacity and anticipatory-skill metrics with 95% coefficient-draw intervals.



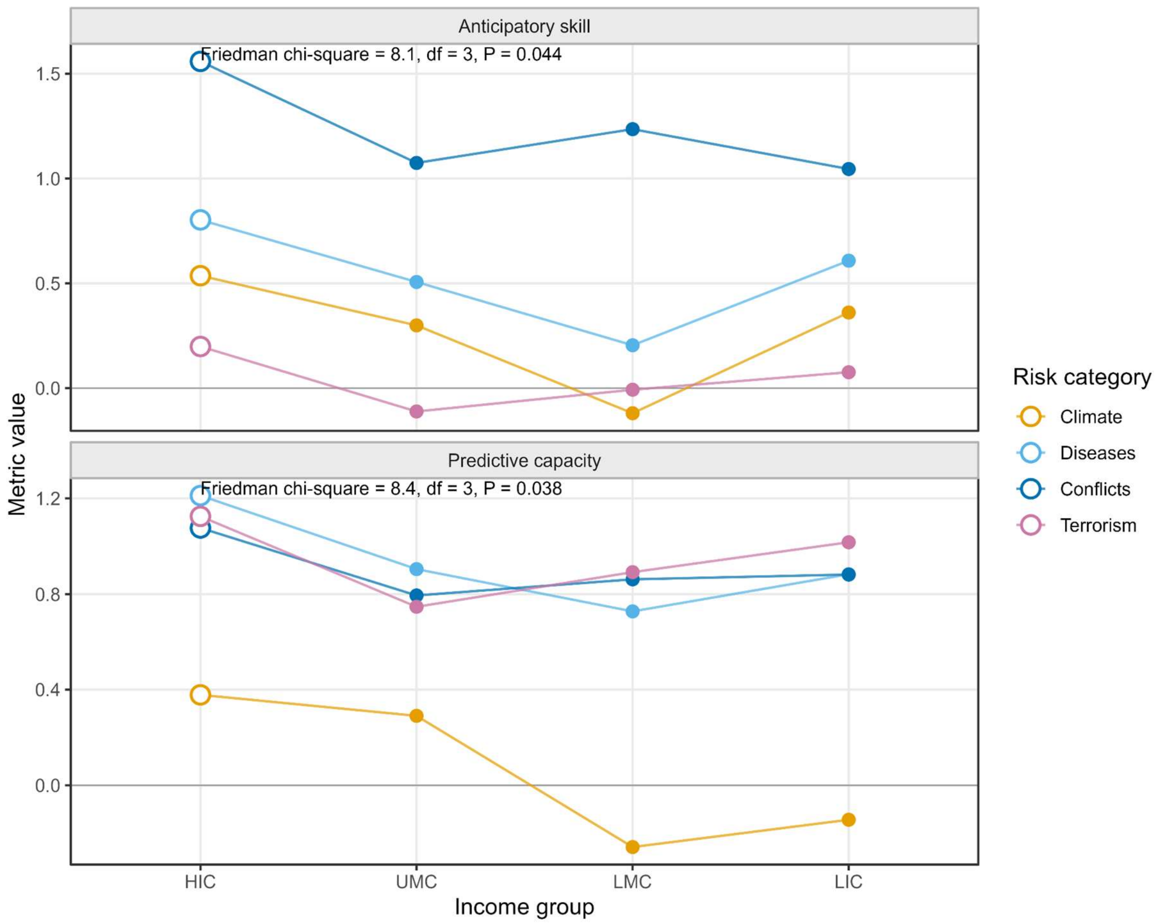
1244

1245 **Figure S11** | Observed predictive-capacity and anticipatory-skill metrics against 95% Monte Carlo null intervals.



1246

1247 **Figure S12** | Income-group ranks for risk categories with positive global predictive capacity.



1248

1249 **Figure S13** | Income-group differences in predictive capacity and anticipatory skill for risk categories
1250 with positive global predictive capacity.

E - Linguistic analysis.

Table S3 | Reports from international organizations that were selected for the linguistic analysis comparison with the GRRs. WMO = World Meteorological Organization: State of the Climate Reports; BIS = Bank for International Settlements: Annual Reports; IMF = International Monetary Fund: World Economic Outlooks; FAO = Food and Agriculture Organization: The State of Food Insecurity in the World Reports; UNWWDR = The United Nations World Water Development Reports; UN Technology = UN Conference on Trade and Development: Technology and Innovation Reports; WIPO = World Intellectual Property Organization Reports; UNHCR = The UN Refugee Agency Global Reports.

Year	WMO	BIS	IMF	FAO	UNWWDR	UN Technology	WIPO	UNHCR
2006	✓	✓	✓	✓	✓			
2007	✓	✓	✓	✓				
2008	✓	✓	✓	✓				
2009	✓	✓	✓	✓	✓			
2010	✓	✓	✓	✓		✓		
2011	✓	✓	✓	✓		✓	✓	
2012	✓	✓	✓	✓	✓	✓		
2013	✓	✓	✓	✓			✓	
2014	✓	✓	✓	✓	✓			
2015	✓	✓	✓	✓	✓	✓	✓	✓
2016	✓	✓	✓	✓	✓			✓
2017	✓	✓	✓	✓	✓		✓	✓
2018	✓	✓	✓	✓	✓	✓		✓
2019	✓	✓	✓	✓	✓		✓	✓
2020	✓	✓	✓	✓	✓			✓
2021	✓	✓	✓	✓	✓	✓		✓
2022	✓	✓	✓	✓	✓		✓	✓
2023	✓	✓	✓	✓	✓	✓		

Table S4 | List of "stop" words.

Stop words			
https	could	th	ai
www	figure	com	many
nd	next	st	rd
org	two	e	c
october	al	g	b
pdf	may	term	http
n	w	ts	h
l	r	p	section
sectio	f	n	source
ranking	bn		

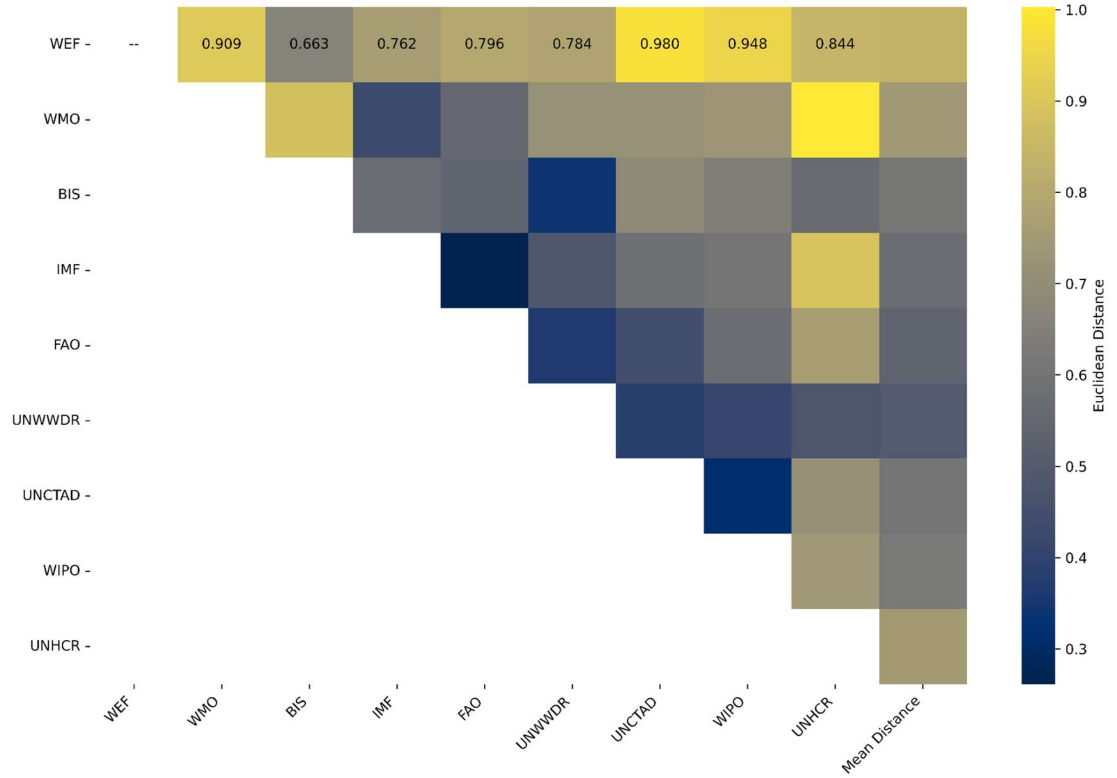


Figure S14 | Euclidean distances among reports from international organizations, assessed over six linguistic criteria.

F - Thematic analysis.

Table S5 | Sustainable Development Goals description.

Sustainable Development Goals (SDGs)	Description
1. No Poverty	End poverty in all its forms everywhere.
2. Zero Hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
3. Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages.
4. Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Gender Equality	Achieve gender equality and empower all women and girls.
6. Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all.
7. Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all.
8. Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
9. Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
10. Reduced Inequalities	Reduce inequality within and among countries.
11. Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable.
12. Responsible Consumption and Production	Ensure sustainable consumption and production patterns.
13. Climate Action	Take urgent action to combat climate change and its impacts.
14. Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.
15. Life on Land	Protect, restore, and promote sustainable use of terrestrial ecosystems, manage forests sustainably, combat desertification, halt and reverse land degradation, and halt biodiversity loss.
16. Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.
17. Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Table S6 | Anthropocene Traps description. Relying on Søgaard Jørgensen et al. (2023, 2026).

Category of trap	Anthropocene Traps (ATs)	Description
Gl - global traps	1. Simplification	Increasing specialization produces simplified sub-systems that are vulnerable to shocks
	2. Growth-for-growth	Institutional lock-ins drive pursuit of growth at the cost of well-being
	3. Overshoot	Continued material growth leads to overshoot of Earth system tipping points
	4. Division	Unstable selection for global human cooperation increases risk of international conflict
	5. Contagion	Global connectivity increases the risk of large-scale contagion, e.g. of infectious diseases
Te - technology traps	6. Infrastructure lock-in	Complex material infrastructure becomes maladaptive, e.g. owing to sunk costs
	7. Chemical pollution	Capacity to produce complex or persistent compounds that can cause long-term harm to humans and ecosystem
	8. Existential technology	Technological arms-races drive the evolution of existential technology, such as weapons of mass destruction
	9. Technological autonomy	Reliance on automation can backfire if systems become misaligned to human needs
	10. Dis- and mis-information	Digitalization can amplify spread of mis- and disinformation e.g. destabilizing democracies
Te - temporal trap	11. Short-termism	Favour of short-term over long-term benefits reinforces other traps and promotes conflic
Co - connectivity traps	12. Overconsumption	Separation of production and consumption facilitates overconsumption
	13. Biosphere disconnect	Separation of human settlements and ecosystems reduces awareness about their benefits
	14. Local social capital loss	Digitalization can lead to loss of local social capital through reduced interaction and echo chambers

Table S7 | Corporate Sustainability Spectrum description. Relying on Landrum & Ohsowski (2017).

Corporate Sustainability Spectrum (CSSs)	Description
1. Compliance	Focuses on meeting externally enforced regulations and compliance requirements with an internally firm-centric perspective.
2. Business-Centered	Prioritizes incremental improvements and business benefits, using eco-efficiency as a tool to "do less bad" while maintaining an anthropocentric view.
3. Systemic	Integrates economic, environmental, and social sustainability by fostering systemic change through collaboration and partnerships.
4. Regenerative	Seeks to repair damage caused by industrial practices by operating within planetary boundaries and prioritizing ecological science.
5. Coevolutionary	Promotes a symbiotic relationship between humans and nature, aiming for mutual flourishing without growth in production or consumption

Notes S2 | Methodological details for screening process.

We imported the .txt files of each GRR in the Orange Data Mining software. We obtained the list of the most frequently used words in each report along with their associated frequencies (or weights), enabling us to compare the most used words across years. We then perform a cleaning process to remove words without relevance or meaning on their own. For words appearing closely in the ranking due to their frequent co-occurrence we opted to retain only one word. For example, in the 2018 report, the terms "fake" and "news" were assigned weights of 34 and 66, respectively, we excluded the word "news" from classification, retaining only "fake" to ensure more accurate weighting and mitigate potential bias and prevent overemphasis on the "fake news" concept. We finally carried out a consistency check across all reports through a comparative analysis and elaboration of a justification list. It is worth noting that the years 2006, 2009, 2012, and 2015 were initially poorly processed by the software. We opted to copy the text from these PDFs, paste it into a Word document, and then reprocess it using the Orange Data Mining software. The results were significantly more conclusive and relevant after this second treatment.

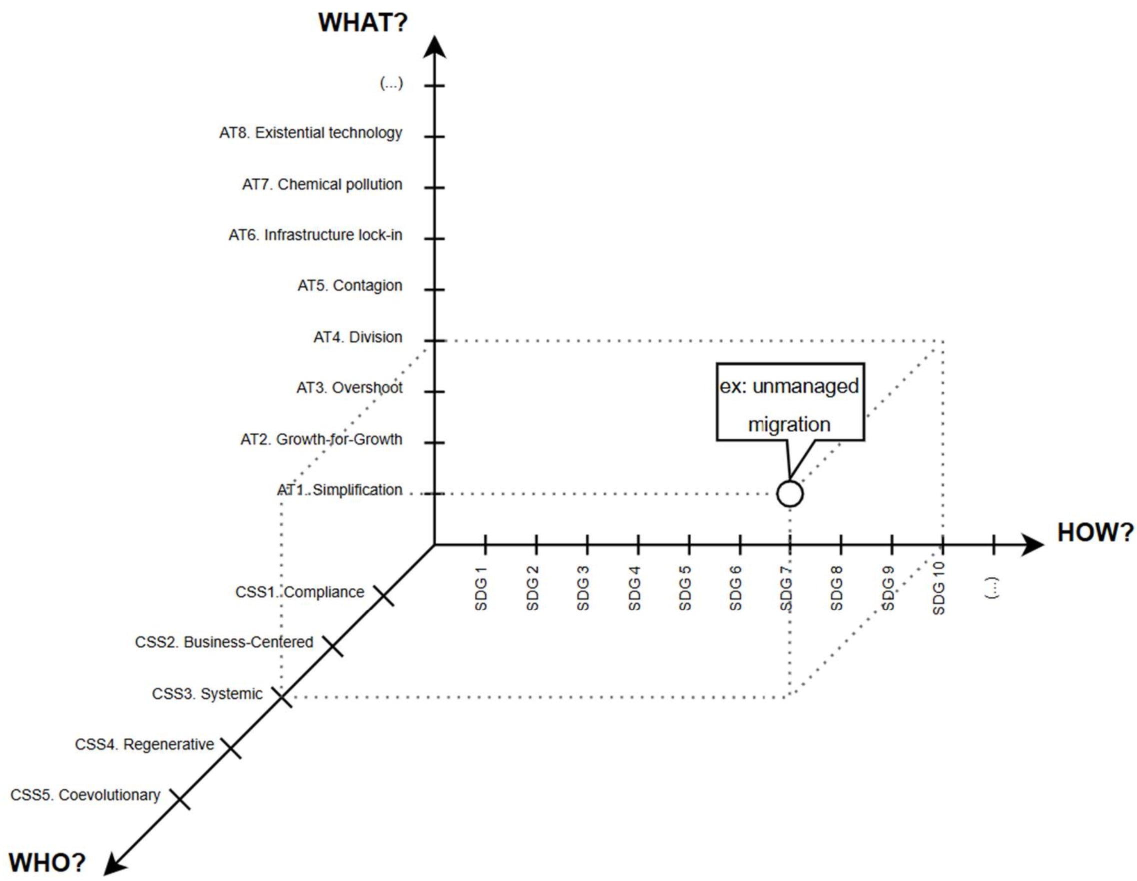
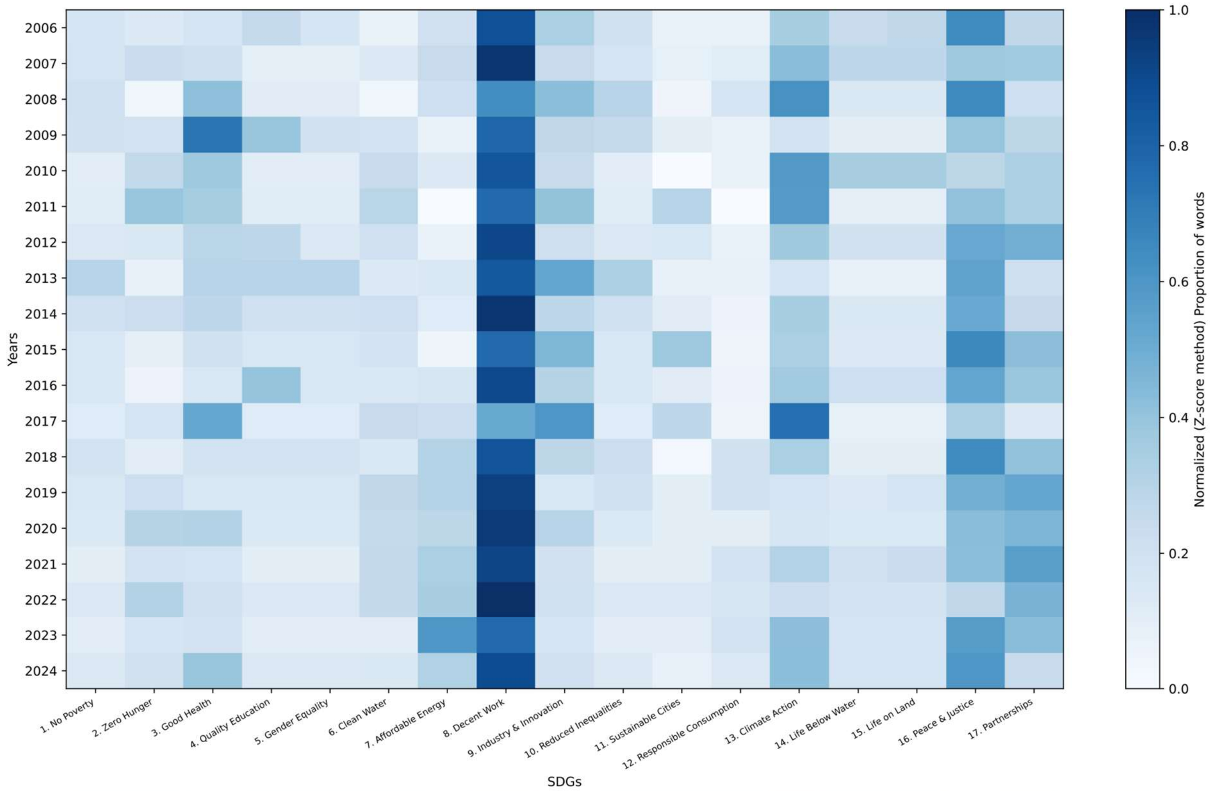


Figure S15 | Heuristic cube of thematic analysis. Source: own elaboration, inspired by Merino-Saum et al. (2018).



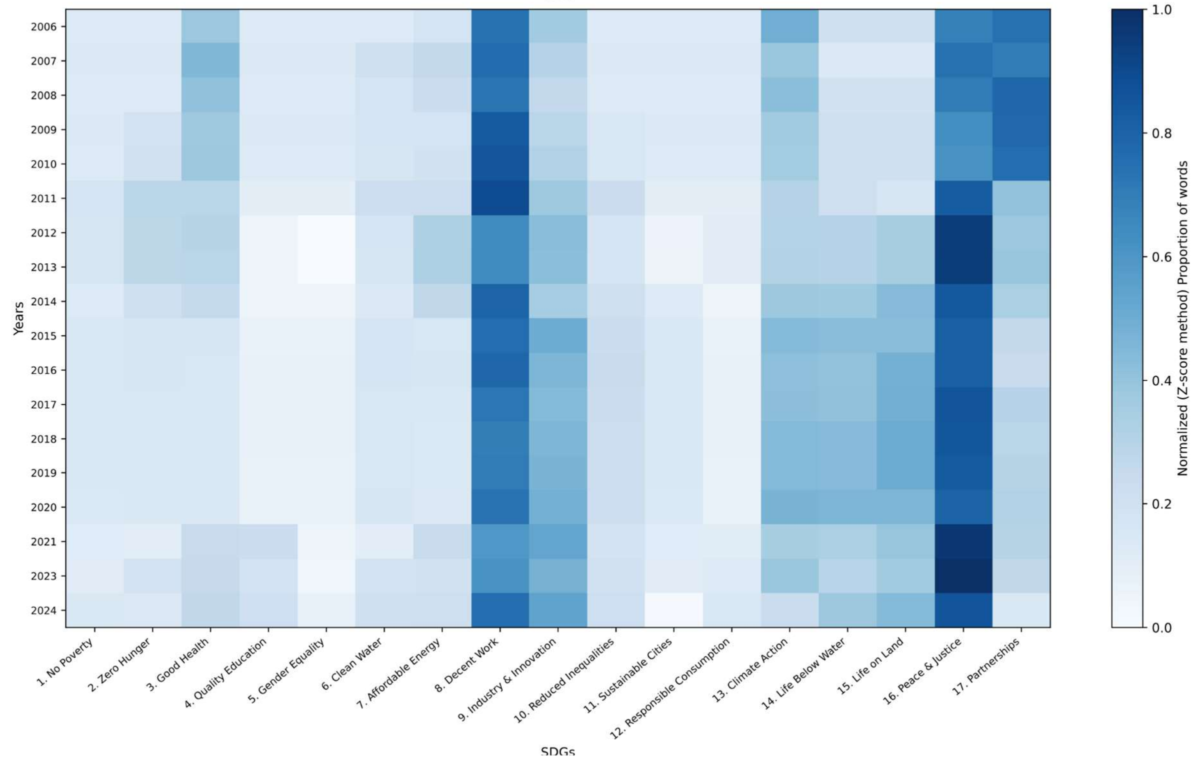


Figure S16 | Normalized proportion of screens screened against Sustainable Development Goals (SDGs) for words (top) and surveys (bottom).

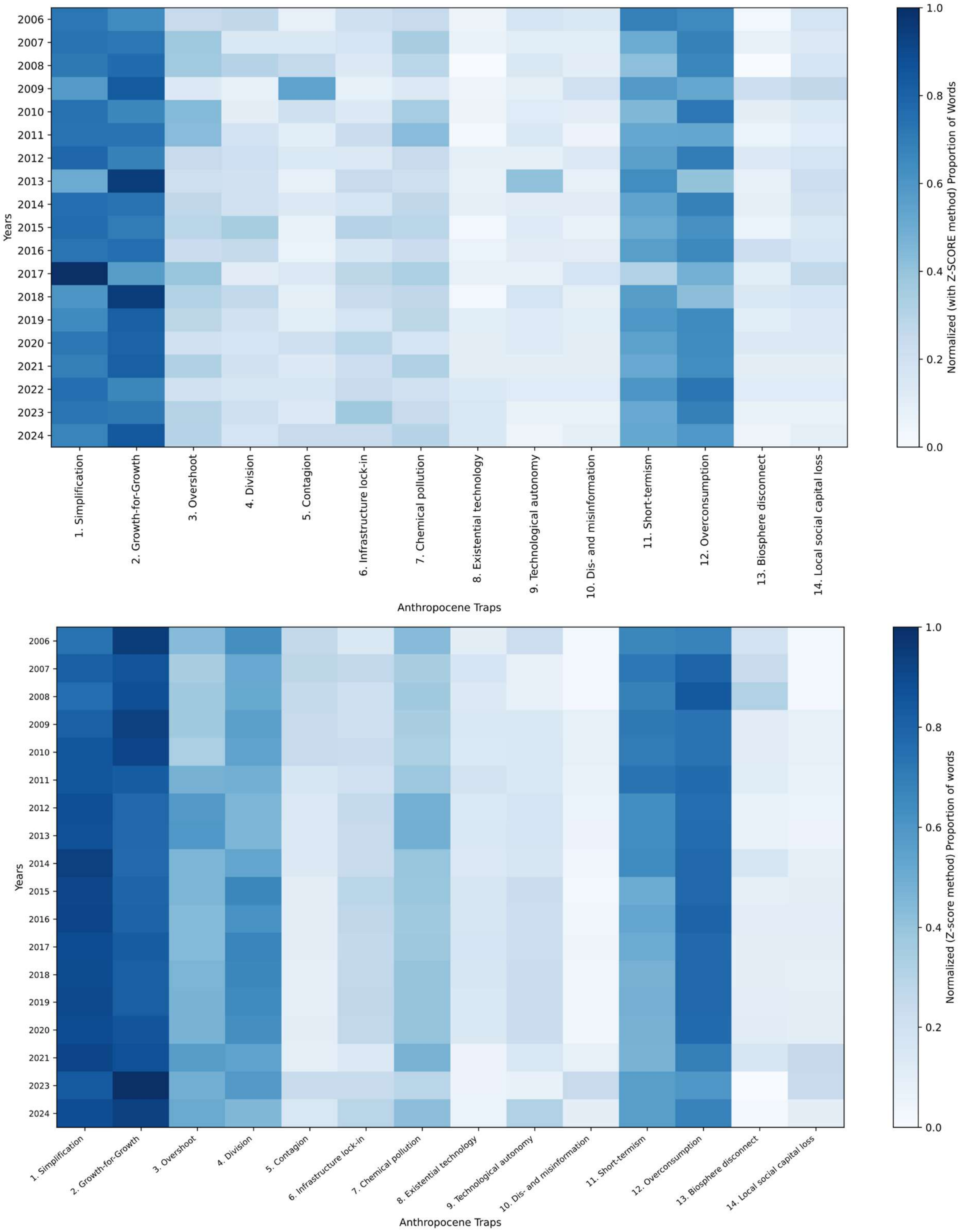


Figure S17 | Normalized proportion of words systematically screened against Anthropocene Traps for words (top) and surveys (bottom).

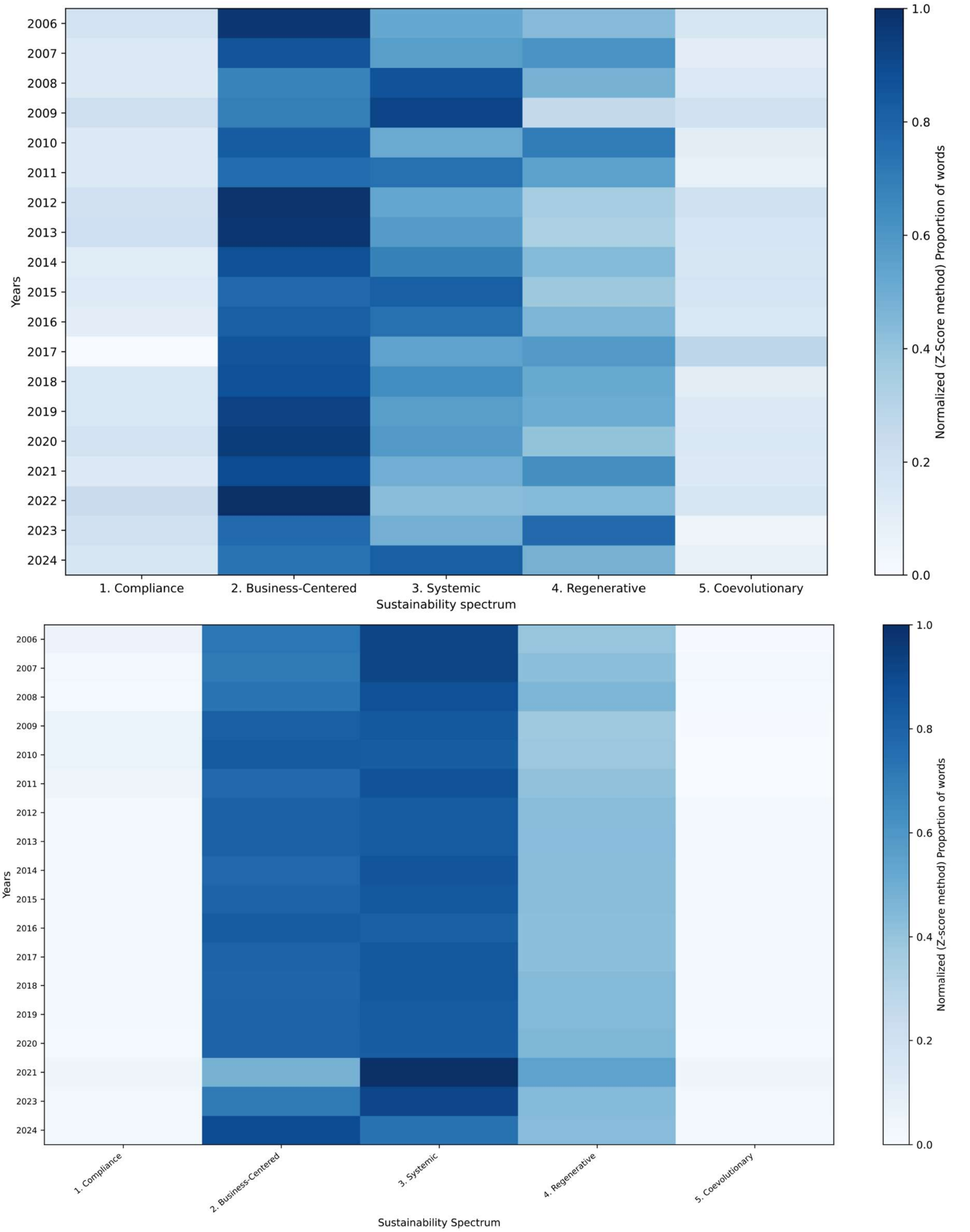
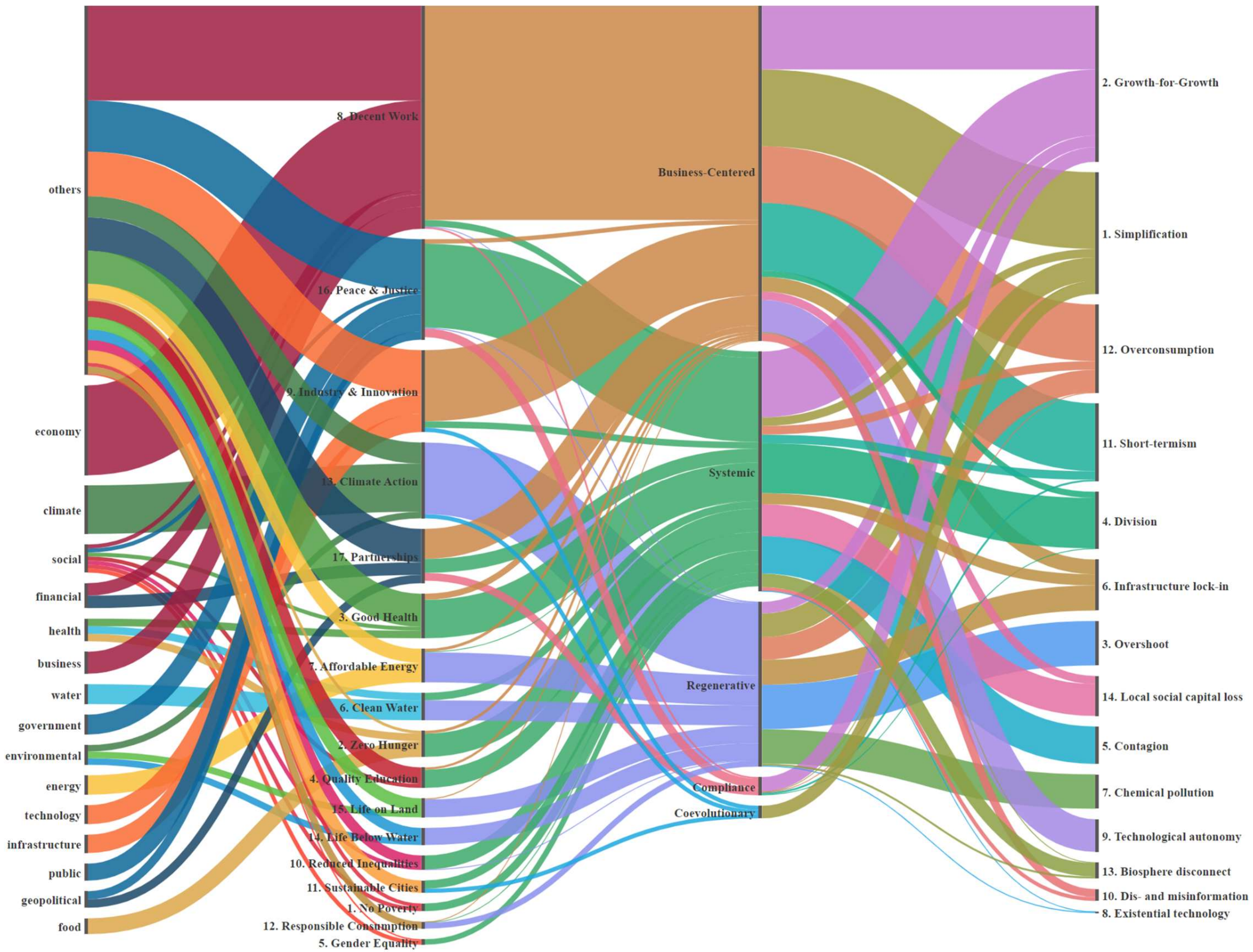


Figure S18 | Normalized proportion of words systematically screened against Corporate Sustainability Spectrums for words (top) and surveys (bottom).



1312

1313 **Figure S19** | Sankey diagram representing the interconnections between (left) words of the GRRs, and screens against (middle left) Sustainable Development
1314 Goals, (middle right) Corporate Sustainability Spectrums, (right) Anthropocene Traps.

G - Statistical significance tests.

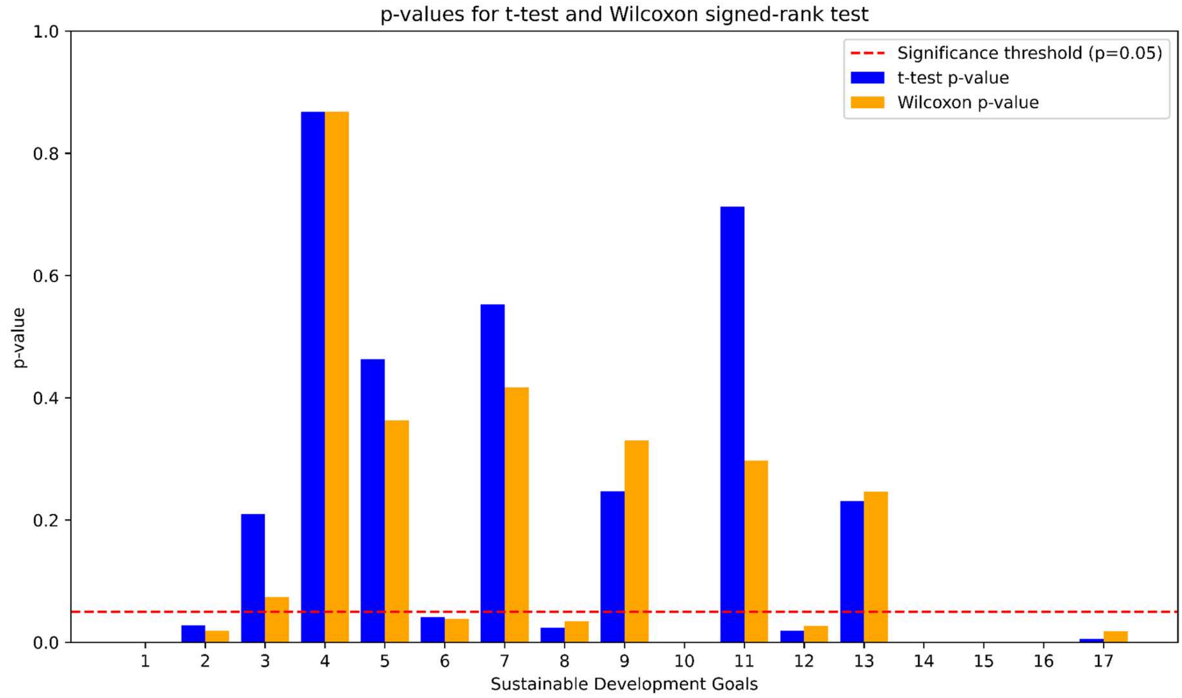


Figure S20 | P-values of t-test and Wilcoxon signed-rank test between survey and text-Based screens against Sustainable Development Goals.

Table S8 | P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Sustainable Development Goals. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.

Sustainable Development Goals	t-pvalue	Wilcoxon-pvalue	Interpretation
1	2.558297e-08	0.000008	Significant in both tests
2	2.796694e-02	0.018556	Significant in both tests
3	2.097044e-01	0.073685	No significant difference
4	8.681325e-01	0.868333	No significant difference
5	4.626984e-01	0.363101	No significant difference
6	4.148293e-02	0.038490	Significant in both tests
7	5.525635e-01	0.417114	No significant difference
8	2.389084e-02	0.034233	Significant in both tests
9	2.468350e-01	0.330536	No significant difference
10	1.789556e-05	0.000252	Significant in both tests
11	7.128115e-01	0.296995	No significant difference
12	1.855754e-02	0.026848	Significant in both tests
13	2.312315e-01	0.246208	No significant difference
14	9.733674e-07	0.000023	Significant in both tests
15	2.141602e-06	0.000023	Significant in both tests
16	5.263195e-07	0.000351	Significant in both tests

17	5.407244e-03	0.017857	Significant in both tests

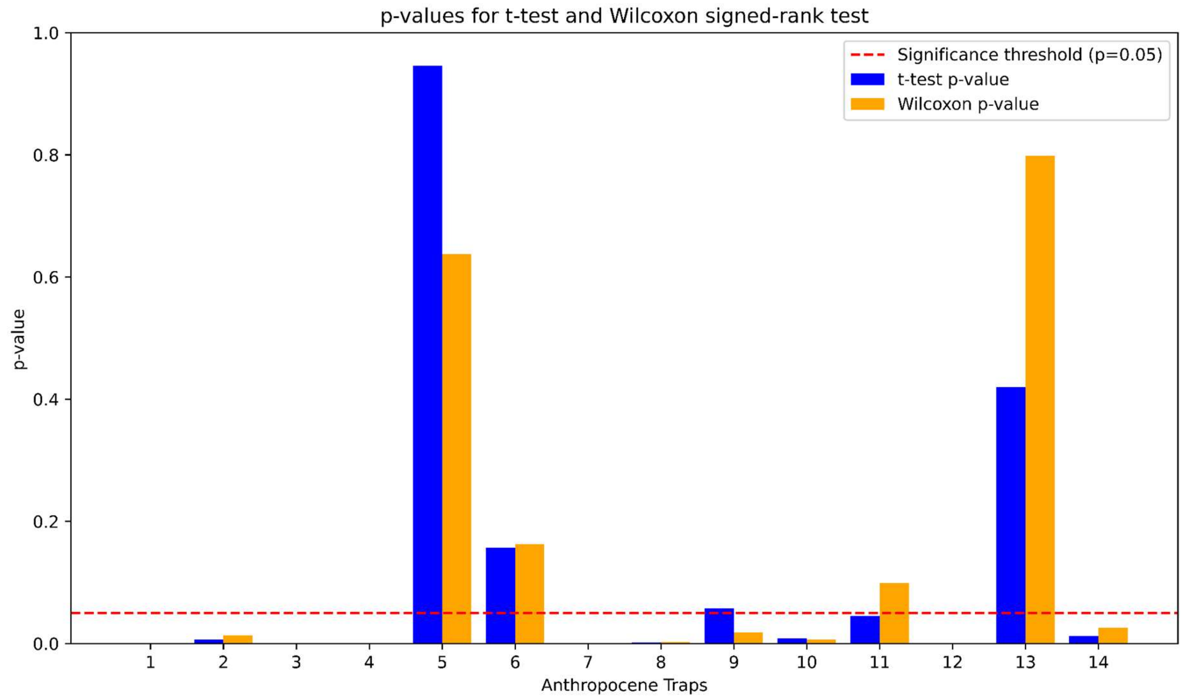


Figure S21 | P-values of t-test and Wilcoxon signed-rank test between survey and text-Based screens against Anthropocene Traps.

Table S9 | P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Anthropocene Traps. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.

Anthropocene Traps	t-pvalue	Wilcoxon-pvalue	Interpretation
1	2.047749e-05	0.000145	Significant in both tests
2	6.435382e-03	0.012921	Significant in both tests
3	4.063399e-05	0.000706	Significant in both tests
4	3.807430e-12	0.000008	Significant in both tests
5	9.462313e-01	0.637518	No significant difference
6	1.564924e-01	0.162336	No significant difference
7	3.437256e-05	0.000650	Significant in both tests
8	1.751242e-03	0.002335	Significant in both tests
9	5.755169e-02	0.018234	Significant in Wilcoxon only
10	8.455982e-03	0.006393	Significant in both tests
11	4.517324e-02	0.098740	Significant in t-test only
12	1.131957e-04	0.000145	Significant in both tests
13	4.198936e-01	0.798706	No significant difference
14	1.211354e-02	0.025775	Significant in both tests

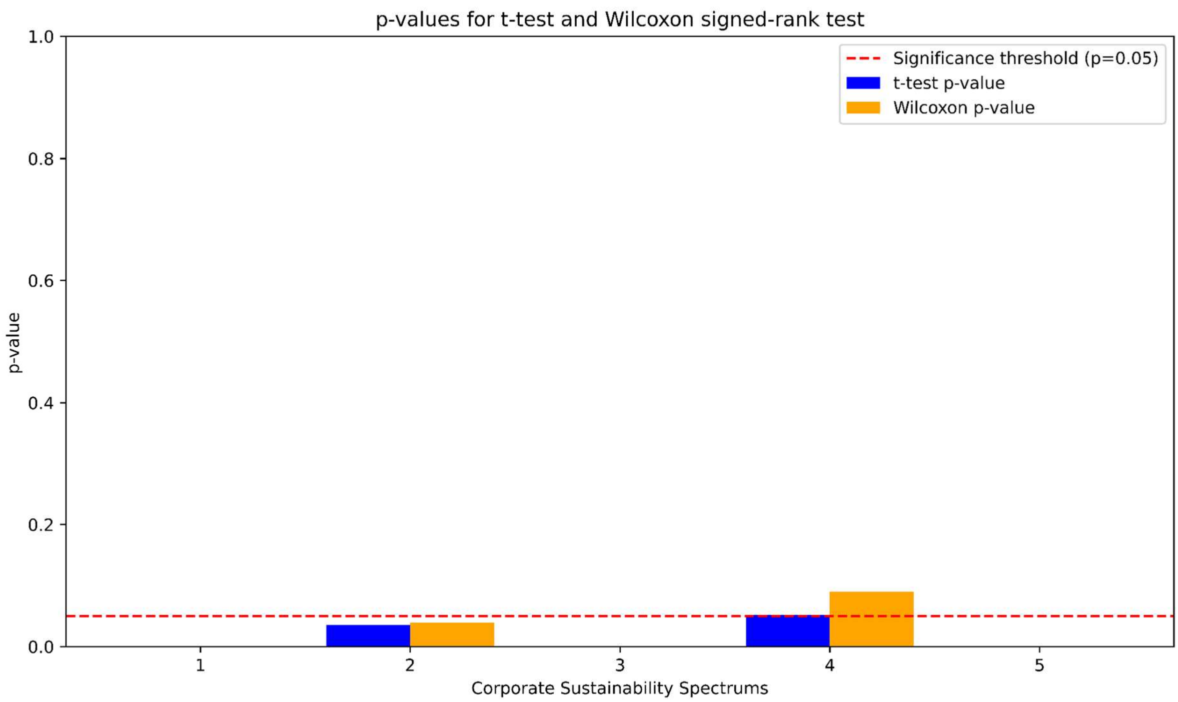


Figure S22 | P-values of t-test and Wilcoxon signed-rank test between survey and text-Based screens against Corporate Sustainability Spectrums.

Table S10 | P-values of t-test and Wilcoxon signed-rank test between survey and text-based screens against Corporate Sustainability Spectrums. Differences between survey and text-based screens are considered statistically significant if p-values are below 0.05.

Corporate Sustainability Spectrums	t-pvalue	Wilcoxon-pvalue	Interpretation
1	2.830489e-08	0.000015	Significant in both tests
2	3.557458e-02	0.039447	Significant in both tests
3	5.747100e-05	0.000252	Significant in both tests
4	5.203275e-02	0.089767	No significant difference
5	2.315405e-08	0.000008	Significant in both tests

H - Evolution of the screening proportions per year.

Table S11 | Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Sustainable Development Goals.

SDG	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2023	2024
1	0,04	0,05	0,04	0,05	0,08	0,15	0,09	0,04	0,03	0,09	0,08	0,11	0,06	0,07	0,06	0,06	0,04	0,07
2	0,04	0,05	0,09	0,08	0,00	0,04	0,12	0,20	0,00	0,07	0,11	0,08	0,08	0,06	0,06	0,02	0,09	0,03
3	0,30	0,33	0,02	0,31	0,16	0,12	0,10	0,17	0,13	0,04	0,08	0,38	0,06	0,07	0,07	0,12	0,08	0,05
4	0,02	0,09	0,10	0,22	0,08	0,08	0,15	0,07	0,05	0,01	0,30	0,04	0,01	0,00	0,01	0,17	0,11	0,14
5	0,04	0,09	0,10	0,05	0,08	0,08	0,07	0,12	0,05	0,01	0,01	0,05	0,01	0,00	0,01	0,01	0,03	0,00
6	0,06	0,08	0,15	0,06	0,01	0,02	0,00	0,02	0,07	0,05	0,01	0,03	0,02	0,12	0,03	0,13	0,11	0,12
7	0,02	0,05	0,08	0,13	0,06	0,22	0,27	0,17	0,13	0,12	0,02	0,03	0,08	0,13	0,13	0,08	0,37	0,03
8	0,13	0,19	0,04	0,07	0,03	0,28	0,31	0,19	0,18	0,01	0,10	0,21	0,13	0,22	0,23	0,35	0,17	0,09
9	0,00	0,02	0,15	0,01	0,03	0,16	0,25	0,25	0,06	0,00	0,14	0,07	0,13	0,36	0,20	0,35	0,39	0,37
10	0,00	0,05	0,09	0,01	0,10	0,21	0,10	0,00	0,12	0,18	0,18	0,20	0,15	0,08	0,15	0,13	0,13	0,14
11	0,06	0,07	0,09	0,06	0,09	0,19	0,04	0,03	0,03	0,26	0,07	0,00	0,10	0,08	0,07	0,06	0,04	0,05
12	0,06	0,03	0,04	0,07	0,07	0,10	0,05	0,03	0,02	0,03	0,03	0,04	0,07	0,06	0,00	0,00	0,02	0,06
13	0,22	0,01	0,06	0,20	0,18	0,27	0,04	0,12	0,08	0,17	0,16	0,26	0,12	0,30	0,32	0,10	0,05	0,17
14	0,07	0,02	0,12	0,14	0,00	0,15	0,19	0,22	0,27	0,36	0,29	0,36	0,35	0,36	0,36	0,24	0,19	0,28
15	0,05	0,02	0,12	0,14	0,00	0,10	0,24	0,27	0,33	0,36	0,37	0,44	0,42	0,39	0,36	0,25	0,26	0,34
16	0,10	0,43	0,12	0,34	0,43	0,40	0,55	0,60	0,44	0,27	0,34	0,55	0,24	0,39	0,45	0,61	0,49	0,29
17	0,53	0,44	0,62	0,58	0,52	0,18	0,02	0,23	0,15	0,01	0,02	0,19	0,01	0,06	0,01	0,06	0,00	0,02

Table S12 | Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Anthropocene traps.

ATs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2023	2024
1	0,01	0,08	0,05	0,23	0,11	0,11	0,10	0,37	0,18	0,14	0,18	0,11	0,29	0,25	0,17	0,23	0,11	0,22
2	0,30	0,14	0,11	0,10	0,25	0,09	0,10	0,17	0,03	0,08	0,04	0,26	0,14	0,01	0,06	0,06	0,29	0,09
3	0,19	0,03	0,00	0,24	0,10	0,04	0,33	0,38	0,19	0,17	0,21	0,05	0,15	0,19	0,27	0,25	0,19	0,21
4	0,36	0,37	0,22	0,47	0,44	0,31	0,25	0,26	0,34	0,31	0,37	0,56	0,40	0,46	0,46	0,35	0,38	0,27
5	0,18	0,14	0,00	0,30	0,04	0,05	0,00	0,05	0,00	0,03	0,03	0,04	0,00	0,01	0,11	0,04	0,11	0,09
6	0,06	0,09	0,08	0,12	0,11	0,03	0,13	0,00	0,07	0,02	0,10	0,02	0,02	0,09	0,02	0,09	0,13	0,04
7	0,19	0,00	0,08	0,22	0,02	0,05	0,24	0,28	0,13	0,10	0,14	0,04	0,13	0,12	0,23	0,15	0,05	0,12
8	0,04	0,10	0,13	0,09	0,09	0,16	0,04	0,07	0,05	0,13	0,10	0,09	0,13	0,04	0,04	0,04	0,09	0,08
9	0,06	0,03	0,07	0,05	0,03	0,00	0,08	0,24	0,04	0,11	0,11	0,15	0,05	0,11	0,10	0,06	0,01	0,27
10	0,13	0,08	0,08	0,11	0,02	0,01	0,08	0,02	0,08	0,04	0,07	0,14	0,05	0,07	0,06	0,01	0,17	0,01
11	0,02	0,22	0,26	0,12	0,25	0,21	0,08	0,01	0,11	0,01	0,03	0,19	0,09	0,11	0,08	0,04	0,05	0,04
12	0,02	0,12	0,17	0,21	0,01	0,24	0,06	0,36	0,10	0,16	0,14	0,29	0,36	0,13	0,13	0,05	0,09	0,08
13	0,16	0,16	0,32	0,11	0,01	0,06	0,06	0,01	0,07	0,03	0,12	0,01	0,04	0,00	0,02	0,06	0,07	0,03
14	0,16	0,11	0,14	0,19	0,05	0,05	0,12	0,16	0,10	0,05	0,07	0,17	0,07	0,04	0,03	0,16	0,17	0,01

Table S13 | Evolution of the difference (absolute values of normalized screenings) between the surveys and the text, for the Corporate Sustainability Spectrums.

CSS	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2023	2024
1	0,13	0,10	0,11	0,15	0,07	0,08	0,18	0,20	0,09	0,10	0,08	0,02	0,14	0,14	0,17	0,09	0,18	0,14
2	0,25	0,15	0,06	0,13	0,01	0,01	0,18	0,16	0,10	0,02	0,01	0,07	0,09	0,13	0,15	0,41	0,06	0,16
3	0,39	0,35	0,01	0,07	0,32	0,12	0,30	0,25	0,18	0,02	0,07	0,30	0,21	0,27	0,24	0,50	0,43	0,08
4	0,04	0,19	0,02	0,12	0,32	0,14	0,07	0,09	0,01	0,05	0,04	0,16	0,07	0,06	0,05	0,08	0,33	0,05
5	0,15	0,08	0,11	0,19	0,10	0,09	0,18	0,15	0,14	0,15	0,13	0,25	0,08	0,11	0,13	0,09	0,02	0,06

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