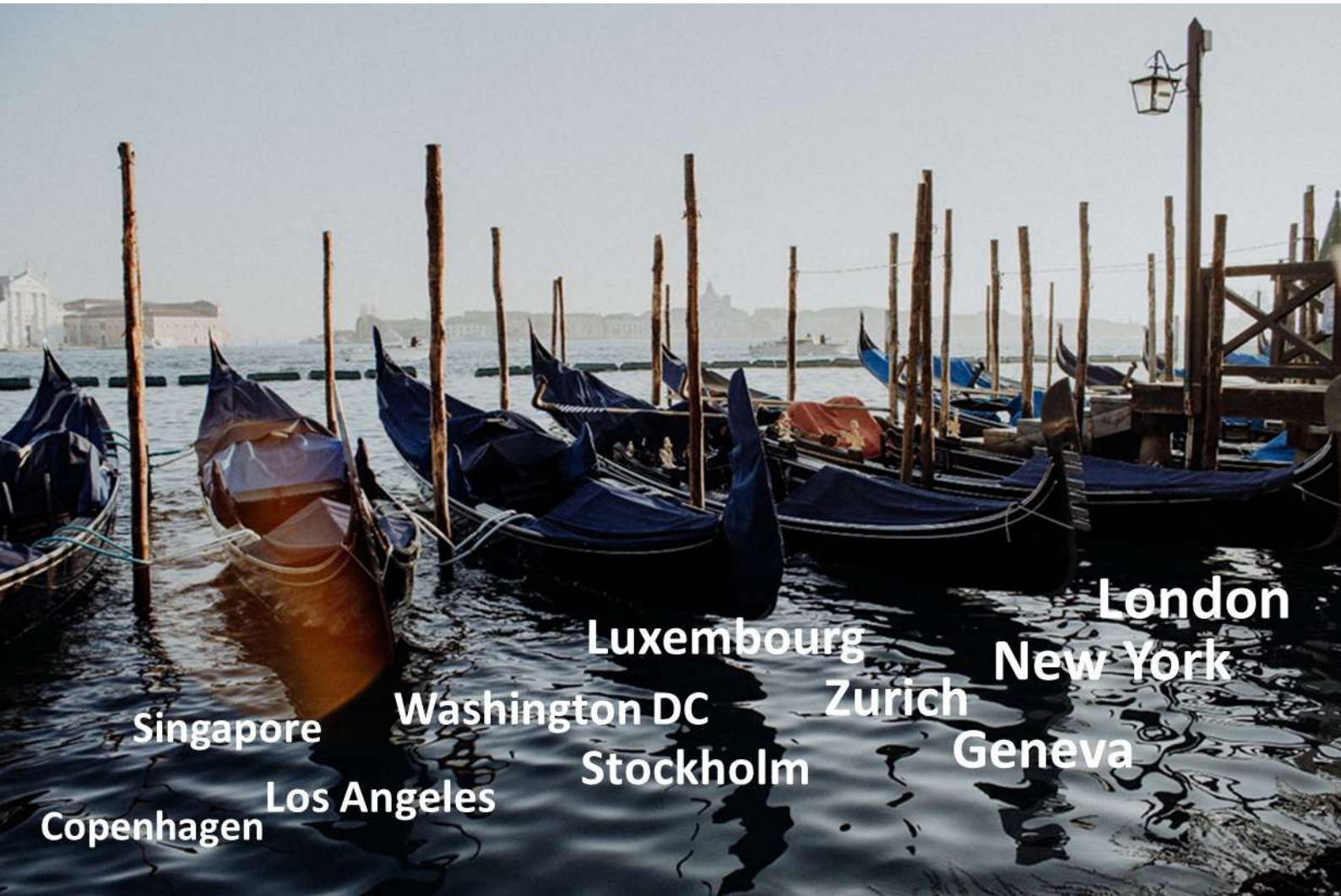


The Global Green Finance Index 12



Copenhagen
Singapore
Los Angeles
Washington DC
Stockholm
Luxembourg
Zurich
London
New York
Geneva

October 2023



Sustainable Futures





Beginning in March 2018, as part of its Long Finance initiative, Z/Yen published the first five editions of the Global Green Finance Index with the generous support of the MAVA Foundation, and more recently with support from Abu Dhabi Global Market. Z/Yen continues this work and is pleased to present the twelfth edition of the Global Green Finance Index (GGFI 12).

Z/Yen helps organisations make better choices - our clients consider us a commercial think-tank that spots, solves, and acts. Our name combines Zen and Yen - 'a philosophical desire to succeed' - in a ratio, recognising that all decisions are trade-offs. One of Z/Yen's specialisms is the development and publication of research combining factor analysis and professional assessments.

Long Finance is a Z/Yen initiative designed to address the question "**When would we know our financial system is working?**" This question underlies Long Finance's goal to improve society's understanding and use of finance over the long-term. In contrast to the short-termism that defines today's economic views the Long Finance time-frame is roughly 100 years.

The authors of this report, Mike Wardle, Simon Mills, and Professor Michael Mainelli, would like to thank Bikash Kharel, Sasha Davis, Charlotte Dawber-Ashley and the rest of the Z/Yen team for their contributions with research, modelling, and ideas.



Foreword

In the ongoing quest to address the most pressing global challenges of our time – from climate change to the alarming decline of biodiversity – sustainable finance has emerged as a beacon of hope. As we embark on the journey into the 12th edition of the Global Green Finance Index (GGFI 12), it is with great pride that Finance Montréal contributes to this critical discussion.

GGFI 12 is more than just an index; it is a testament to the unwavering commitment of financial centres worldwide to drive positive change.

In a world of growing environmental challenges, financial centres such as Montréal stand out as drivers of progress. They are committed not only to providing sustainable economic development, but also to building robust green infrastructure, fostering the growth of sustainable finance, and nurturing a skilled workforce. The collective determination of these centres sends a resounding message: the future of finance is inherently intertwined with the future of our planet.

We are pleased to highlight the remarkable performance of Montreal in GGFI 12. Montreal has advanced nine ranking places to secure the 12th position globally. This achievement demonstrates our city's dedication to the principles of sustainable finance. It showcases our collective endeavour to harness the power of finance to address climate change, biodiversity loss, and other critical global challenges.

Montreal's strength in sustainable finance reflects the values and vision that our financial community embodies, as well as the high priority it gives to investments aligned with sustainability goals. Montreal is not merely a financial centre; it is a hub for transformative change.

Finance Montréal is deeply honoured to be entrusted with the task of writing this important foreword. We believe that the financial industry, as a key catalyst for change, can lead the way in addressing environmental and social challenges. Our role in shaping the future of global finance is a responsibility we embrace with enthusiasm.

We hope that this report serves as a source of inspiration and a roadmap for policy and investment decision-makers. We aspire to provide impulse to a transformative movement in the world of finance; one that is dedicated to building a more sustainable, equitable, and prosperous future for all.

Jacques Deforges
CEO
Finance Montréal



Summary

Overview

This is the twelfth edition of the Global Green Finance Index (GGFI 12). The GGFI is a factor assessment index, based on a range of instrumental factors - quantitative measures - and a worldwide survey of finance professionals' assessments on the quality and depth of green finance offerings in financial centres.

The centres which perform well in the GGFI are generally places that commit to environmental improvements across the economy as well as directly in finance. Centres such as London, New York, and Geneva have a commitment to providing sustainable economic development and to building their skill base and green infrastructure.

Among those responding to the GGFI survey, Energy Efficient Investment, Sustainable Infrastructure Finance, and Environment, Social, And Governance (ESG) Analytics, and Disinvestment From Fossil Fuels are rated as the areas of green finance with the most impact. Carbon markets are also mentioned by a large number of respondents. This focus on energy and infrastructure, underpinned by ESG and carbon trading shows the need for the financial world to take action in these areas.

Policy & Regulatory Frameworks continue to be identified as the leading driver in the development of green finance, alongside International Initiatives. In the lead up to COP 28 in Dubai, this continues to highlight the importance of transnational cooperation and policy to set the framework for green finance to thrive.

In the supplement to this edition of the GGFI, we focus on space, and the issue of managing space debris to continue to focus space technology in addressing the UN Sustainable Development Goals (SDGs), with one estimate suggesting that almost 40% of the targets that support the 17 SDGs are directly taking advantage of monitoring systems using geo-location and earth observation satellites.

Index Results

- London retained its first position in the index, with New York retaining second place.
- Geneva took third place, and Zurich and Singapore moved into the top 10, replacing Amsterdam and San Francisco.
- Western European centres take six of the top 10 places, with US centres taking three. Singapore enters the top 10 - the only Asia/Pacific centre in this leading group.
- The margins separating centres at the top of the index continue to narrow in GGFI 12. Among the top 10 centres the spread of ratings is 20 out of 1,000, compared to 31 out of 1,000 in GGFI 11.
- Following a large increase in GGFI 11, the average rating for centres rose just 1.28%, with 22 centres falling in the ratings. 13 centres fell 10 or more places in the rankings.
- We researched 126 financial centres for GGFI 12. The number of centres in the index has increased to 94 (86 in GGFI 11), with the addition of San Diego, Atlanta, Philadelphia, Miami, Manila, Cyprus, Monaco, and the Bahamas.

Western Europe

- Six Western European centres feature in the top 10 in GGFI 12.
- Zurich, Frankfurt, Hamburg, and Jersey gained seven or more rank places.
- Monaco joins the index for the first time.

North America

- New York maintained its second place overall, with Washington DC and Los Angeles also in the world top 10.
- Three of the four Canadian centres in GGFI 12 improved their rankings for the second edition in a row, with Montreal up 9 rank places to 12th.
- San Diego, Atlanta, Philadelphia, and Miami feature in the GGFI for the first time.

Asia/Pacific

- Singapore rose two rank places to enter the world top 10 and leads the region, ahead of Sydney, Melbourne, and Seoul.
- Five Asia/Pacific centres feature in the top 20 across the world.
- Manila has its first ranking in the GGFI.

Middle East & Africa

- The leading centres in the region fell back a little in the rankings, with Dubai the regional leader, followed by Abu Dhabi.
- Casablanca held on to third place in the region and remained the leading GGFI centre in Africa, while Tel Aviv moved up 14 places, sitting in fourth position in the region.

Latin America & The Caribbean

- Santiago overtook Rio de Janeiro to take first place in the Latin America & The Caribbean region.
- All centres in the region improved their ratings.
- Bahamas entered the index for the first time.

Eastern Europe & Central Asia

- Astana has a clear lead in the Eastern Europe & Central Asia region, ranking 22 places above Istanbul in second place in the region.
- All centres in the region other than Moscow improved their green finance rating in GGFI 12.
- Cyprus is a new entrant to the GGFI from the region.

GGFI 12

GGFI 12 was compiled using 130 instrumental factors. These quantitative measures are provided by third parties including the World Bank, The Economist Intelligence Unit, the OECD, and the United Nations. Details can be found in Appendix 5.

The instrumental factors were combined with 5,224 financial centre assessments provided by respondents to the [GGFI online questionnaire](#). A breakdown of the 773 respondents is shown in Appendix 3. Further details of the methodology behind GGFI 12 are in Appendix 4.

The 94 centres listed in GGFI 12 are those which received a minimum of 25 assessments from survey respondents located outside of those centres. Assessments of respondents' home centres were excluded from the data, in order to avoid home centre bias.

GGFI 12 Ranks And Ratings

Table 1 | GGFI 12 Ranks And Ratings

Centre	GGFI 12		GGFI 11		Change In	
	Rank	Rating	Rank	Rating	Rank	Rating
London	1	631	1	642	0	▼11
New York	2	624	2	641	0	▼17
Geneva	3	623	4	620	▲1	▲3
Zurich	4	618	12	609	▲8	▲9
Luxembourg	5	616	5	616	0	0
Stockholm	6	615	3	621	▼3	▼6
Washington DC	7	614	9	612	▲2	▲2
Los Angeles	8	613	7	614	▼1	▼1
Singapore	9	612	11	610	▲2	▲2
Copenhagen	10	611	8	613	▼2	▼2
Amsterdam	11	610	6	615	▼5	▼5
Montreal	12	609	21	600	▲9	▲9
San Francisco	13	608	10	611	▼3	▼3
Sydney	14	607	13	608	▼1	▼1
Chicago	15	606	19	602	▲4	▲4
Melbourne	16	605	23	598	▲7	▲7
Oslo	17	604	16	605	▼1	▼1
Seoul	18	603	15	606	▼3	▼3
Edinburgh	19	602	14	607	▼5	▼5
Shanghai	20	601	20	601	0	0
San Diego	21	600	New	New	New	New
Toronto	22	599	28	583	▲6	▲16
Paris	23	598	17	604	▼6	▼6
Shenzhen	24	597	25	586	▲1	▲11
Madrid	25	596	30	581	▲5	▲15
Boston	26	595	29	582	▲3	▲13
Beijing	27	594	27	584	0	▲10
Busan	28	593	26	585	▼2	▲8
Frankfurt	29	592	36	575	▲7	▲17
Vancouver	30	591	34	577	▲4	▲14
Wellington	31	590	18	603	▼13	▼13
Munich	32	589	22	599	▼10	▼10
Dubai	33	588	32	579	▼1	▲9
Tokyo	34	587	31	580	▼3	▲7
Abu Dhabi	35	586	33	578	▼2	▲8
Hong Kong	36	585	37	574	▲1	▲11
Qingdao	37	584	35	576	▼2	▲8
Hamburg	38	583	45	566	▲7	▲17
Brussels	39	582	39	572	0	▲10
Casablanca	40	581	38	573	▼2	▲8
Osaka	41	580	42	569	▲1	▲11
Tel Aviv	42	579	56	550	▲14	▲29
Vienna	43	578	48	563	▲5	▲15
Jersey	44	577	53	553	▲9	▲24
Helsinki	45	576	24	597	▼21	▼21
Glasgow	46	575	46	565	0	▲10
Berlin	47	574	43	568	▼4	▲6

Table 1 (continued) | GGFI 12 Ranks And Ratings

Centre	GGFI 12		GGFI 11		Change In	
	Rank	Rating	Rank	Rating	Rank	Rating
Dublin	48	573	50	561	▲ 2	▲ 12
Milan	49	572	54	552	▲ 5	▲ 20
Atlanta	50	571	New	New	New	New
Lisbon	51	570	51	556	0	▲ 14
Calgary	52	569	40	571	▼ 12	▼ 2
Astana	53	568	52	554	▼ 1	▲ 14
GIFT City-Gujarat	54	567	41	570	▼ 13	▼ 3
Guangzhou	55	566	44	567	▼ 11	▼ 1
Rome	56	565	47	564	▼ 9	▲ 1
Isle of Man	57	564	57	549	0	▲ 15
Guernsey	58	563	49	562	▼ 9	▲ 1
Philadelphia	59	562	New	New	New	New
Miami	60	561	New	New	New	New
Jakarta	61	560	60	545	▼ 1	▲ 15
Kuala Lumpur	62	558	55	551	▼ 7	▲ 7
Johannesburg	63	553	62	538	▼ 1	▲ 15
Doha	64	552	66	527	▲ 2	▲ 25
Santiago	65	551	70	517	▲ 5	▲ 34
Rio de Janeiro	66	550	63	531	▼ 3	▲ 19
Cape Town	67	544	67	526	0	▲ 18
Mauritius	68	543	64	529	▼ 4	▲ 14
Sao Paulo	69	542	74	510	▲ 5	▲ 32
New Delhi	70	540	59	546	▼ 11	▼ 6
Mexico City	71	539	73	511	▲ 2	▲ 28
Mumbai	72	538	65	528	▼ 7	▲ 10
Bangkok	73	537	71	516	▼ 2	▲ 21
Manila	74	536	New	New	New	New
Istanbul	75	533	68	525	▼ 7	▲ 8
Riyadh	76	532	58	547	▼ 18	▼ 15
Warsaw	77	531	72	514	▼ 5	▲ 17
Cyprus	78	530	New	New	New	New
Liechtenstein	79	529	61	544	▼ 18	▼ 15
Prague	80	528	77	501	▼ 3	▲ 27
Riga	81	527	82	489	▲ 1	▲ 38
Malta	82	526	76	507	▼ 6	▲ 19
Monaco	83	523	New	New	New	New
Lagos	84	520	79	493	▼ 5	▲ 27
Kigali	85	516	80	491	▼ 5	▲ 25
Cayman Islands	86	515	85	482	▼ 1	▲ 33
Moscow	87	514	69	523	▼ 18	▼ 9
Bahrain	88	513	75	508	▼ 13	▲ 5
Nairobi	89	512	86	465	▼ 3	▲ 47
Almaty	90	511	81	490	▼ 9	▲ 21
British Virgin Islands	91	509	78	497	▼ 13	▲ 12
Sofia	92	505	84	485	▼ 8	▲ 20
Bahamas	93	503	New	New	New	New
Bermuda	94	499	83	488	▼ 11	▲ 11

GGFI Dimensions

The GGFI ascertains the green finance performance of international financial centres by asking practitioners to rate them on two dimensions:

- The depth to which green finance has penetrated the business of the financial centre, i.e. the prevalence of green financial services and products within the financial centre in question.
- The quality of the green finance products and services on offer.

The purpose of tracking both aspects is to enable respondents to rate a financial centre independently from its market volumes. For example, if a centre adopts weak green labelling standards in a bid to boost volumes, this may show up in the GGFI as a lower quality rating.

The additional data generated through this approach increases granularity. This allows the identification of trends and can assist policy makers to track the impacts of their decisions.

The detailed ratings of the dimensions for the top 15 centres are shown in table 2. Additional details are in Appendix 1.

Table 2 | Top 15 Centres - Rating Details For Depth And Quality Dimensions

GGFI 12 Rank	Centre	GGFI Dimensions			
		Green Finance Depth Rank	Green Finance Depth Rating	Green Finance Quality Rank	Green Finance Quality Rating
1	London	1	310	1	321
2	New York	2	309	4	315
3	Geneva	4	307	2	316
4	Zurich	11	302	2	316
5	Luxembourg	9	303	5	313
6	Stockholm	3	308	11	307
7	Washington DC	6	306	7	308
8	Los Angeles	4	307	14	306
9	Singapore	7	304	7	308
10	Copenhagen	7	304	11	307
11	Amsterdam	18	299	6	311
12	Montreal	9	303	14	306
13	San Francisco	14	301	11	307
14	Sydney	11	302	17	305
15	Chicago	23	298	7	308

Chart 1 shows the relationship between ratings of the depth and quality dimensions in the index and the generally close correlation between the assessments of each factor by respondents. Centres close to the trend line are balanced for depth and quality, centres further away have either a better rating for depth, or for quality. The relative score of Bahrain, Kigali, and Cyprus for green finance quality are highest compared with their scores in depth. On the other side of the line, Philadelphia, Calgary, and Berlin have high relative scores for depth.

Chart 1 | Relationship Between Ratings Of Depth And Quality

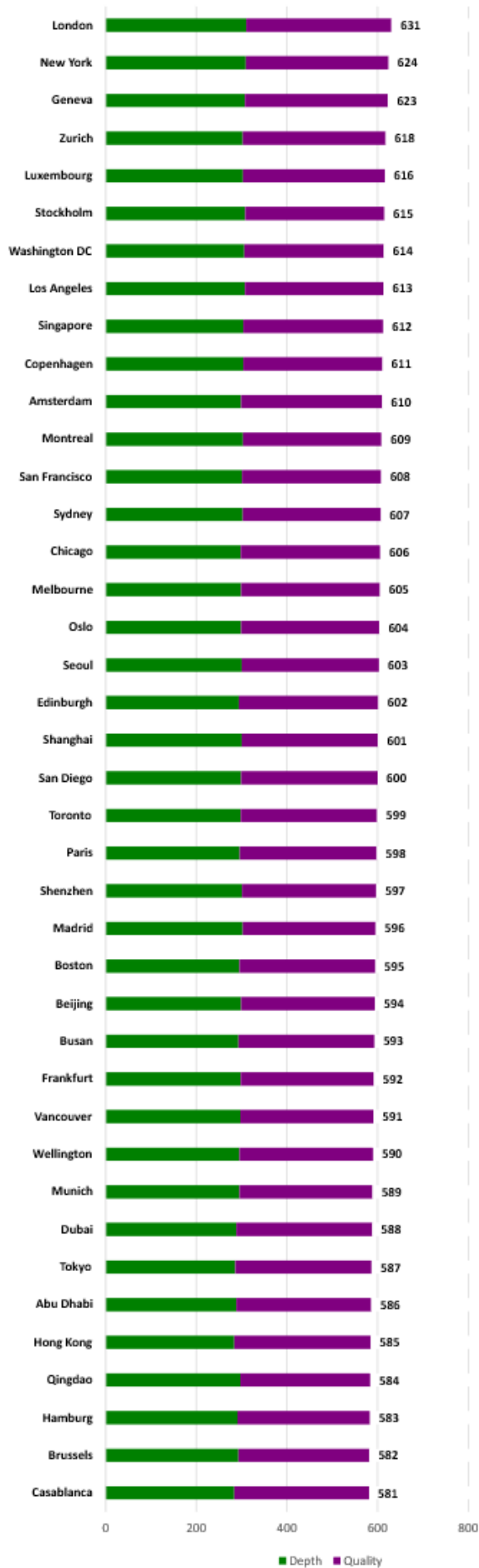


Chart 2 shows the contribution of each of the dimensions to the overall rating for the top 40 centres in the GGFI. London came first for both green finance quality and green finance depth but scores higher for quality. Successful financial centres focused on green finance need both quality and depth in their green markets to thrive.

“Country regulations, especially in Africa, fall behind the development of financial institutions. There needs to be stronger enabling legislation.”

PARTNER, INVREMENT FIRM, NEW YORK

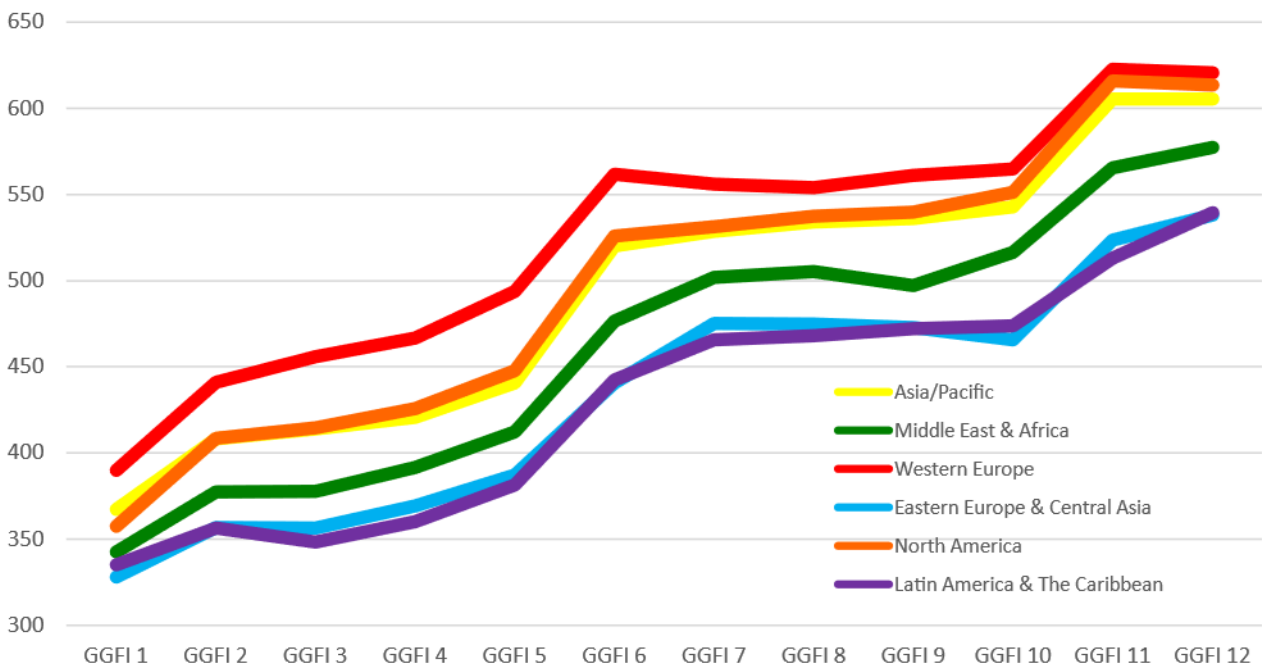
Chart 2 | The Contribution Of The Dimensions To The Overall Rating - GGFI 12 Top 40 Centres



Regional Performance

The average rating of the top five centres in Western Europe and North America fell slightly and was level in Asia/Pacific. The leading Latin America & The Caribbean centres overtook the leading Eastern European & Central Asia centres on this measure.

Chart 3 | Average Ratings Of The Top Five Centres In Each Region



“Mandatory disclosure based on TCFD and ISSB standards is essential. Governments should promote disclosure of Scope 1, 2, and 3 and emission reduction targets on companies and financial institutions, and encourage institutional investors to incorporate ESG factors in their asset investment and management.”

PROFESSOR, UNIVERSITY, TOKYO

Examination of the quality and depth dimensions demonstrates that on the depth ratings, the average rating for the top five centres in Western Europe, Asia/Pacific, and North America fell slightly. In the quality measure, all regions are improving. In the depth scores, the leading centres in Latin America & The Caribbean have overtaken the leading centres in Eastern Europe & Central Asia .

Chart 4 | Average Ratings For Depth Of The Top Five Centres In Each Region

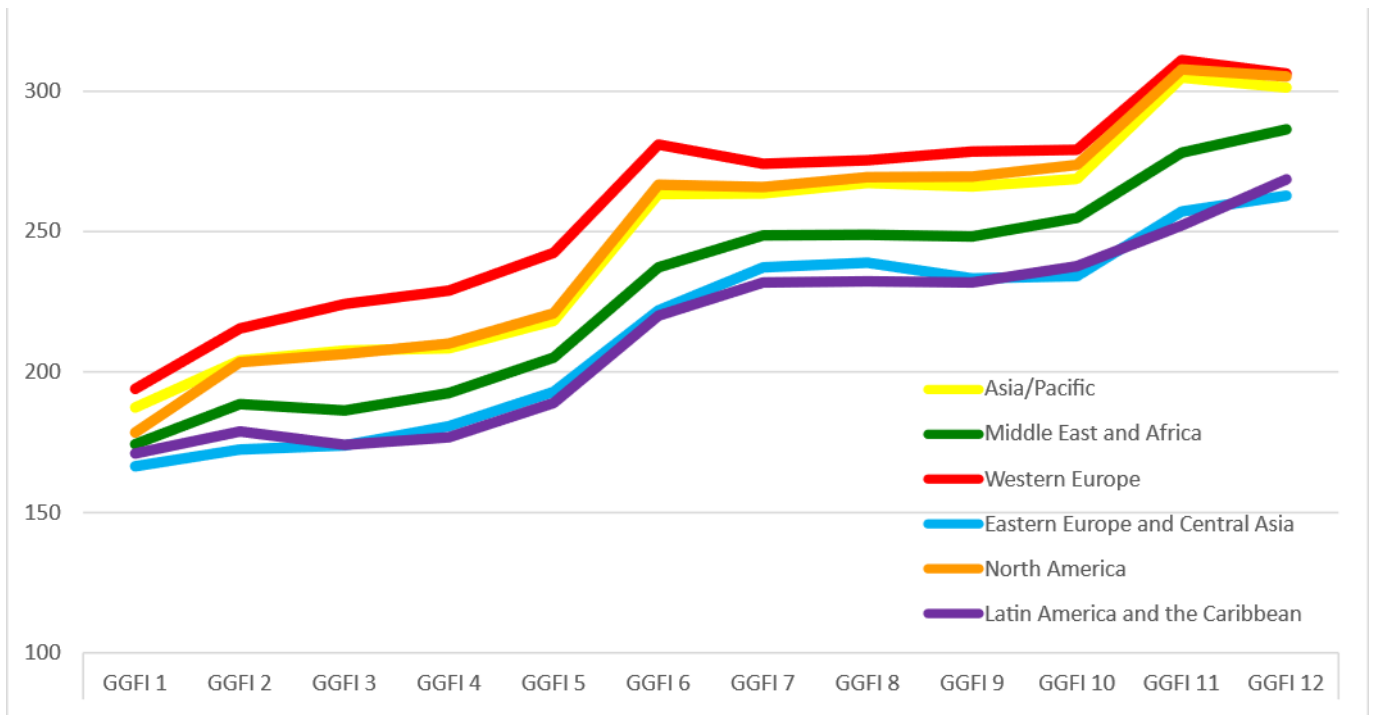
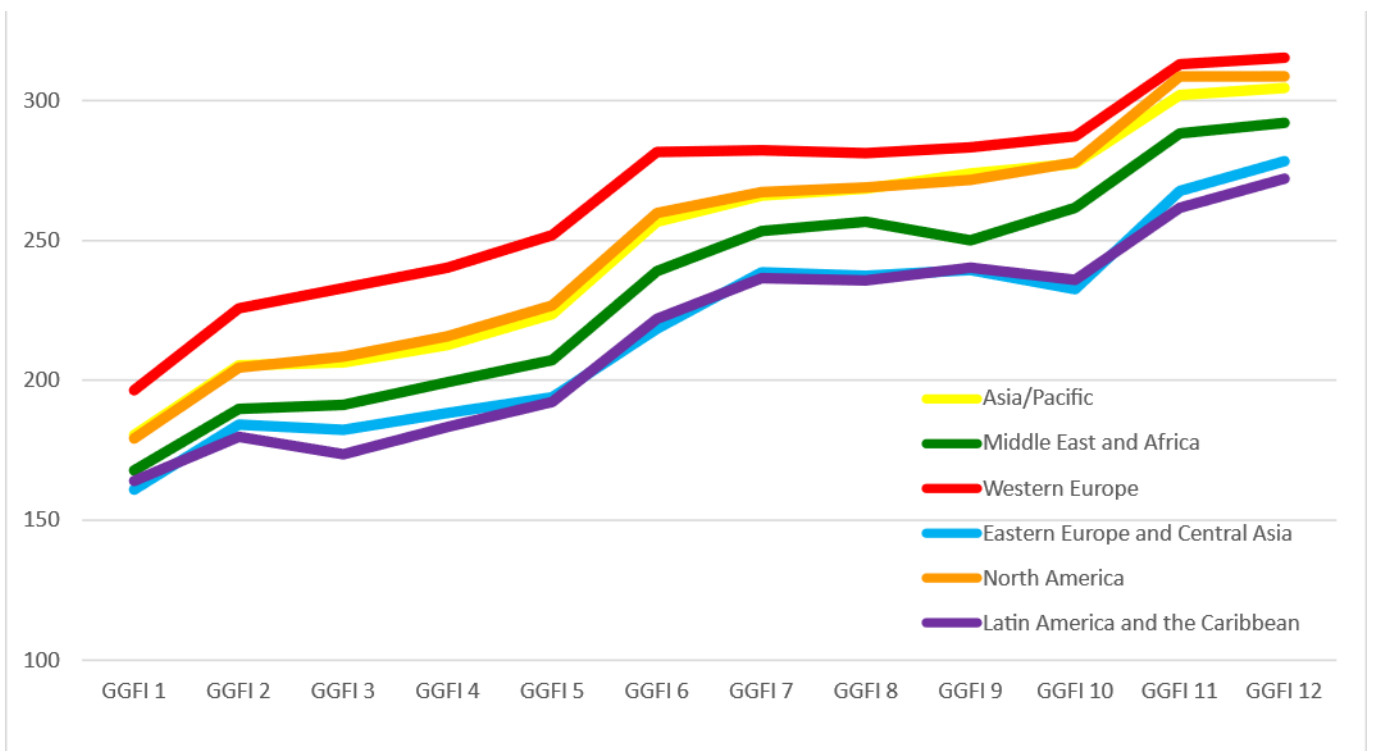


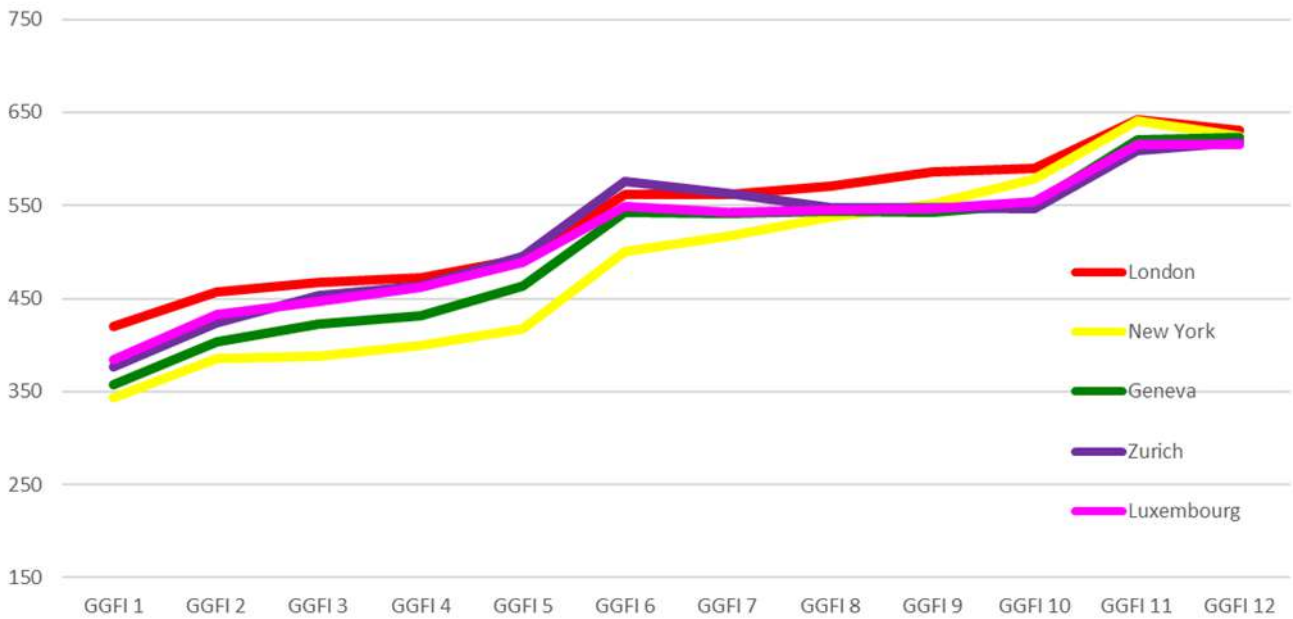
Chart 5 | Average Ratings For Quality Of The Top Five Centres In Each Region



Top Five Centres

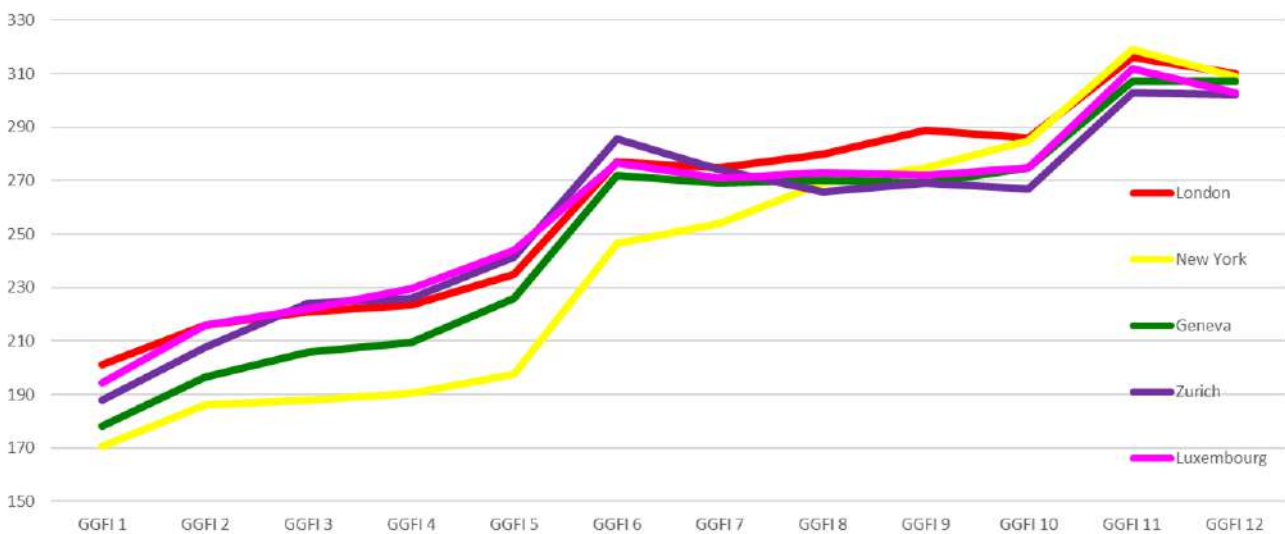
London and New York fell a little in the overall ratings in GGFI 12. Only 15 points now separate London in first position from Luxembourg in fifth.

Chart 6 | The Top Five Centres Over Time



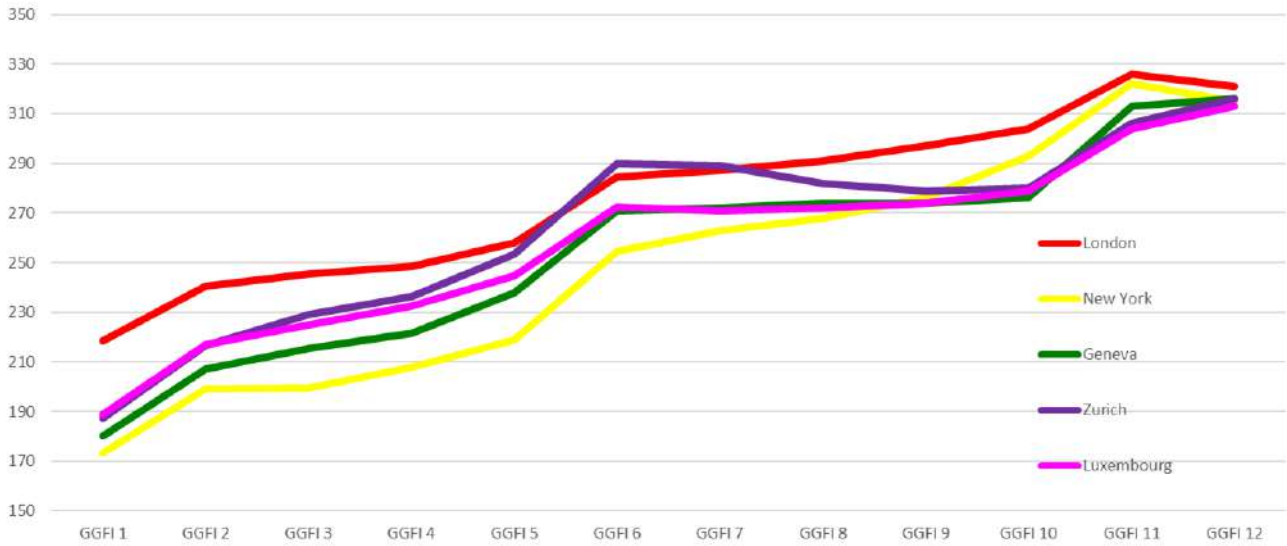
When the depth dimension is examined, London regained its first place on this measure ahead of New York. Again, the leading centres are very closely matched.

Chart 7 | Ratings For The Depth Dimension In The Top Five Centres Over Time



On the quality measure, London lost some ground, and Geneva and Zurich came equal second, with New York in fourth position. Only eight points separate the top five centres on this measure.

Chart 8 | Ratings For The Quality Dimension In The Top Five Centres Over Time



Leading Financial Centres

It is notable that some leading financial centres perform less well than expected in the GGFI, considering their performance in the [Global Financial Centres Index](#) (GFCI), which has been measuring financial centre competitiveness since 2007.

We can compare the centres which rank in the top 20 in the GFCI with their performance in the GGFI. This shows some disconnection between the highest performing centres in the GFCI and performance on green finance in the GGFI. In total, 14 centres feature in the top 20 in both measures with London, New York, and Los Angeles, featuring in the top 10 in both indices.

Table 3 | Leading Financial Centres - Comparison of GGFI And GFCI Rankings

Centre	Global Green Finance Index 12	Green Finance Depth	Green Finance Quality	Financial Centre Competitiveness
New York	2	2	4	1
London	1	1	1	2
Singapore	9	7	7	3
Hong Kong	36	54	21	4
San Francisco	13	14	11	5
Los Angeles	8	4	14	6
Shanghai	20	16	21	7
Washington DC	7	6	7	8
Chicago	15	23	7	9
Geneva	3	4	2	10
Seoul	18	16	19	11
Shenzhen	24	14	31	12
Beijing	27	18	32	13
Frankfurt	29	23	35	14
Paris	23	28	20	15
Luxembourg	5	9	5	16
Boston	26	29	26	17
Zurich	4	11	2	18
Amsterdam	11	18	6	19
Tokyo	34	48	21	20
Source	GGFI 12 Rank	GGFI 12 Depth Rank	GGFI 12 Quality Rank	GFCI 34 Rank

“Financial Centres in the Middle East and West Asia region are playing catch up on environmental and other ESG regulations that are driving actions in other financial centres.”

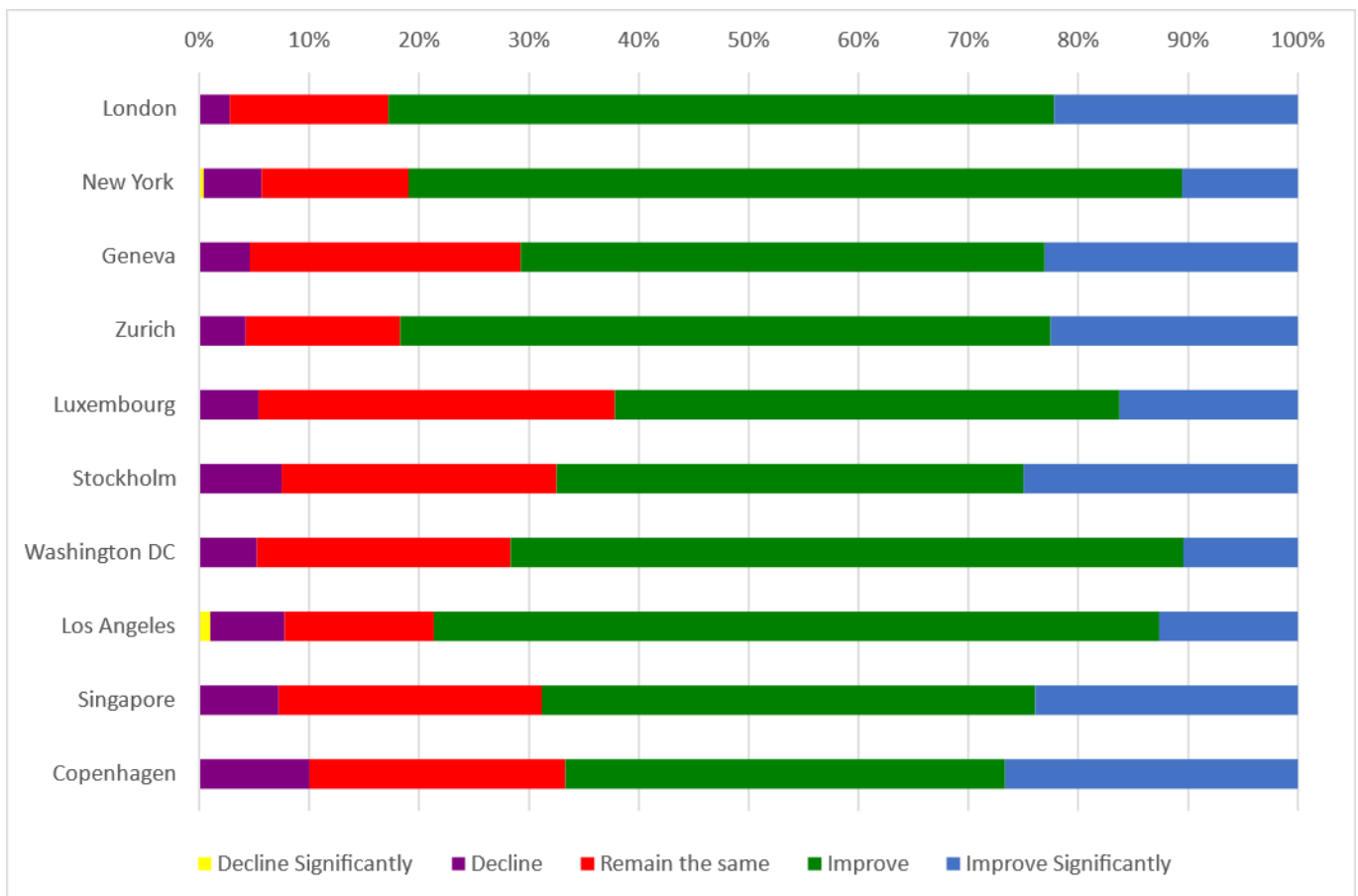
ASSOCIATE MANAGING DIRECTOR, PROFESSIONAL SERVICES FIRM, DUBAI

GGFI 12 Further Analysis

Expected Change In Centres

We asked respondents whether the centres they rated would improve, decline, or stay the same in relation to their green finance offering over the next two to three years. The results for the top 10 centres are displayed in Chart 9, showing high levels of confidence, with the majority of respondents predicting an improvement by all centres in this group, and with very high levels of confidence in London, New York, and Zurich.

Chart 9 | Top 10 Centres - Expected Change In Green Finance Offering



“Governments use taxes to finance and support their development policies in the economic and social fields for the benefit of the public interest, to improve the quality of public services in the fields of education, health services and others, as well as to strengthen infrastructure such as roads and projects of public benefit.”

CHIEF COMPLIANCE OFFICER, TRADING FIRM, MAURITIUS

Instrumental Factors

The GGFI is a factor assessment index, based on a worldwide survey of finance professionals' assessments on the quality and depth of green finance offerings in financial centres. These assessments are run through a statistical model which uses 130 instrumental factors relating to a range of aspects of financial centre competitiveness. These include measures of sustainability, the business environment, infrastructure, and human capital.

Table 4 shows the top 15 instrumental factors' correlation with the GGFI ranking. The correlation with the Global Financial Centres Index reinforces that leading financial centres continue to improve their green finance offering. Other highly correlated factors include the Urban Mobility Readiness Index, and the Safe Cities Index. Infrastructure measures also feature strongly.

Table 4 | Top 15 Instrumental Factors By R-Squared Correlation

Instrumental Factor	R-Squared
The Global Financial Centres Index	0.761
Urban Mobility Readiness Index	0.666
Safe Cities Index	0.650
Global Innovation Index	0.593
IESE Cities In Motion Index	0.545
Sustainable Cities Index	0.543
Smart City Index	0.539
Logistics Performance Index	0.528
Best Countries For Business	0.527
OECD Country Risk Classification	0.527
International IP Index	0.520
JLL Real Estate Transparency Index	0.519
Quality Of Living City Rankings	0.515
World Talent Rankings	0.490
Corruption Perception Index	0.483

“There's a greater supply of early careers green finance people who are acquiring qualifications and coming through education with good conceptual understanding - but there's a major issue with a lack of those with genuine, senior industry experience to support and lead those coming through. A lot of 'ESG experts' who have just added to their job title and simply don't have genuine, credible applied understanding. It's a risk and also a credibility issue.”

DIRECTOR OF POLICY, TRADE ASSOCIATION, EDINBURGH

Focusing only on the instrumental factors which relate to sustainability, the factors most closely correlated in terms of their R-Squared relationship with the GGFI rankings are set out in Table 5. The leading factors continue to focus on cities as sustainable places and on the development of the green economy.

Table 5 | Top 15 Sustainability Instrumental Factors By R-Squared Correlation

Sustainability Factors	R-Squared
Urban Mobility Readiness Index	0.666
IESE Cities In Motion Index	0.545
Sustainable Cities Index	0.543
Quality of Living City Rankings	0.515
Sustainable Economic Development	0.415
Energy Transition Index	0.345
The Green Future Index	0.332
World Energy Trilemma Index	0.331
Global Sustainable Competitiveness Index	0.276
The Global Green Economy Index	0.235
Buildings Energy Efficiency Policies Database (Y/N)	0.226
Quality Of Life Index	0.207
Proportion Of Population Using Safely-Managed Drinking-Water Services (%)	0.183
Environmental Performance Index	0.179
Pollution Index	0.174



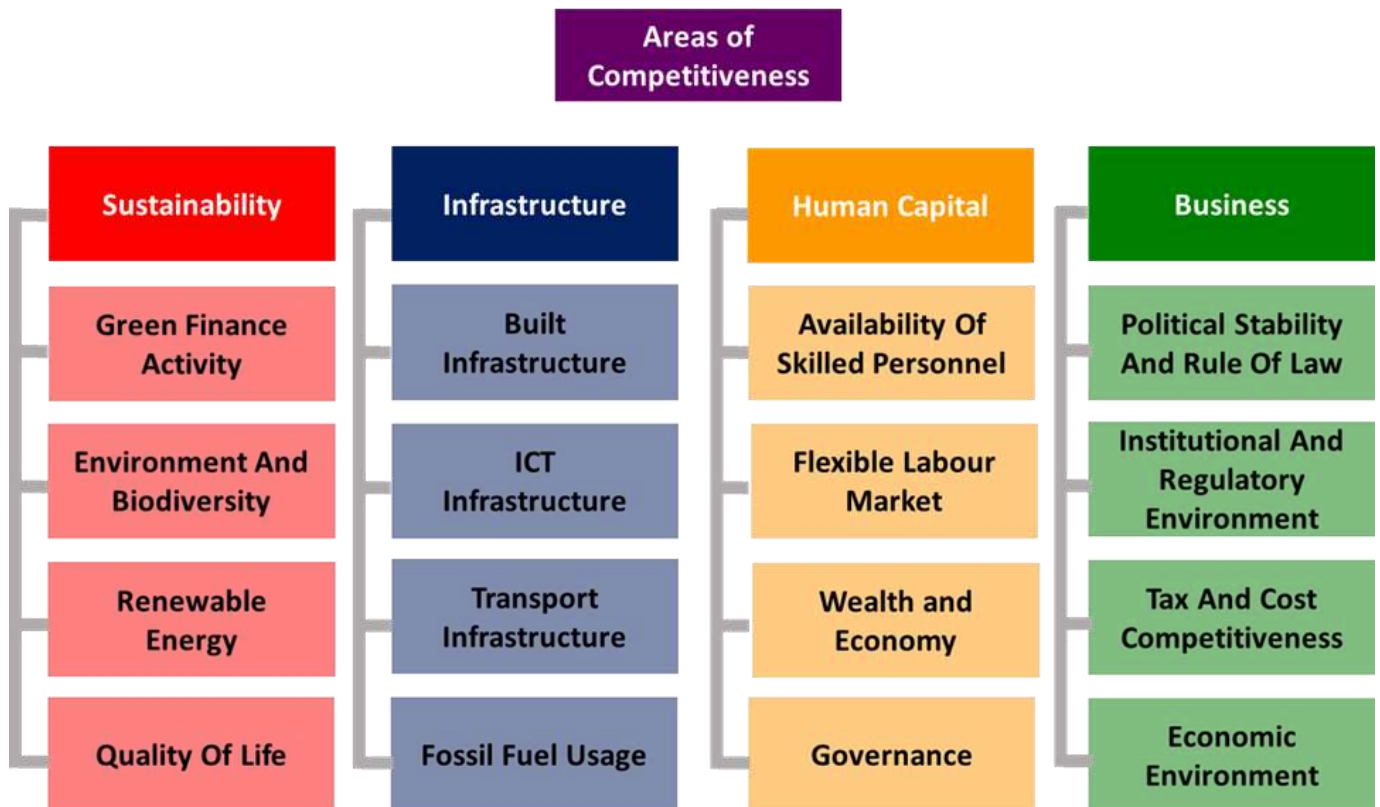
Areas Of Competitiveness

The instrumental factors used in the GGFI model are grouped into four broad areas:

- Sustainability
- Infrastructure
- Human Capital
- Business

These areas, and the instrumental factor themes which comprise each area, are shown in Chart 10.

Chart 10 | GGFI Areas Of Competitiveness



To assess how financial centres’ green finance offerings perform against each of these areas, the GGFI statistical model is run for each area of competitiveness separately, allowing a picture to be built of centres’ strengths and weaknesses. The performance of the top ranked 15 centres in each of these areas is illustrated in table 6.

The leading centres in the GGFI have strengths across all four areas of competitiveness. Some centres are strong in a particular area, for example, Washington DC in infrastructure or Singapore in the sustainability measures.

Table 6 | Top 15 Centres By Area Of Competitiveness

Rank	Sustainability	Business	Human Capital	Infrastructure
1	London	London	London	London
2	New York	New York	Geneva	New York
3	Singapore	Luxembourg	New York	Edinburgh
4	Geneva	Geneva	Zurich	Stockholm
5	Oslo	Singapore	Luxembourg	Washington DC
6	Copenhagen	Zurich	Oslo	Los Angeles
7	Zurich	Shanghai	Montreal	San Francisco
8	Stockholm	Los Angeles	Shanghai	Geneva
9	Montreal	Edinburgh	Beijing	Luxembourg
10	Luxembourg	Beijing	Melbourne	Copenhagen
11	Beijing	Amsterdam	Singapore	Zurich
12	Washington DC	Oslo	Stockholm	Singapore
13	San Diego	Stockholm	Los Angeles	Chicago
14	Casablanca	Washington DC	Amsterdam	Montreal
15	San Francisco	Chicago	Seoul	Oslo



Index Ranking For Sustainability

We can compare the overall index ranking with the ranking based on the sustainability area of competitiveness, using only the instrumental factors that have a direct relationship to sustainability. This analysis produces slightly different results to the main index, as shown in the comparison in Table 7. The plus and minus figures show the difference between the main index and the index calculated using only sustainability factors.

Where only sustainability factors are included in the analysis, London and New York retain their positions. Singapore, Oslo, Beijing, and Casablanca gain significantly, while Los Angeles, Amsterdam, Sydney, and Chicago drop out of the top 15.

Table 7 | Top 15 Centres Using All Factors And Only Sustainability Factors

Rank	All Factors	Sustainability Factors
1	London	London
2	New York	New York
3	Geneva	Singapore (+6)
4	Zurich	Geneva (-1)
5	Luxembourg	Oslo (+12)
6	Stockholm	Copenhagen (+4)
7	Washington DC	Zurich (-3)
8	Los Angeles	Stockholm (-2)
9	Singapore	Montreal (+3)
10	Copenhagen	Luxembourg (-5)
11	Amsterdam	Beijing (+16)
12	Montreal	Washington DC (-5)
13	San Francisco	San Diego (+8)
14	Sydney	Casablanca (+26)
15	Chicago	San Francisco (-2)

"There are increasing concerns about 'competence greenwashing' concept - too many individuals taking a short course and suddenly becoming an 'ESG professional/expert'. Availability of skills is increasing but would be good to capture metrics around certified/verified skills rather than simple self-evaluation."

CHIEF EXECUTIVE, PROFESSIONAL ASSOCIATION, LONDON

Commentary On Factors

The GGFI survey asks respondents to comment on factors that affect the uptake of green finance, and in particular on regulation, taxation, and the availability of skills. The responses are summarised in Table 8.

Table 8 | Commentary On Areas Of Competitiveness

Area Of Competitiveness	Number Of Mentions	Main Themes
Regulatory Environment	111	<ul style="list-style-type: none"> • There is a need to ensure that green finance regulations are tailored to the maturity of the local market - i.e., challenging enough to ensure credibility, but not too challenging that they discourage innovation. • There is a case for regulating investments into fossil fuels and other industries with negative externalities.
The Availability Of Skills In Green Finance	106	<ul style="list-style-type: none"> • There remains too little expertise to drive market change. Young people in finance need early education in green finance principles and practice. • Digital skills are important to ensure monitoring of emissions and transition plans, and improving traceability of sustainable goods and materials.
Taxation	100	<ul style="list-style-type: none"> • There should be tax incentives for green investments and excise duties or higher taxes to force companies and investors to pay for the negative externalities they create. • Tax regimes could be adapted to provide relief for investments in green initiatives that can be shown to be impactful.
Other	27	<ul style="list-style-type: none"> • There is a risk that demand for energy will drive increased use of fossil fuels. • US green finance development is growing mainly the corporate and private investment sectors.

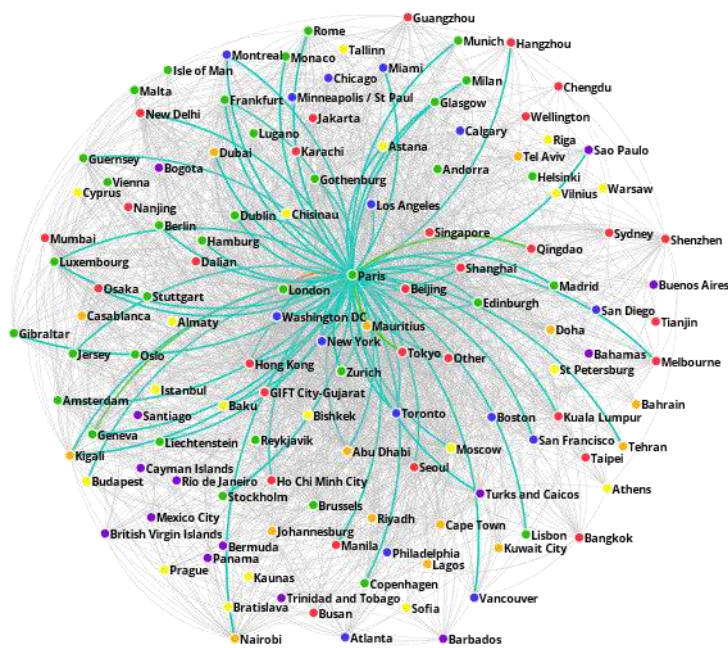
We also asked respondents to identify interesting initiatives in green finance. These included:

- Step up/step down margin adjustment based on KPIs designed on ESG factors.
- Blue bonds designed for investment in oceans and waterways.
- Community carbon trading schemes in Africa/Kenya.
- The Alliance for Financial Inclusion - Inclusive Green Finance Working Group.
- Hong Kong's green bond token.
- Singapore's blockchain-based carbon trading and Singapore Green Bonds.
- France's supply chain finance.
- Green capital requirements by the Central Bank of Hungary.
- Carbon capture - with around 80 new VC/PE/Family Office backed startups in the US in the last two years.
- Government of Gabon, debt for nature swap in Gabon to buy back notes and replacing them with a new instrument that meets green or blue conditions.
- The UNEP FI Principles for Responsible Banking Academy.

Connectivity

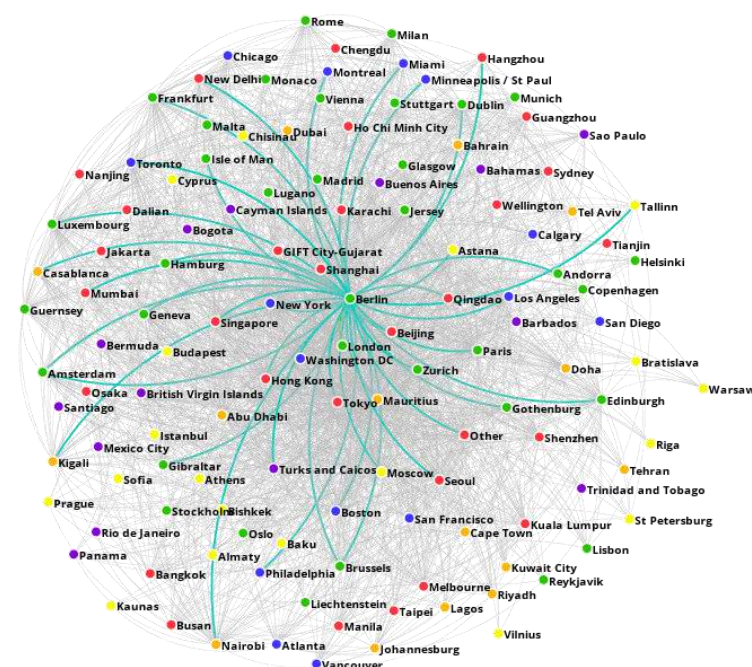
One factor where financial centres' green finance performance differs is the extent to which centres are connected to other financial centres. One way of measuring this connectivity is to look at the number of assessments given to and received from other centres in the GGFI survey. Charts 11 and 12 use Paris and Berlin as examples to contrast the different levels of connectivity that the two centres enjoy. In this example, while both cities are well-connected, Paris has a wider spread of connections across all regions of the world than Berlin.

Chart 11 | GGFI 12 Connectivity - Paris



- 1-5 ratings
- 6-10 ratings
- 11-15 ratings
- 16-20 ratings
- 21+ ratings

Chart 12 | GGFI 12 Connectivity - Berlin



- Asia/Pacific
- North America
- Western Europe
- Middle East & Africa
- Latin America & the Caribbean
- Eastern Europe & Central Asia

Financial Centre Profiles

We conduct further analyses based on three measures (axes) that determine a financial centre's profile in relation to three different dimensions.

'Connectivity' – the extent to which a centre is well known among GGFI survey respondents, based on the number of 'inbound' assessment locations (the number of locations from which a particular centre receives assessments) and 'outbound' assessment locations (the number of other centres assessed by respondents from a particular centre).

'Diversity' – the instrumental factors used in the GGFI model give an indication of a broad range of factors that influence the richness and evenness of factors that characterise any particular financial centre.

We consider this span of factors to be measurable in a similar way to that of the natural environment. We therefore use a combination of biodiversity indices (calculated on the instrumental factors) to assess a centre's diversity. This takes account of the range of factors against which the centre has been assessed – the 'richness' of the centre's business environment; and the 'evenness' of the distribution of that centre's scores. A high score means that a centre is well diversified; a low diversity score reflects a less rich business environment.

'Speciality' – the depth within a financial centre of green finance and sustainability. A centre's 'speciality' or performance is calculated from the difference between the overall GGFI rating and the ratings when the model is calculated based only on sustainability factors.

In Table 9, 'Diversity' (Breadth) and 'Speciality' (Depth) are combined on one axis to create a two-dimensional table of financial centre profiles. The 94 centres in GGFI 12 are assigned a profile on the basis of a set of rules for the three measures: how well connected a centre is, how broad its services are, and how specialised it is.

The Global Leaders (in the top left of the table) have both broad and deep green finance activity and are connected with a greater range of other financial centres. Other leading centres are profiled as Established International Centres.

Chart 13 | GGFI Dimensions

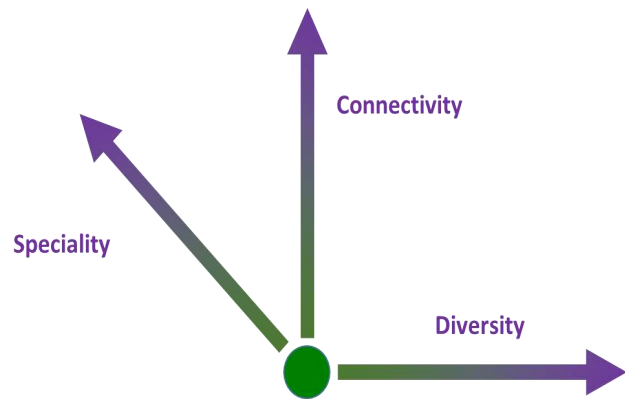
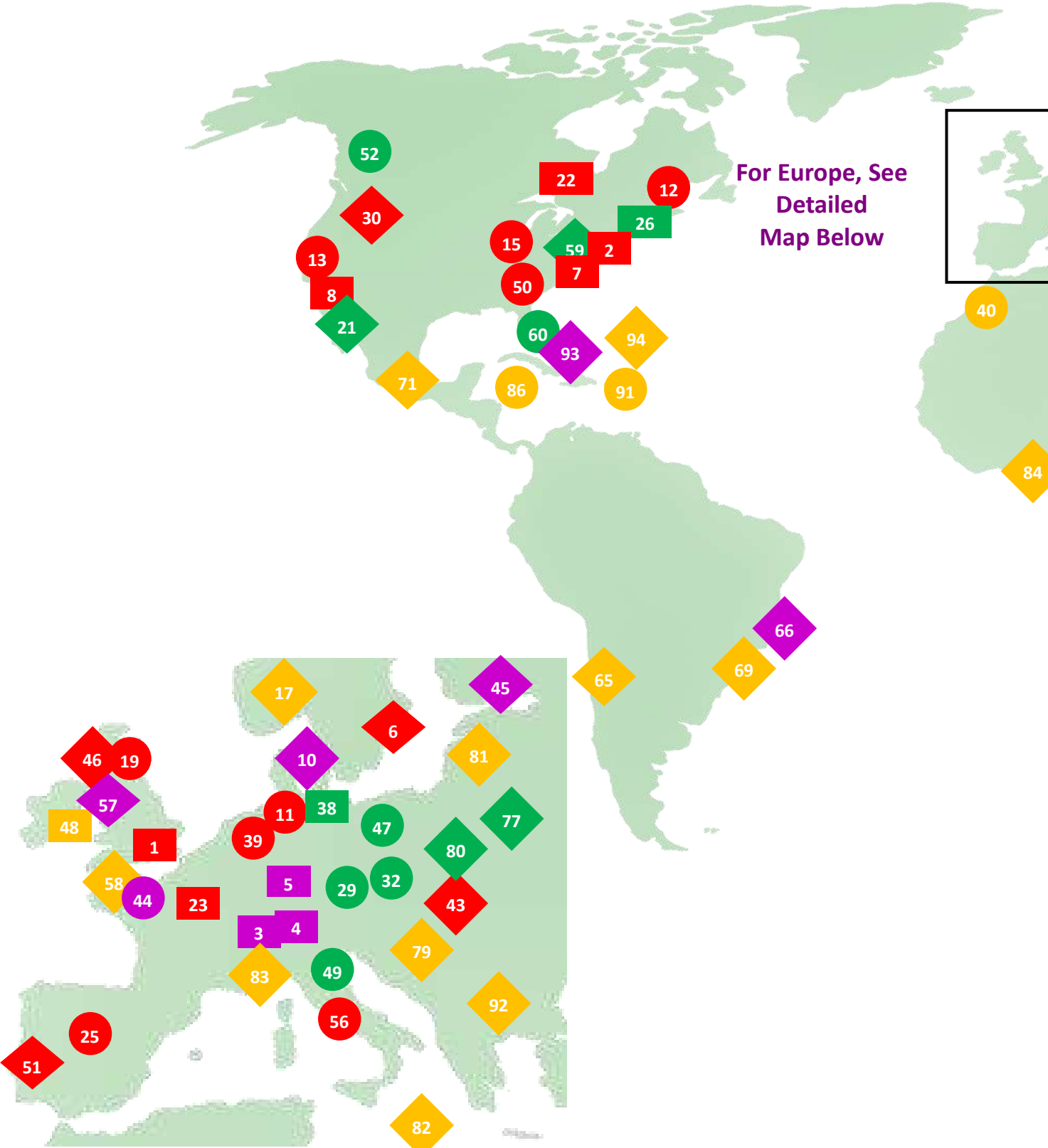


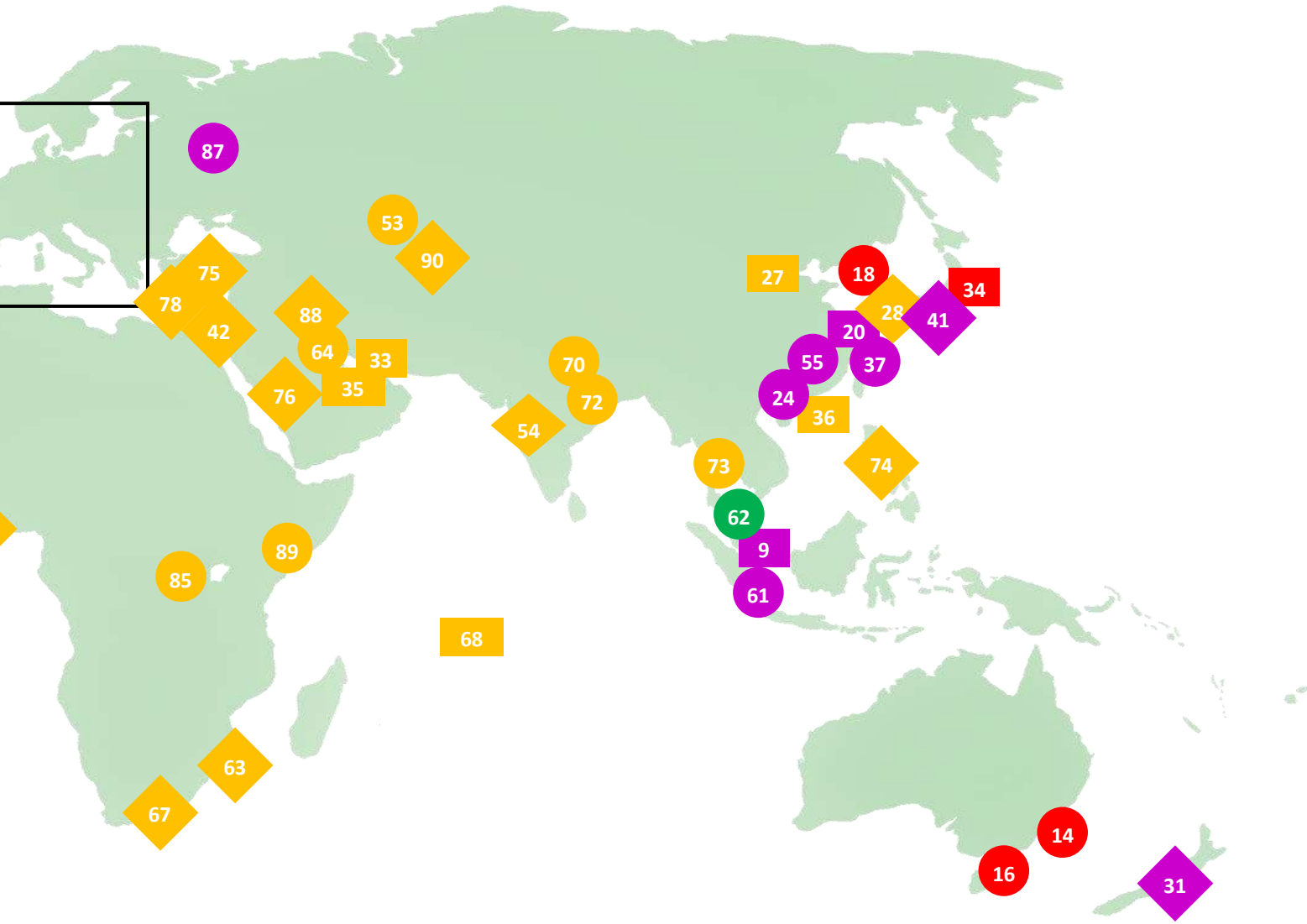
Table 9 | Financial Centre Profiling

	Broad and Deep	Relatively Broad	Relatively Deep	Emerging
	Global Leaders	Global Diversified	Global Specialists	Global Contenders
Global	London	Boston*	Geneva*	Beijing
	New York	Frankfurt	Zurich*	Dubai*
	Washington DC*		Luxembourg	Abu Dhabi*
	Los Angeles		Singapore*	Hong Kong
	Toronto*		Shanghai	Dublin*
	Paris*			Mauritius*
	Tokyo*			
International	Established International	International Diversified	International Specialists	International Contenders
	Amsterdam	Munich*	Shenzhen	Casablanca
	Montreal	Hamburg*	Jersey*	Astana
	San Francisco*	Berlin	Guangzhou*	Guernsey*
	Sydney	Milan	Jakarta*	Johannesburg*
	Chicago	Calgary*	Qingdao	Doha
	Melbourne*	Miami (New)		Cape Town
	Seoul	Kuala Lumpur*		New Delhi*
	Edinburgh*			Mumbai
	Madrid			Bangkok
	Brussels			Manila (New)
	Atlanta (New)			Kigali
	Rome			Cayman Islands*
				Nairobi*
				British Virgin Islands*
				Moscow*
	Local	Established Players	Local Diversified	Local Specialists
Stockholm		San Diego (New)	Copenhagen*	Oslo*
Vancouver		Philadelphia (New)	Wellington	Busan
Glasgow		Warsaw	Osaka	Tel Aviv
Lisbon		Prague*	Vienna*	GIFT City-Gujarat
			Helsinki	Santiago*
			Isle of Man	Sao Paulo*
			Rio de Janeiro	Mexico City
			Bahamas (New)	Istanbul
				Riyadh*
				Cyprus (New)
				Liechtenstein*
				Riga
				Malta*
				Monaco (New)
				Lagos
				Bahrain*
				Almaty
				Sofia
				Bermuda*

* An asterisk denotes a change since GGFI 11

The GGFI 12 World - Centres In The Index





The numbers on the map indicate the GGFI 12 rankings.

Broad and Deep	Relatively Broad	Relatively Deep	Emerging
Global Leaders	Global Diversified	Global Specialists	Global Contenders
Established International	International Diversified	International Specialists	International Contenders
Established Players	Local Diversified	Local Specialists	Evolving Centres

Space Debris – The Tragedy Of The Commons

Introduction

Space, in particular the satellites in low-Earth orbit, is a crucial component of 21st century society. From providing access to the internet for remote and war-torn corners of the globe (In 2022, during the Russian invasion, Ukraine requested SpaceX to activate their "Starlink" satellite internet service to replace internet and communication networks that were being degraded or destroyed¹), to providing real time data to insurers and farmers on weather patterns, so space-based technologies have an essential role to play in providing the data that make markets function.

However, as the competition to provide space-based services heats up, orbits are becoming crowded, and a new menace is raising concerns – that of space junk. This supplement to GGFI 12 aims to explore this issue further and proposes a market-based solution to the problem that covers environmental, social and governance issues.

The Beginning

On 4 October 1957, Sputnik 1 blasted off from what is now known as the Baikonur Cosmodrome in Kazakhstan. The satellite, travelling at a speed of 8 km/s (18,000 mph), took 96 minutes to orbit the earth, transmitting regular pulses on 20.005 and 40.002 MHz, which were monitored by radio operators around the world².

Sputnik maintained transmissions for 21 days, until its power failed, and the satellite continued to orbit the earth until 4 January 1958 when it burned up while re-entering Earth's atmosphere.



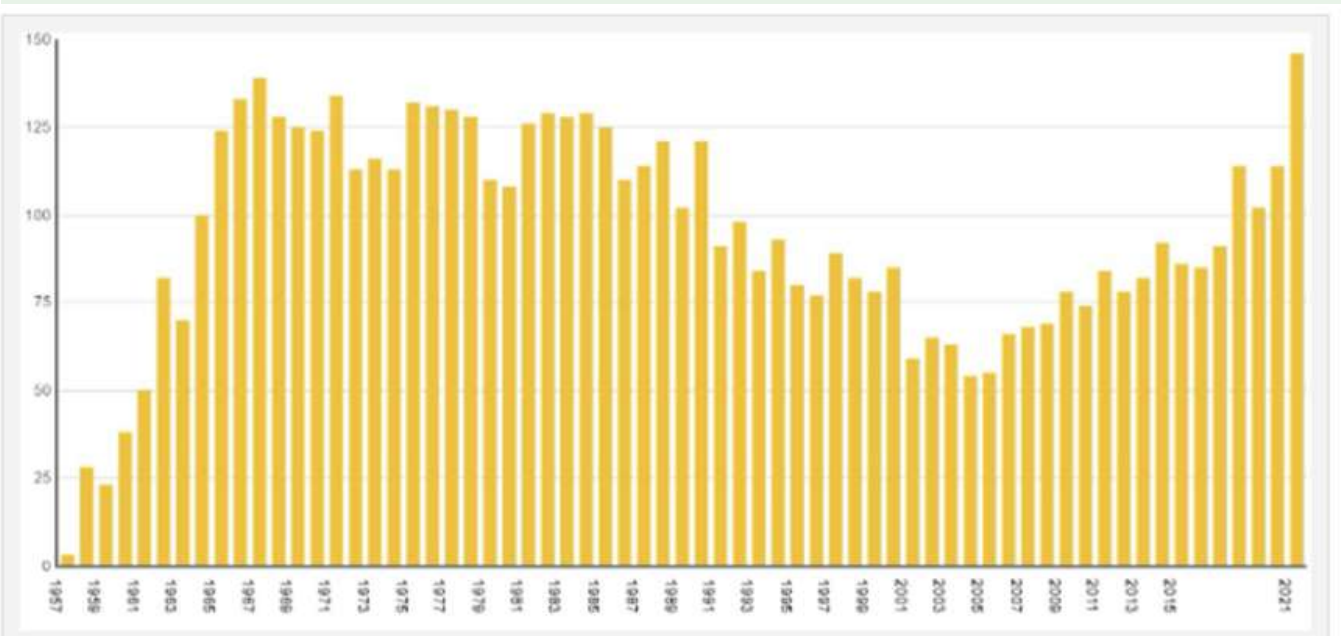
1. The Economist Satellite2022 *Internet is a hot new commodity in Ukraine* <https://www.economist.com/graphic-detail/2022/04/29/satellite-internet-is-a-hot-new-commodity-in-ukraine>
2. Nasa (retrieved 2023) <https://history.nasa.gov/sputnik.html>

Since 4 October 1957, there have been approximately 5,860 launches from 50 sites around the world, which have taken satellites, and people, into orbit³. Since 2008 when SpaceX became the first privately developed rocket to reach orbit, the number of launches per year has accelerated.

The Space Race

Initially, the exploitation of space was an extension of the cold war, with the two late twentieth century superpowers, the US and the USSR vying for supremacy (hence the decline in launches from the late 1980's to the early 2000's (see figure 1)). However, the last two decades have seen a rapid expansion of commercial activity, particularly with respect to launch capability, which has seen the cost per kilo for payload launches drop from over \$100,000 per kilo to under \$2,000 (see figure 2). At the same time, advances in technologies such as robotics, remote sensing, and artificial intelligence have catalysed opportunities in digital mapping, enhanced communications, navigation, and resource and environmental management – particularly with respect to biodiversity and carbon emissions.

Figure 1 | Annual Orbital Launches



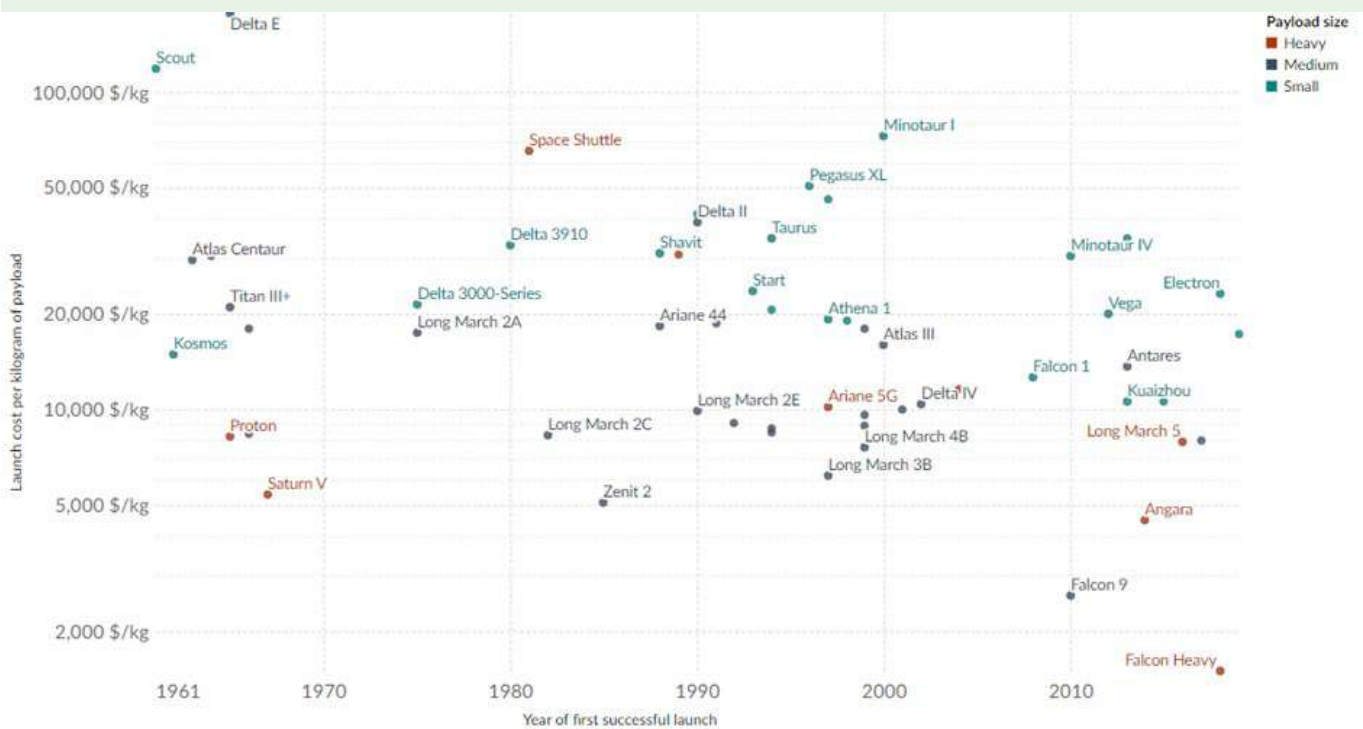
Source: Seradata⁴

In 2019, 95% of the estimated \$366 billion in revenue earned in the space sector was from the space-for-earth economy: that is, goods or services produced in space for use on earth⁵ – primarily data.

The earth-for-space economy involves the launch vehicles (or busses) and the hardware that is put into orbit. This includes telecommunications and internet infrastructure, earth observation capabilities, national security satellites, and more. This part of the space economy is also booming - as the number of commercial space launches has grown and new companies enter the market, there has been a marked decrease in costs for launch and space hardware.

3. Statista (Retrieved 2023) <https://www.statista.com/statistics/1343344/orbital-space-launches-global/#:~:text=The%20number%20of%20orbital%20space, the%20Space%20Race%20in%201957.>
4. Seradata (retrieved 2023) <https://www.seradata.com/2021-launch-year-a-new-record-for-both-orbital-rocket-and-satellite-launch-totals-in-a-year/>
5. Weinzeirl M & Sarang M 2021 **The Commercial Space Age Is Here**, Harvard Business Review <https://hbr.org/2021/02/the-commercial-space-age-is-here#:~:text=The%20implications%20E2%80%94%20for%20business%2C%20policy,space%20for%20use%20on%20earth.>

Figure 2 | Cost Per Kilogramme For Launches



Source: Our World In Data⁶

Crowded Orbits

In the early 1960's, the General Assembly requested space nations to voluntarily register their satellites with the Secretary-General to help the newly established Committee On The Peaceful Uses Of Outer Space (COPUOS) to develop laws governing activities in space. In 1975, UN member states adopted the Convention on Registration of Objects Launched into Outer Space, which entered into force in 1976.

Today the United Nations Office for Outer Space Affairs (UNOOSA) keeps a register of objects launched into orbit and maintains a watchful eye on the exploration and use of outer space under the Outer Space Treaty⁷.

Article IX of the Outer Space Treaty specifically states that "Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination".

According to UNOOSA records, there were 8,261 satellites orbiting the Earth as of January 2022. Of these only 4,852 were active. However, just in the last year, this number has since been significantly augmented. Taking only SpaceX's Starlink programme as an example, as of August 2023, there were almost 5,000 Starlink small satellites in low Earth orbit (LEO)⁸. Nearly 12,000 satellites are planned to be deployed, with a possible later extension to 42,000. Other commercial space organisations and

6. Our World In Data (retrieved 2023) <https://ourworldindata.org/grapher/cost-space-launches-low-earth-orbit?time=earliest..2019>

7. UNPOSA (retrieved 2023) <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html>

8. Jonathan's Space Pages (retrieved 2023) <https://planet4589.org/space/con/star/stats.html>

nations are also rushing to enhance their orbital capabilities. In particular, China is considering its own mega-constellation with a plan to launch 12,992 satellites under a project called “Guo Wang”⁹.

There is no international body responsible for regulating who launches what into space, instead oversight is maintained by a patchwork of over 30 national regulatory frameworks¹⁰.

Figure 3 | Satellite Sizes

SIZE	Mass	Example	
Large	Over 1000kg	Hubble Space Telescope 12.2 Tonnes	
Medium	500 - 1000kg	Spot 6 Earth Observation 800kg	
Small	100 - 500kg	NigeriaSat 2 Earth Observation 300kg	
Micro	10 - 100kg	ABA First Runner Earth Observation 80kg	
Nano	1 - 10kg	QB50P2 CubeSat Atmospheric Sampling 1.2kg	

Satellites vary greatly in mass. Each launch can propel multiple satellites into orbit which weigh between 1 kilogramme and 15 tonnes (see Figure 3). Space is a very unforgiving environment and satellites face particular peril at the launch phase, when vehicular failure can destroy many millions of euros of equipment – The financial times recently reported that the space insurance sector has had a particularly torrid year “When all the mishaps are added up, claims could total roughly USD 1 billion this year, say industry sources, against premium income of roughly USD 600 million”¹¹.

9. Suess J 2023 *Guo Wang: China’s Answer to Starlink?* <https://rusi.org/explore-our-research/publications/commentary/guo-wang-chinas-answer-starlink>

10. COPUOS 2023 *Schematic Overview Of National Regulatory Frameworks For Space Activities* https://www.unoosa.org/res/oosadoc/data/documents/2023/aac_105c_22023crp/aac_105c_22023crp_28_0_html/AC105_C2_2023_CRP28E.pdf

11. Hollinger P 2023 *Space Needs A Sustainable Insurance Industry*, Financial Times 28/09/23 <https://www.ft.com/content/d93f6044-73fd-41fe-a2e5-a57becc26eea>

Even if the launch is successful, the successful deployment of the satellite in the correct orbit is a major technical challenge. According to NASA the unsuccessful deployments of solar arrays, antennas and other spacecraft deployable appendages are one of the main causes of initial satellite failures¹².

Geostationary orbit (GEO) is the best place for telecommunications satellites, whilst low Earth Orbit (LEO), the most effective deployment for earth observation satellites. LEO is a particularly harsh environment as tenuous wisps of atmosphere act as a drag on satellites, causing them to lose speed and altitude. For micro and nano satellites this is factored into their life cycle and they generally de-orbit and burn up in the atmosphere within 5 years of deployment.

For small, medium, and large satellites in GEO, which represent a more substantial investment, the spacecraft generally has some form of propulsion module for apogee injection, attitude manoeuvre for transfer orbit, station keeping, and orbit control which can keep a satellite operational for decades. At the end of operational life, it can deorbit or transfer to a graveyard orbit. These propulsion systems contain highly reactive substances such as hydrazine.

Space Junk

Space debris, also known as space junk, refers to the collection of defunct human-made objects in Earth's orbit. These objects range from dead satellites and spent rocket stages to smaller fragments resulting from explosions, collisions, or disintegration.

Scientists estimate the total number of space debris objects in orbit to be around 29,000 for sizes larger than 10 cm, 670,000 larger than 1 cm, and more than 170 million larger than 1 mm. About 65% of the catalogued objects originate from break-ups in orbit – more than 240 explosions, caused by uncontrolled hydrazine reactions – as well as collisions¹³ (See Figure 4).

Among the larger objects, there are approximately 2,000 inactive satellites and spent rocket stages. These larger objects are tracked more accurately than smaller fragments.

Figure 4 | Composite Image of Space Junk Orbits



Source: European Space Agency¹⁴

12. Rivera A & Stewart A 2021 *Study of Spacecraft Deployables Failures*, NASA <https://ntrs.nasa.gov/citations/20210020397>

13. European Space Agency, (retrieved 2023) https://www.esa.int/ESA_Multimedia/Images/2018/09/Debris_around_Earth

14. European Space Agency (accessed 2023)

Most 'space junk' moves extremely fast (7.8 km/s is low-Earth orbital velocity) and due to the speed and volume of debris in LEO, this presents a significant threat to current and future space-based services as LEO is, according to NASA "the world's largest garbage dump"¹⁵.

Space debris is a rising global risk that needs to be addressed as the accumulation of space debris poses several significant challenges and risks:

1. **Threat To Operational Satellites:** Space debris poses a serious threat to operational satellites that provide essential services such as communication, weather monitoring, navigation, and scientific research. Collisions with debris can cause irreparable damage or complete destruction of satellites, leading to service disruptions and financial losses.
2. **Risk Of Collisions:** With thousands of active satellites and an estimated 128 million debris objects larger than 1 mm in orbit, the probability of collisions between space debris and operational satellites is increasing. Each collision creates more debris, setting off a chain reaction known as the Kessler Syndrome, where the density of debris in certain orbits becomes so high that it significantly impairs future space activities.
3. **Crewed Space Missions At Risk:** Human spaceflight missions, such as those conducted by the International Space Station (ISS) or future crewed missions to the Moon and Mars, face heightened risks due to space debris. Even small debris pieces can cause catastrophic damage to spacecraft, endangering the lives of astronauts and jeopardising space exploration efforts.
4. **Economic Impact:** The economic consequences of space debris are significant. Satellite operators and insurers bear the financial burden of insuring against potential losses from collisions with debris. Satellite operators may also incur additional costs for collision avoidance manoeuvres, satellite replacements, or the premature retirement of operational satellites due to increased risks.
5. **Long-term Space Sustainability:** The accumulation of space debris poses a threat to the long-term sustainability of space activities. If left unaddressed, the growth of debris could render certain orbital regions unusable, limiting the potential for future satellite launches and hindering space exploration and scientific research endeavours.
6. **Limited Regulatory Framework:** Currently, there is no comprehensive international regulatory framework governing space debris mitigation. Guidelines and best practices exist, but compliance is voluntary, leading to inconsistent adoption and implementation. Strengthening regulatory measures and promoting international cooperation is crucial to effectively address the space debris problem.

If access to space becomes problematic the world will suffer serious impairment to 38% of the Sustainable Development Goals (SDGs). A 2018 study conducted by UNOOSA, in cooperation with the European GNSS Agency (GSA), indicates that "almost 40%, or 65 out of 169 targets, that are underpinning the 17 SDGs are directly taking advantage from the use of geo-location and earth observation satellites. With the inclusion of telecommunication satellites, this statistic rises considerably"¹⁶.

Despite this risk there are no international laws requiring companies to clean up debris in LEO, although national regulators are beginning to wake up to the risk. On 2 October 2023, the United States Federal Communications Commission (FCC) issued its first ever fine to a company for littering in space¹⁷. The FCC's investigation found that the company violated the Communications Act, and the

15. NASA (retrieved 2023) https://www.nasa.gov/centers/hq/library/find/bibliographies/space_debris

16. UNOOSA & European GNSS Agency 2018 <https://sdgs.un.org/un-system-sdg-implementation/united-nations-office-outer-space-affairs-unoosa-24523>

17. FCC 2023 **FCC Takes First Space Debris Enforcement Action** <https://docs.fcc.gov/public/attachments/DOC-397412A1.pdf>

terms of the company's license by relocating its direct broadcast satellite EchoStar-7 at the satellite's end-of-mission to a disposal orbit well below the elevation required by the terms of its license. At this lower altitude, it could pose orbital debris concerns. The settlement included an admission of liability from the company and an agreement to adhere to a compliance plan and pay a penalty of \$150,000.

Although, the sum is negligible, this is a landmark decision, following on from a 2022 decision to adopt new rules requiring satellite operators in low-Earth orbit to dispose of their satellites within five years of completing their missions, significantly shortening the long-held 25-year guideline for "deorbiting" satellites post-mission.

Unfortunately, it stops short of plans floated to require satellite operators to indemnify the U.S. government against harm caused by their satellites, which could include the introduction of a performance bond (that could reach \$100 million for megaconstellation operators)¹⁸.

Market Based Solutions

There are several interlinked approaches which can be used to tackle the problems of space debris:

- 1. Space Debris Tracking And Monitoring:** Enhance global tracking and monitoring capabilities to catalogue and predict the movements of space debris more precisely. This information is vital for collision avoidance manoeuvres and future planning.
- 2. Debris Mitigation Measures:** Encourage satellite operators and manufacturers to adopt best practices for debris mitigation, including designing satellites with built-in deorbiting capabilities, minimizing the creation of debris during satellite deployments, and implementing end-of-life disposal plans.
- 3. International Collaboration:** Foster international collaboration and cooperation among space agencies, private industry, and regulatory bodies to develop and enforce comprehensive space debris mitigation guidelines and standards. Establish mechanisms for information sharing, joint research, and coordinated efforts to address the global nature of the space debris problem.
- 4. Research And Innovation:** Invest in research and development of advanced technologies and materials that can help mitigate the risks of space debris. This includes improved shielding technologies for spacecraft, better tracking and monitoring systems, and innovative propulsion methods for satellite deorbiting.
- 5. Public Awareness And Education:** Raise public awareness about the challenges posed by space debris and the importance of responsible space operations. Educate the public, policymakers, and future space professionals about the potential consequences of unchecked space.
- 6. Active Debris Removal (ADR):** Develop and deploy technologies for actively removing larger debris objects from orbit. ADR initiatives, such as capturing and deorbiting defunct satellites or using robotic systems to clear debris, can significantly reduce the risks posed by existing large debris items.

The most effective leverage could be applied through the insurance sector. The Organization for Economic Cooperation and Development points out that: *"While not strictly a debris mitigation measure, in-orbit insurance, in particular third-party liability insurance could play an important role in shaping operator behaviour and contribute to covering remediation costs"*¹⁹.

18. Henry C 2023 *FCC punts controversial space debris rules for extra study*, Space News <https://spacenews.com/fcc-punts-controversial-space-debris-rules-for-extra-study/>

19. OECD 2020 Space Sustainability: The Economics Of Space Debris In Perspective, page 35 <https://read.oecd.org/10.1787/a339de43-en?format=pdf>

Figure 5 | ADR Concept ClearSpace 1



Despite this, it is estimated that currently only 6% of satellites in low-Earth orbit have in-orbit insurance. A recent paper, published at the International Astronautical Congress in Baku²⁰, proposes the use of performance bonds and P&I mutuals to reduce premiums by spreading exposure.

Performance bonds could be offered for satellite retirement and anti-collision insurance- these are financial instruments that guarantee the funding required for the safe deorbiting or retirement of satellites at the end of their operational life if the satellite does not safely deorbit or retire according to plan. A requirement to obtain such a bond before getting permission to launch would ensure that satellite operators retire their satellites in a responsible manner and adhere to established guidelines for sustainable space operations.

Holding satellite operators accountable for disposal can significantly reduce the accumulation of space debris and promote long-term space sustainability. In the event of an operator not retiring their satellite responsibly, the bond can be used to cover the costs of doing so.

Features of performance bonds for satellite retirement could include:

- A tiered pricing structure based on satellite size, mission duration, and risk factors.
- A rigorous evaluation process for satellite retirement plans to ensure compliance with international guidelines.
- Close collaboration with satellite operators to monitor retirement plan execution and provide guidance if needed.
- Regular audits and inspections to verify compliance with retirement obligations.
- Clear indemnification terms in case of unexpected satellite failures or operator bankruptcy.

20. Mainelli M et al 2023 *In-orbit servicing and insurance markets: a symbiotic approach*, International Astronautical Congress (IAC 2023), Baku https://www.longfinance.net/documents/3690/Astroscale_-_Insurance_-_Draft_v10.0_Final_Copy_Edited.pdf/

Fundamentally anti-collision insurance coverage should be mandated by the regulatory bodies responsible for overseeing the space sector in each [jurisdiction](#). This would be taken by satellite operators, space agencies, and commercial space ventures. This insurance would protect against financial losses resulting from collisions with space debris or other operational satellites.

Incentivizing operators to adopt collision avoidance measures would mitigate the risks of catastrophic collisions and minimize the creation of additional debris. However, providing appropriate cover economically may require a collaborative effort between public and private entities -an existing example of which can be found in the UK's Pool Re for terrorism insurance.

Taking a combined public and private approach would provide:

- Access to government space debris databases, research, and technological advancements.
- Shared risk and financial burden between the public and private sectors.
- Leveraging the expertise of insurance and reinsurance professionals.
- Pooling of resources for enhanced risk modelling and analysis.
- Efficient regulatory compliance and coordination between relevant stakeholders.

Conclusions

The current situation with respect to space debris and orbital crowding in LEO is “the tragedy of the commons” writ large. Without international cooperation and effective regulation, underpinned by effective insurance products, the possibility of a Kessler Syndrome event occurring within the next decade increases in probability – and the more debris there is in orbit, the higher the insurance premiums and the lower investors' appetite. To quote one senior practitioner involved in the sector- *“Why throw billions into orbit if it has a high risk of getting shredded?”*

Action is required to protect space, and the insurance industry and the nascent In-Orbit Servicing industry stand ready to facilitate that action. That action could come in the form of international agreement to leverage insurance for liability and removal of debris for satellite operators. That action will preserve the benefits of space for society today and put it on a sustainable footing for the future.

The satellite insurance market presents unique challenges for insurers, especially with potential high risk of exposure for individual incidents. It is time that operators, insurers, and government come together to consider alternative possibilities to provide effective coverage against the risks inherent in satellite operations, while taking the opportunity to promote best practices across the satellite industry.

Financial centres may be in the best position to kickstart the debate by assessing interest and appetite, as well as identifying problems and pitfalls. The City of London will be hosting a series of discussions on the concept of SDRBs and associated products and initiatives provided by space protection insurers from November 2023 to November 2024: The 695th Lord Mayor's Space Protection Initiative.

Regional Analysis

In our analysis of the GGFI data, we look at six regions of the world to explore their financial centres' green finance depth and quality.

Alongside the ranks and ratings of centres, we investigate the average assessments received by regions and centres in more detail.

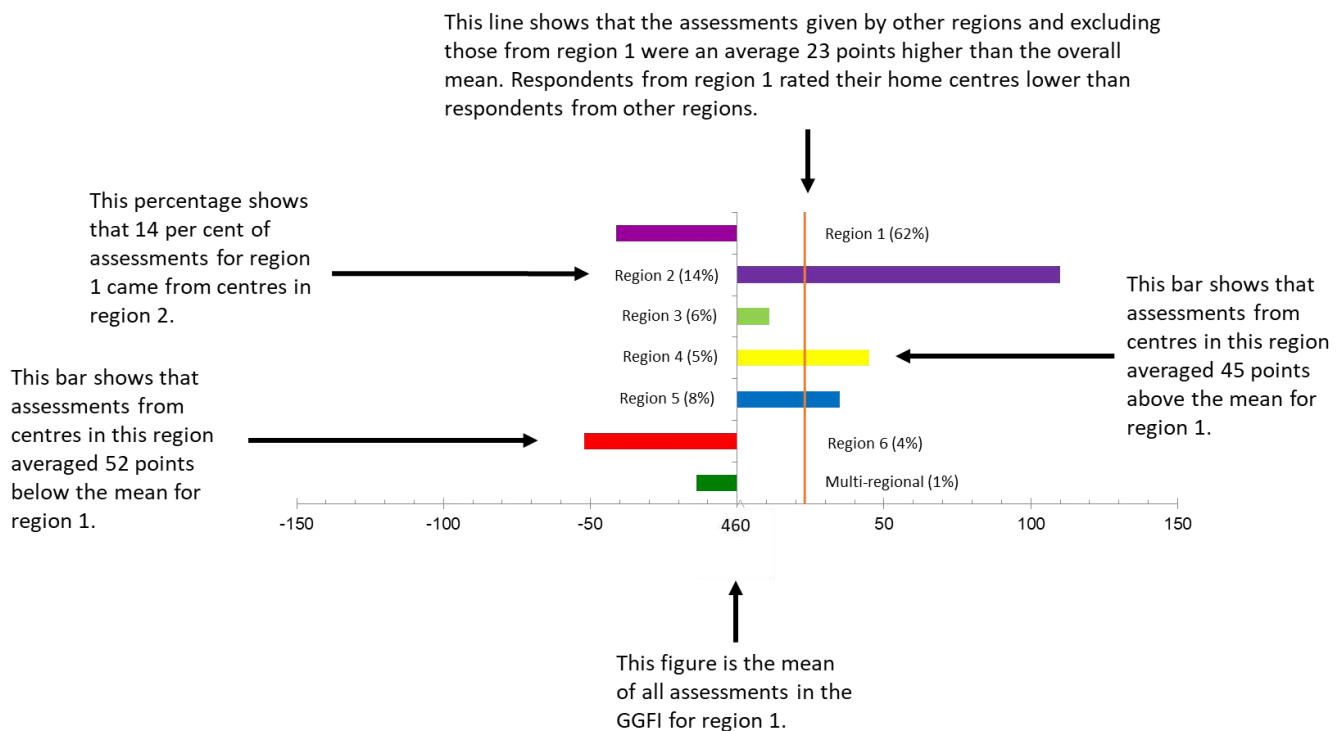
We display this analysis in charts, either for a region or an individual centre. These charts show:

- the mean assessment provided to that region or centre;
- the difference in the mean assessment when home region assessments are removed from the analysis;
- the difference between the mean and the assessments provided by other regional centres; and
- the proportion of assessments provided by each region.

Chart 14 shows an example of this analysis. Coloured bars to the left of the vertical axis indicate that respondents from that region gave lower than average assessments. Bars to the right indicate respondents from that region gave higher than average assessments. Assessments given to a centre by people based in that centre are excluded to remove 'home' bias.

The additional vertical axis (in red) shows the mean of assessments when assessments from the home region are removed. The percentage figure noted by each region indicates the percentage of the total number of assessments that are from that region.

Chart 14 | Example: Assessments Compared With The Mean For A Region



North America

- New York maintained second position in the index and continues to lead in the region, with Washington DC and Los Angeles also in the world top 10.
- San Diego, Atlanta, Philadelphia, and Miami entered the index for the first time.
- Montreal improved nine rank places to lead in Canada.
- North American centres were rated significantly above average by people from Asia/Pacific and those from a multi-regional background and below average by people in other regions.

Table 10 | North American Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
New York	2	624	2	641	0	▼ 17
Washington DC	7	614	9	612	▲ 2	▲ 2
Los Angeles	8	613	7	614	▼ 1	▼ 1
Montreal	12	609	21	600	▲ 9	▲ 9
San Francisco	13	608	10	611	▼ 3	▼ 3
Chicago	15	606	19	602	▲ 4	▲ 4
San Diego	21	600	New	New	New	New
Toronto	22	599	28	583	▲ 6	▲ 16
Boston	26	595	29	582	▲ 3	▲ 13
Vancouver	30	591	34	577	▲ 4	▲ 14
Atlanta	50	571	New	New	New	New
Calgary	52	569	40	571	▼ 12	▼ 2
Philadelphia	59	562	New	New	New	New
Miami	60	561	New	New	New	New

Chart 15 | Top Five North American Centres Ratings Over Time

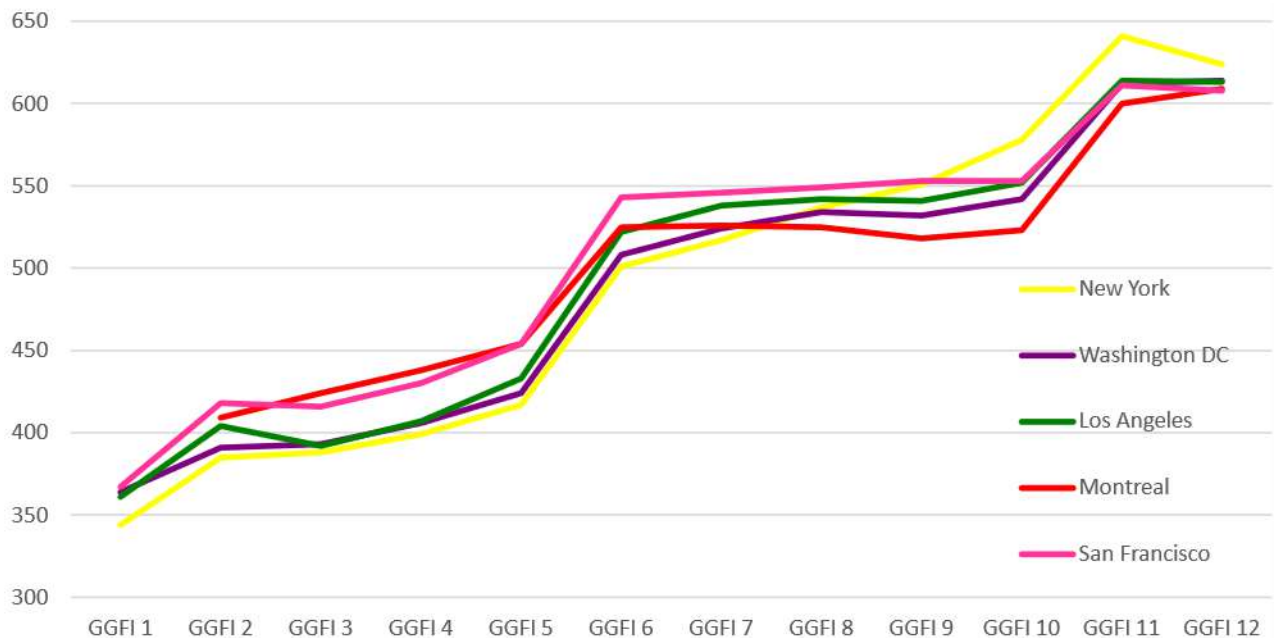


Chart 16 | North American Regional Assessments - Difference From The Mean

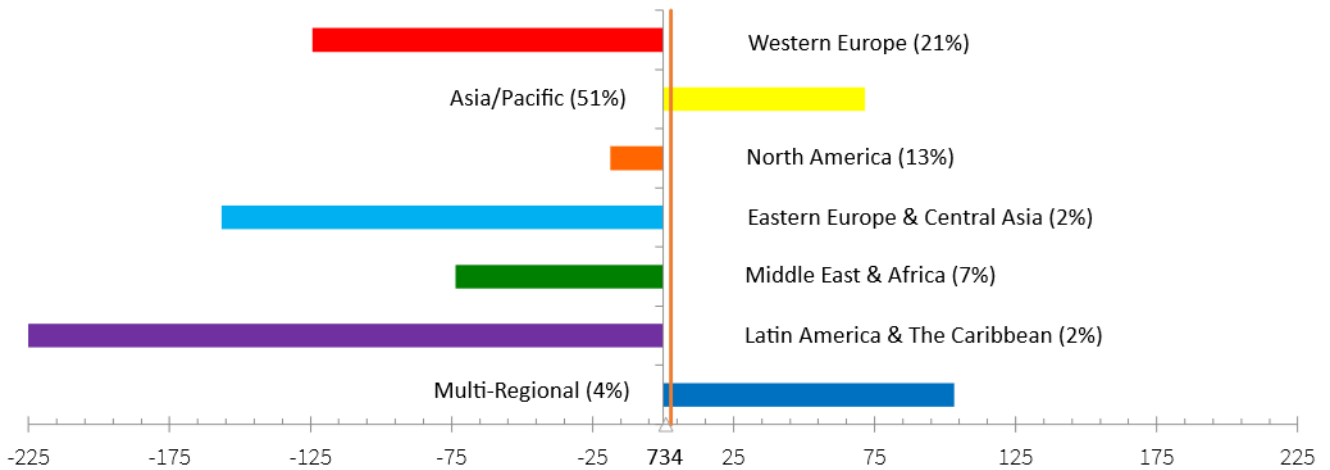


Chart 17 | Regional Assessments For New York - Difference From The Mean

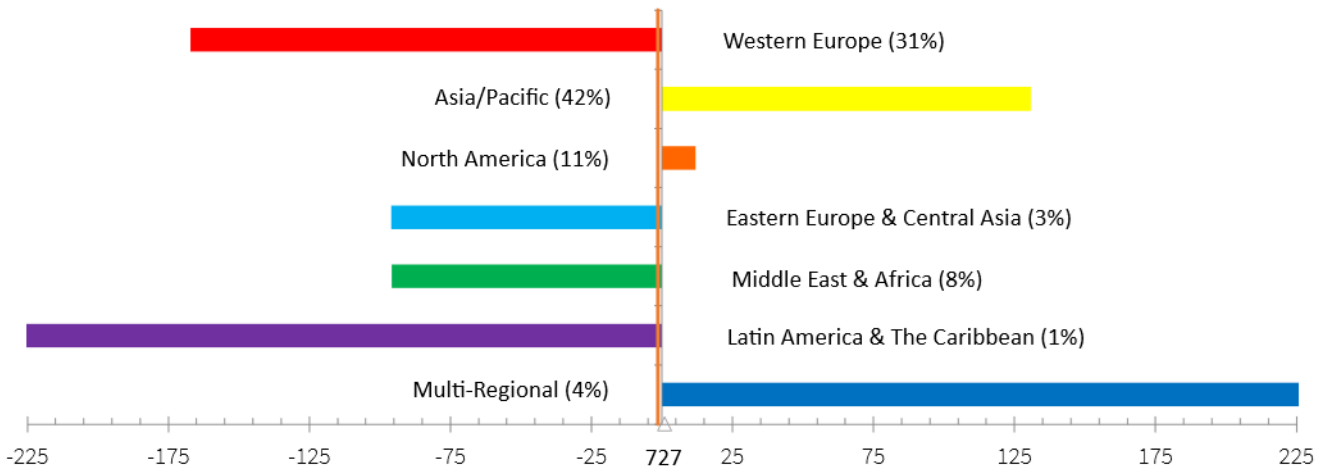
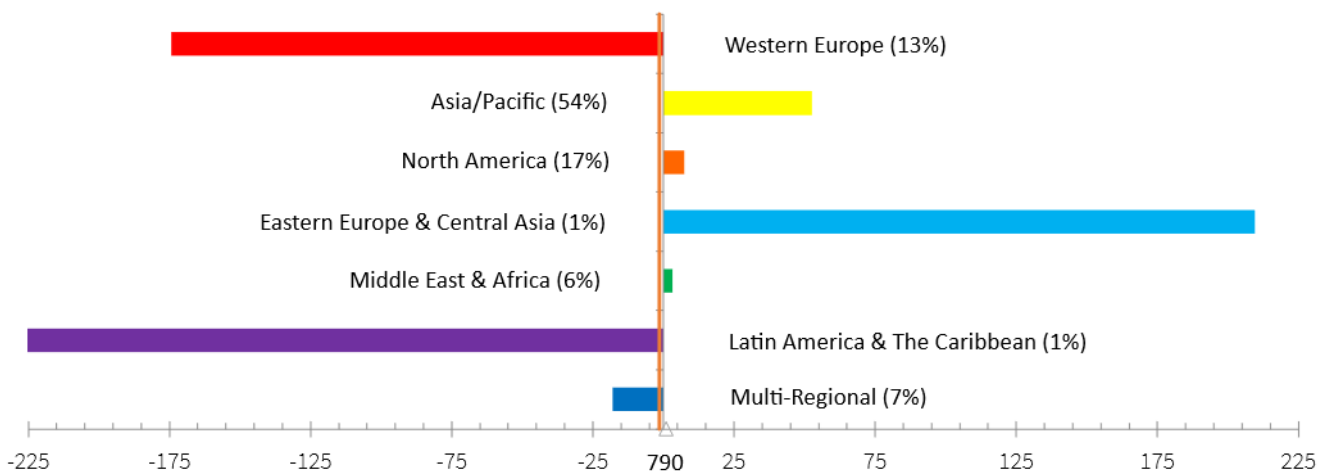


Chart 18 | Regional Assessments For Washington DC - Difference From The Mean



Middle East & Africa

- Dubai leads in the region, but fell one place, with Abu Dhabi in second place and Casablanca leading in Africa.
- Most centres in the region fell in the ranking, while Tel Aviv rose 14 places.
- Respondents from Asia/Pacific, Eastern Europe & Central Asia, and those with a multi-regional background rated Middle East & African centres higher than average.

Table 11 | Middle Eastern & African Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Dubai	33	588	32	579	▼ 1	▲ 9
Abu Dhabi	35	586	33	578	▼ 2	▲ 8
Casablanca	40	581	38	573	▼ 2	▲ 8
Tel Aviv	42	579	56	550	▲ 14	▲ 29
Johannesburg	63	553	62	538	▼ 1	▲ 15
Doha	64	552	66	527	▲ 2	▲ 25
Cape Town	67	544	67	526	0	▲ 18
Mauritius	68	543	64	529	▼ 4	▲ 14
Riyadh	76	532	58	547	▼ 18	▼ 15
Lagos	84	520	79	493	▼ 5	▲ 27
Kigali	85	516	80	491	▼ 5	▲ 25
Bahrain	88	513	75	508	▼ 13	▲ 5
Nairobi	89	512	86	465	▼ 3	▲ 47

Chart 19 | Top Five Middle East & Africa Centre Ratings Over Time

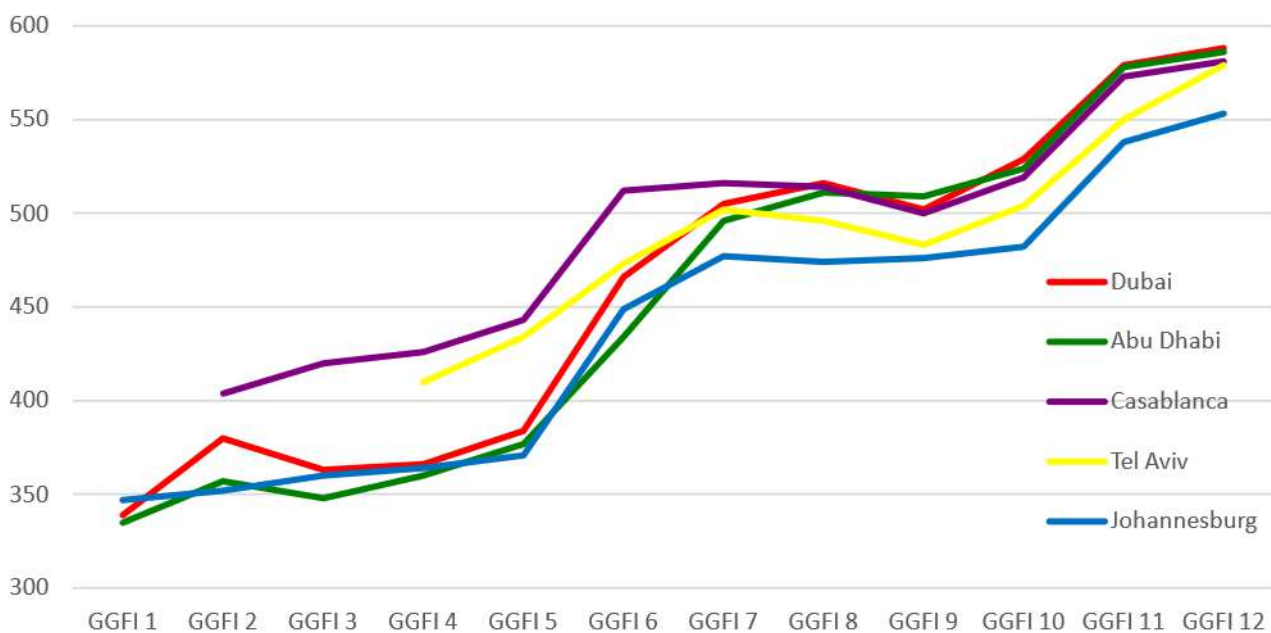


Chart 20 | Middle East & Africa Regional Assessments - Difference From The Mean

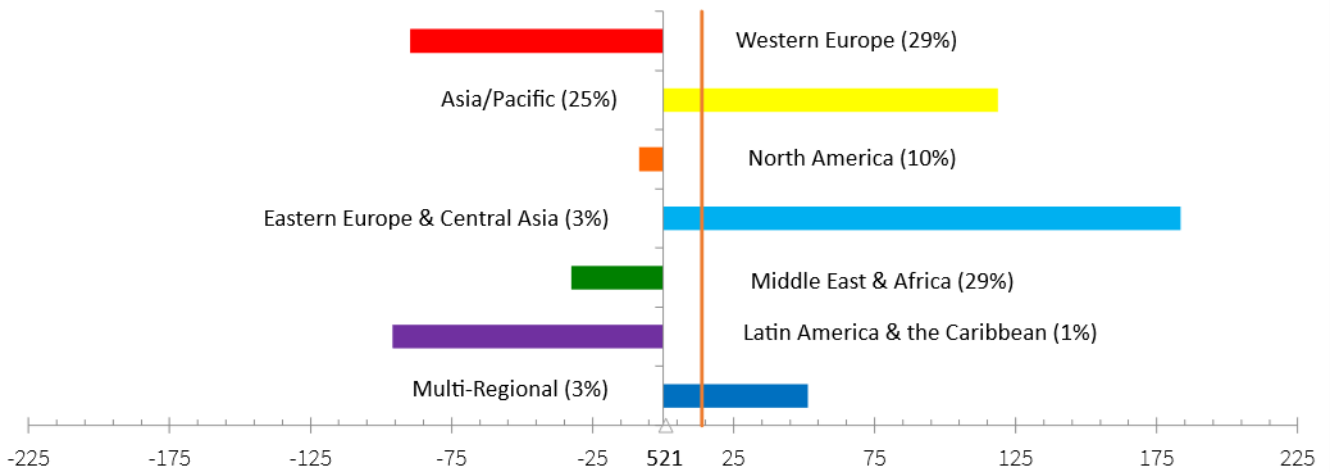


Chart 21 | Regional Assessments For Dubai - Difference From The Mean

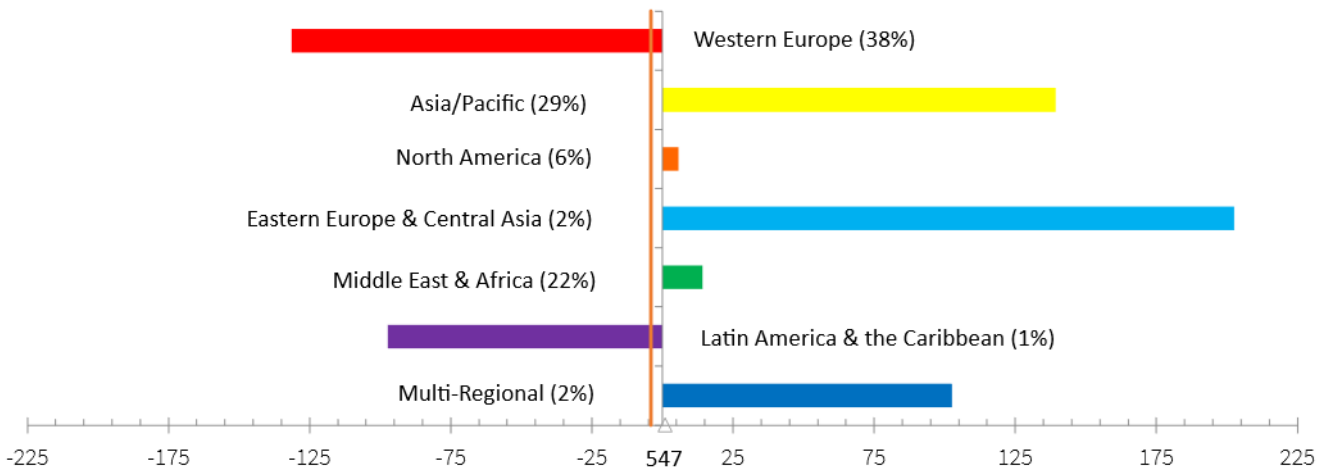
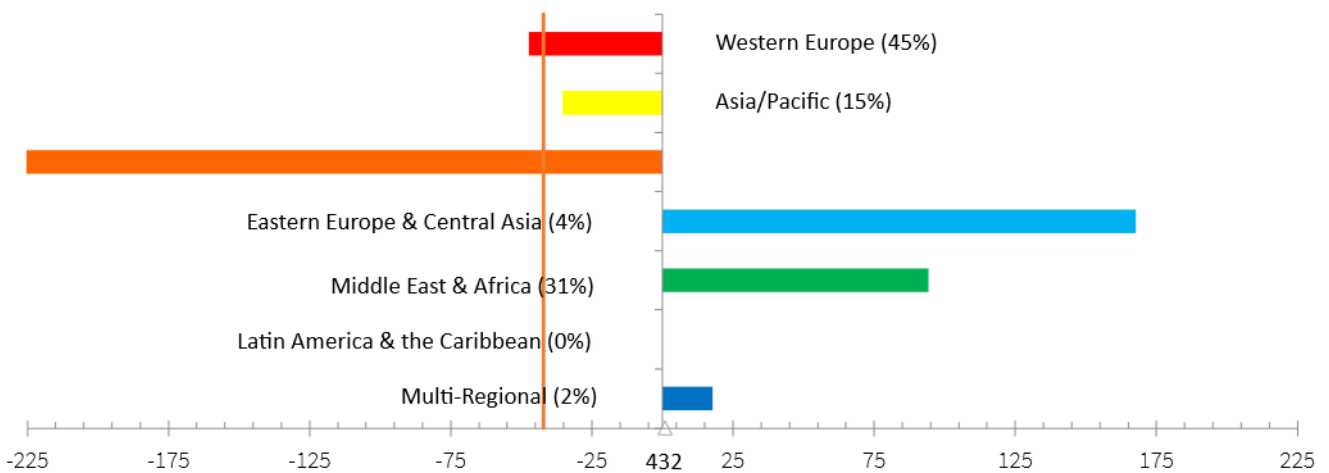


Chart 22 | Regional Assessments For Abu Dhabi - Difference From The Mean



Eastern Europe & Central Asia

- Astana is the clear leader in green finance in the region, ranking 22 places above Istanbul in second place.
- Cyprus joins the index for the first time in 78th position.
- Respondents from Western Europe and North America rate Eastern European & Central Asia centres lower than average while those from all other regions rate them higher than average.

Table 12 | Eastern European & Central Asian Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Astana	53	568	52	554	▼ 1	▲ 14
Istanbul	75	533	68	525	▼ 7	▲ 8
Warsaw	77	531	72	514	▼ 5	▲ 17
Cyprus	78	530	New	New	New	New
Prague	80	528	77	501	▼ 3	▲ 27
Riga	81	527	82	489	▲ 1	▲ 38
Moscow	87	514	69	523	▼ 18	▼ 9
Almaty	90	511	81	490	▼ 9	▲ 21
Sofia	92	505	84	485	▼ 8	▲ 20

Chart 23 | Top Five Eastern Europe & Central Asia Centre Ratings Over Time

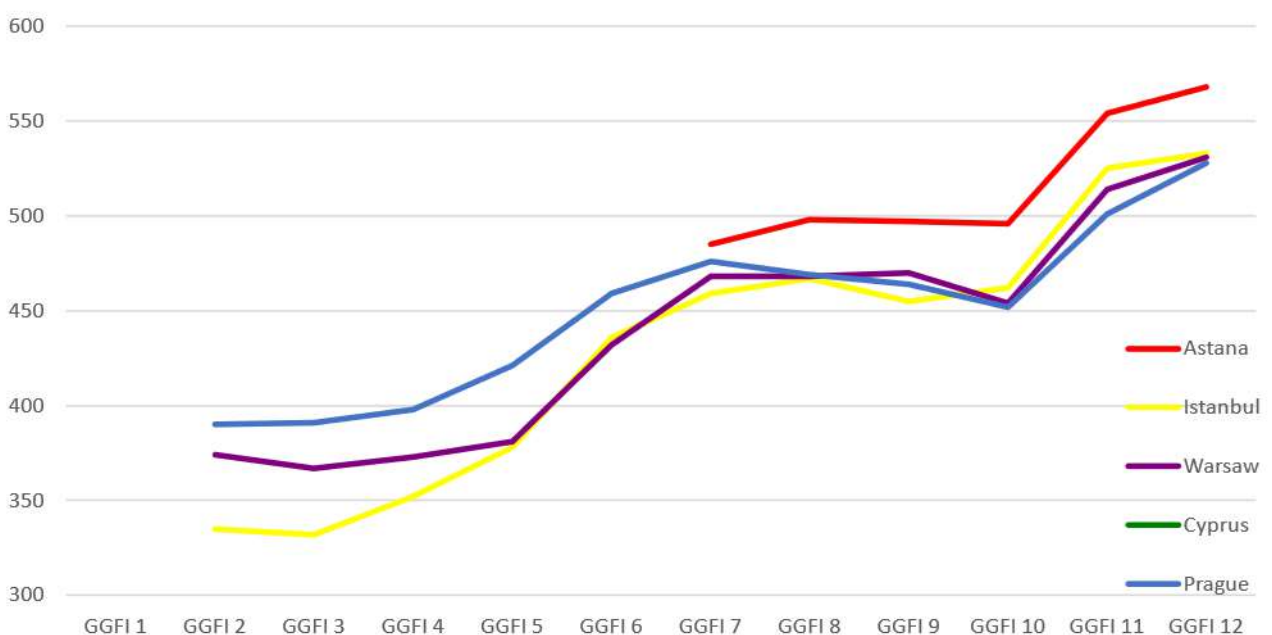


Chart 24 | Eastern Europe & Central Asia Regional Assessments - Difference From The Mean

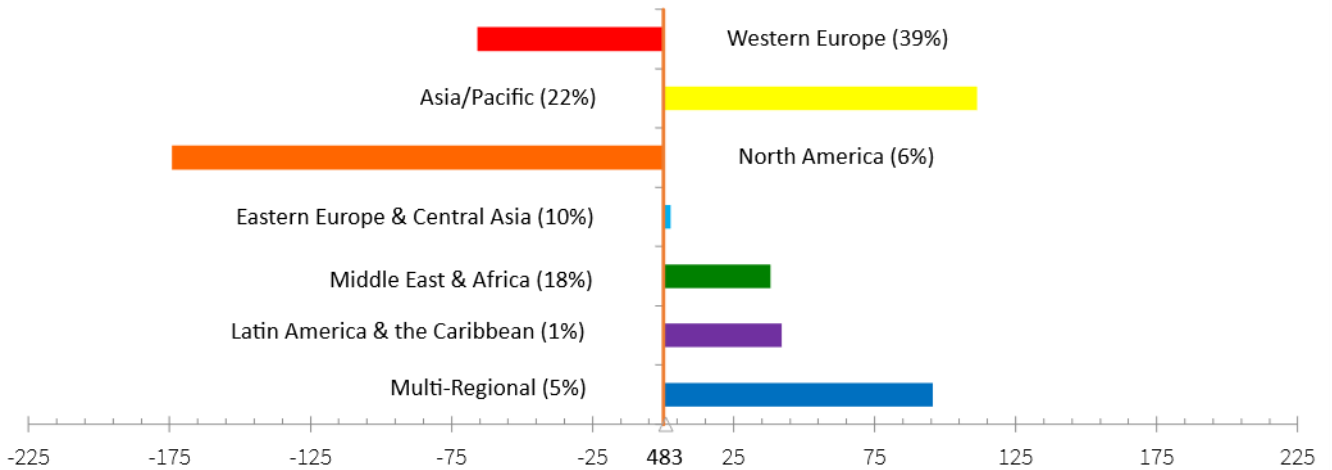


Chart 25 | Regional Assessments For Astana - Difference From The Mean

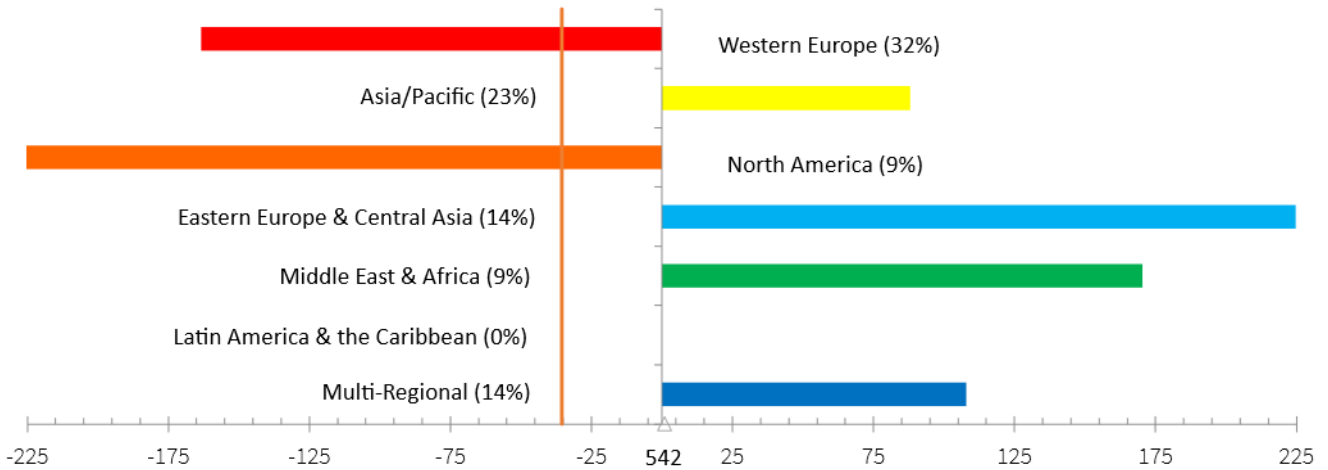
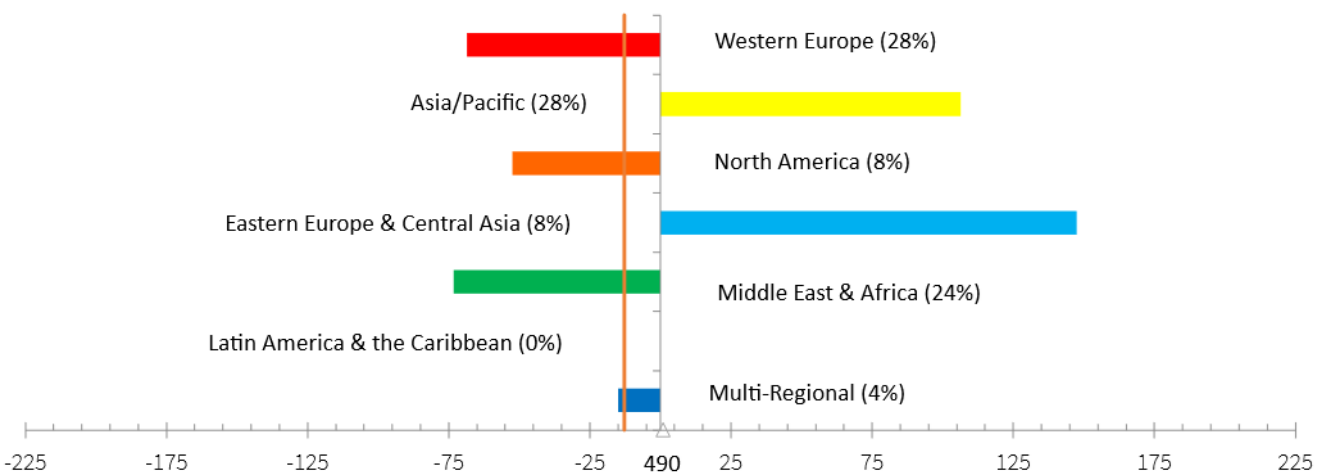


Chart 26 | Regional Assessments For Istanbul - Difference From The Mean



Western Europe

- London led the region, with Geneva in second place in the region, followed by Zurich and Luxembourg and six Western European centres feature in the world top ten.
- Monaco entered the index for the first time.
- Respondents from Western Europe, North America, and the Middle East & Africa rated Western European centres lower than average.

Table 13 | Top 15 Western European Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
London	1	631	1	642	0	▼ 11
Geneva	3	623	4	620	▲ 1	▲ 3
Zurich	4	618	12	609	▲ 8	▲ 9
Luxembourg	5	616	5	616	0	0
Stockholm	6	615	3	621	▼ 3	▼ 6
Copenhagen	10	611	8	613	▼ 2	▼ 2
Amsterdam	11	610	6	615	▼ 5	▼ 5
Oslo	17	604	16	605	▼ 1	▼ 1
Edinburgh	19	602	14	607	▼ 5	▼ 5
Paris	23	598	17	604	▼ 6	▼ 6
Madrid	25	596	30	581	▲ 5	▲ 15
Frankfurt	29	592	36	575	▲ 7	▲ 17
Munich	32	589	22	599	▼ 10	▼ 10
Hamburg	38	583	45	566	▲ 7	▲ 17
Brussels	39	582	39	572	0	▲ 10

Chart 27 | Top Five Western European Centre Ratings Over Time

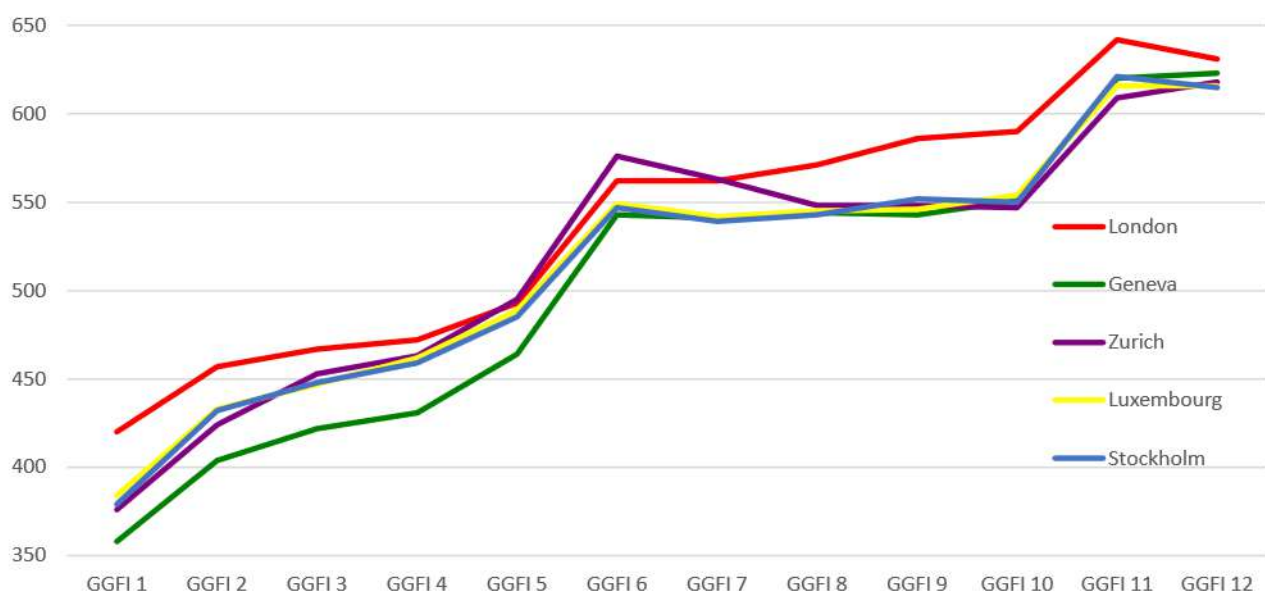


Chart 28 | Western Europe Regional Assessments - Difference From The Mean

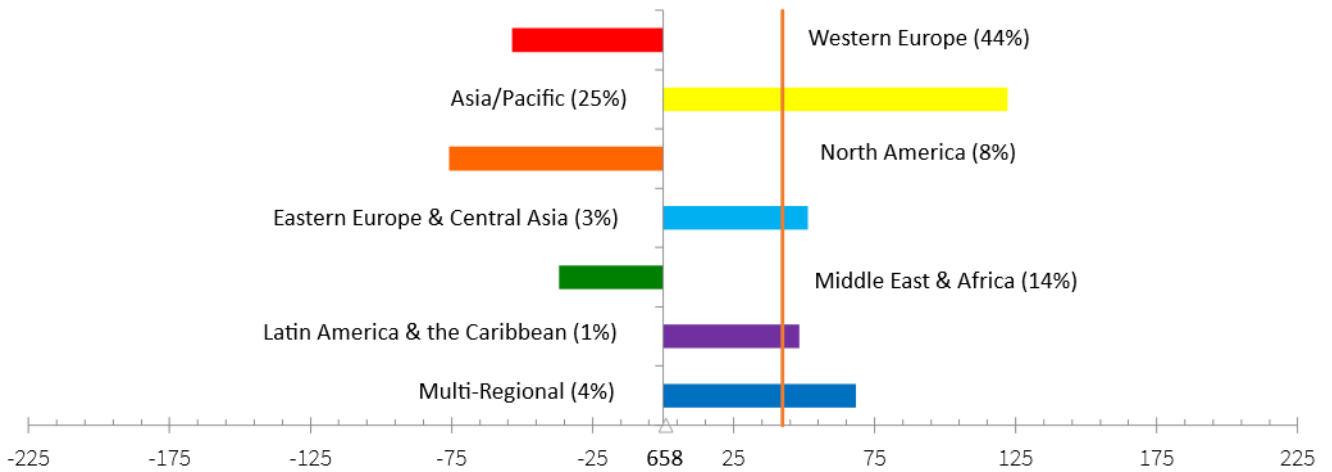


Chart 29 | Regional Assessments For London - Difference From The Mean

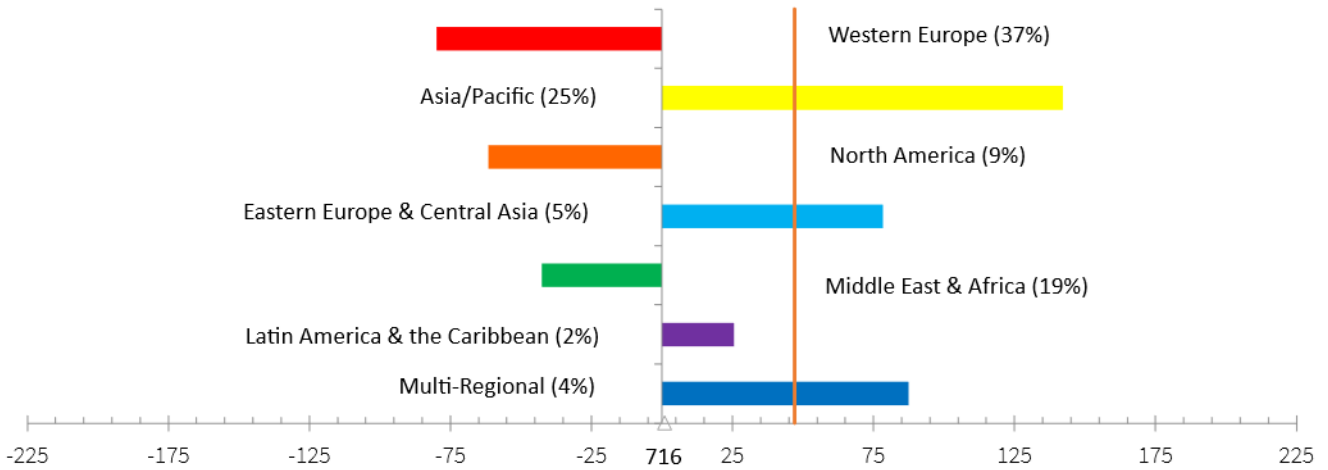
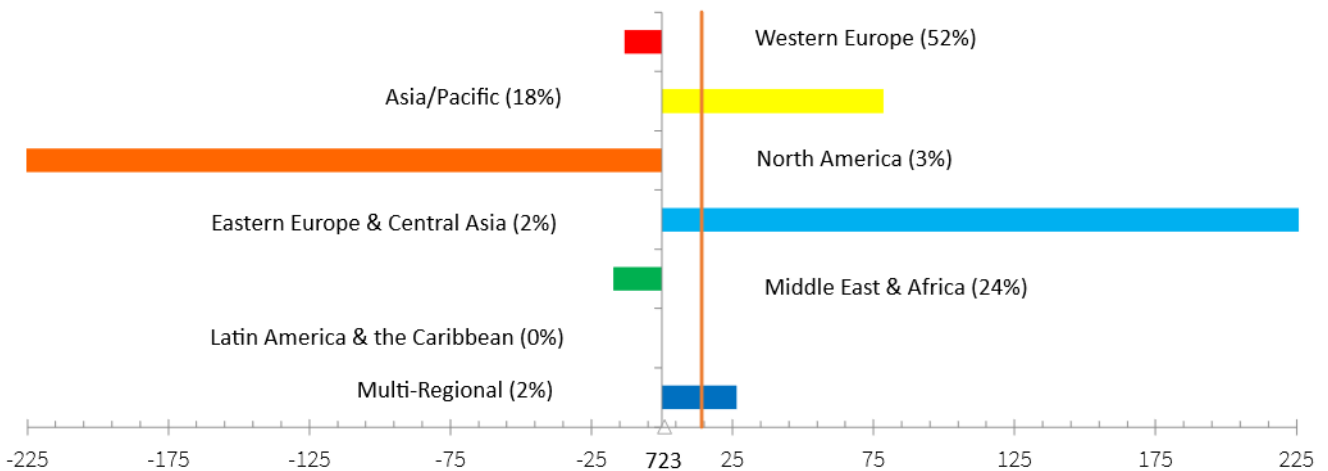


Chart 30 | Regional Assessments For Geneva - Difference From The Mean



Latin America & The Caribbean

- Santiago overtook Rio de Janeiro to take first position in the region.
- Bahamas entered the index for the first time.
- Respondents from Western Europe, North America, and the home region of Latin America & The Caribbean rated centres in the region below average.

Table 14 | Latin American & Caribbean Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Santiago	65	551	70	517	▲ 5	▲ 34
Rio de Janeiro	66	550	63	531	▼ 3	▲ 19
Sao Paulo	69	542	74	510	▲ 5	▲ 32
Mexico City	71	539	73	511	▲ 2	▲ 28
Cayman Islands	86	515	85	482	▼ 1	▲ 33
British Virgin Islands	91	509	78	497	▼ 13	▲ 12
Bahamas	93	503	New	New	New	New
Bermuda	94	499	83	488	▼ 11	▲ 11

Chart 31 | Top Five Latin American & Caribbean Centre Ratings Over Time

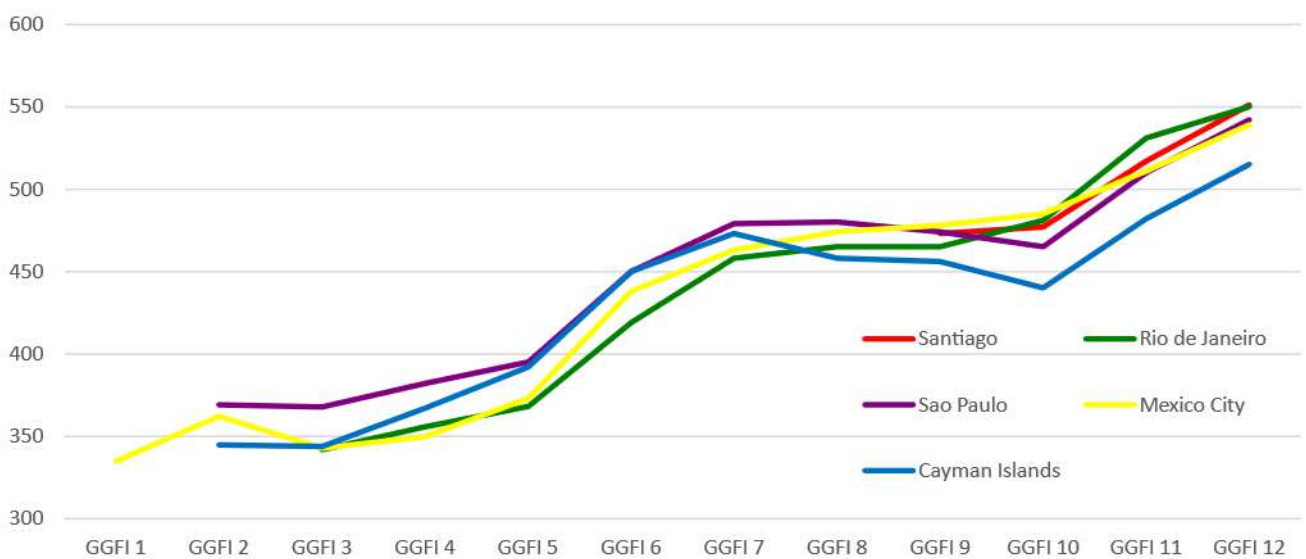


Chart 32 | Latin America & The Caribbean Regional Assessments - Difference From The Mean

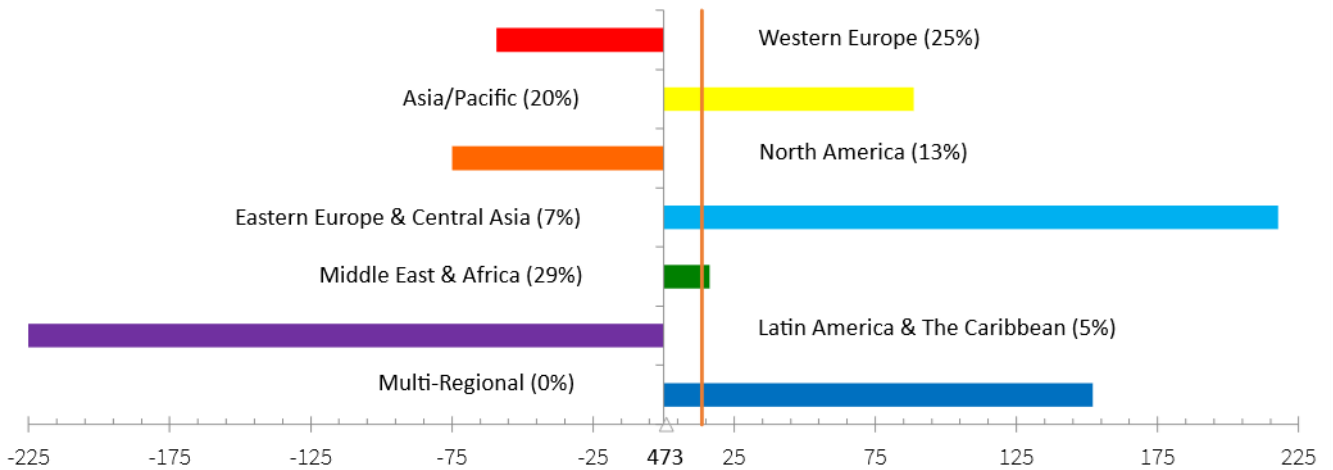


Chart 33 | Regional Assessments For Santiago - Difference From The Mean

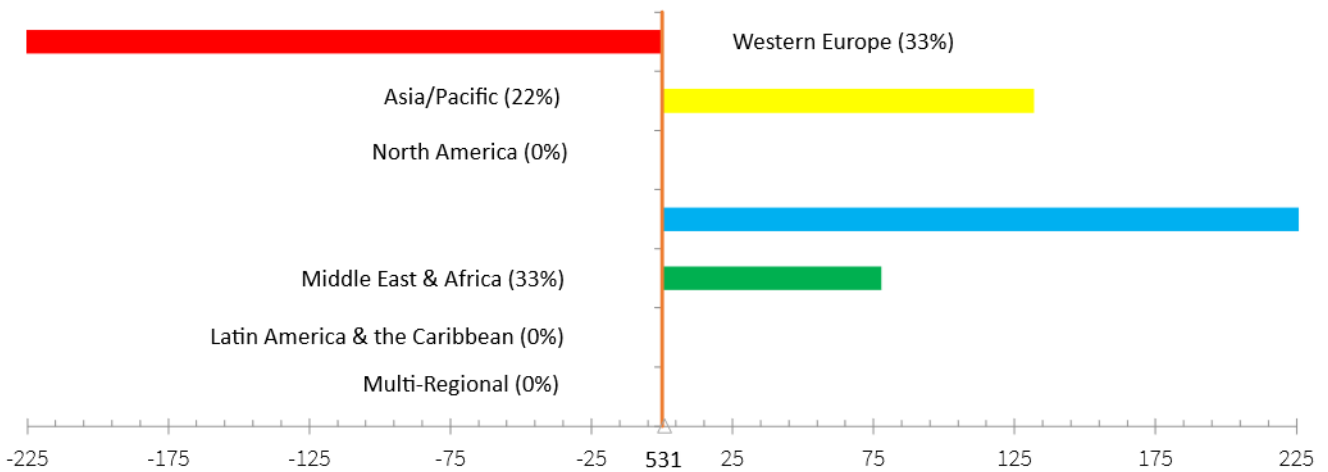
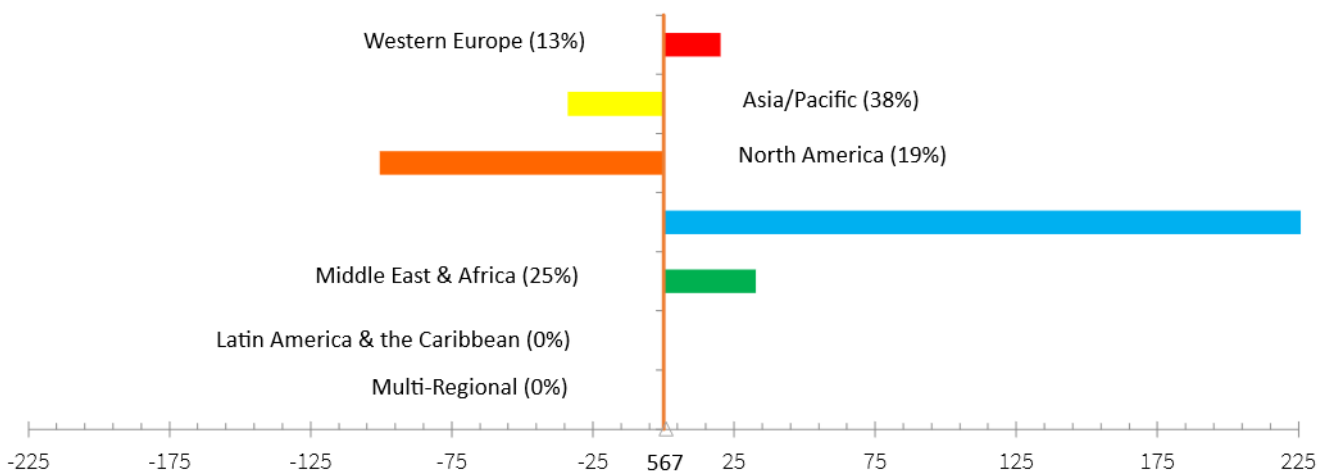


Chart 34 | Regional Assessments For Rio de Janeiro - Difference From The Mean



Asia/Pacific

- Singapore and Sydney maintained their leading positions in the region, while Melbourne, Seoul, and Shanghai also featured in the top 20 in the world.
- Manila entered the index for the first time.
- Respondents from Asia/Pacific and people operating across more than one region rated these centres above average.

Table 15 | Top 15 Asia/Pacific Centres In GGFI 12

Centre	GGFI 12		GGFI 11		Change In Rank	Change In Rating
	Rank	Rating	Rank	Rating		
Singapore	9	612	11	610	▲ 2	▲ 2
Sydney	14	607	13	608	▼ 1	▼ 1
Melbourne	16	605	23	598	▲ 7	▲ 7
Seoul	18	603	15	606	▼ 3	▼ 3
Shanghai	20	601	20	601	0	0
Shenzhen	24	597	25	586	▲ 1	▲ 11
Beijing	27	594	27	584	0	▲ 10
Busan	28	593	26	585	▼ 2	▲ 8
Wellington	31	590	18	603	▼ 13	▼ 13
Tokyo	34	587	31	580	▼ 3	▲ 7
Hong Kong	36	585	37	574	▲ 1	▲ 11
Qingdao	37	584	35	576	▼ 2	▲ 8
Osaka	41	580	42	569	▲ 1	▲ 11
GIFT City-Gujarat	54	567	41	570	▼ 13	▼ 3
Guangzhou	55	566	44	567	▼ 11	▼ 1

Chart 35 | Top Five Asia/Pacific Centre Ratings Over Time

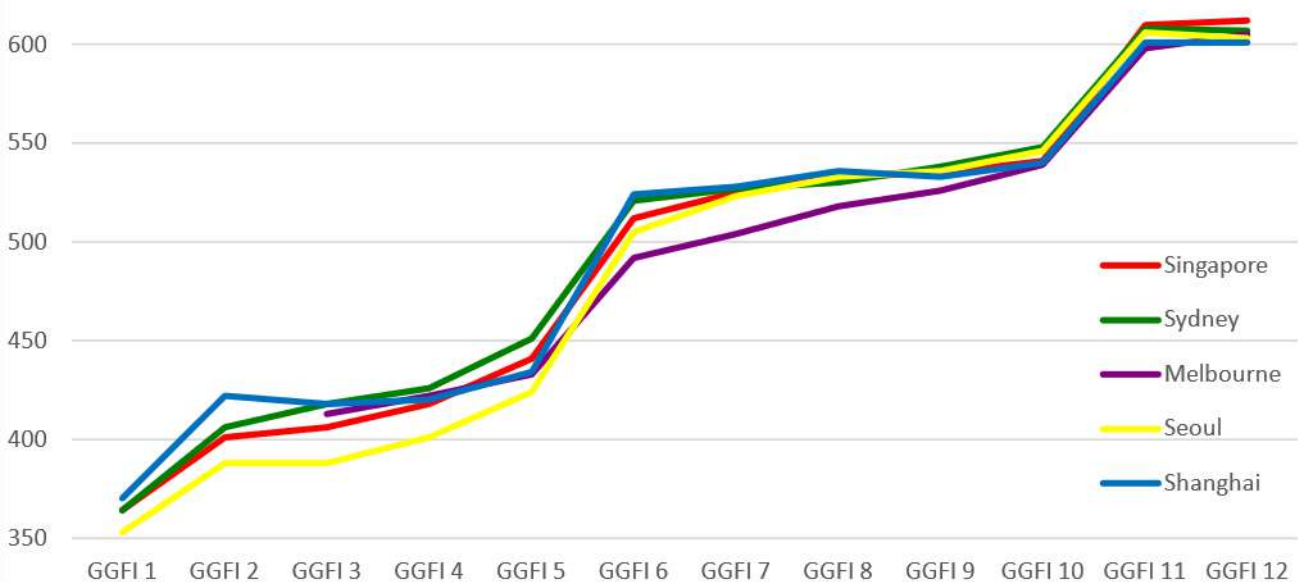


Chart 36 | Asia/Pacific Regional Assessments - Difference From The Mean

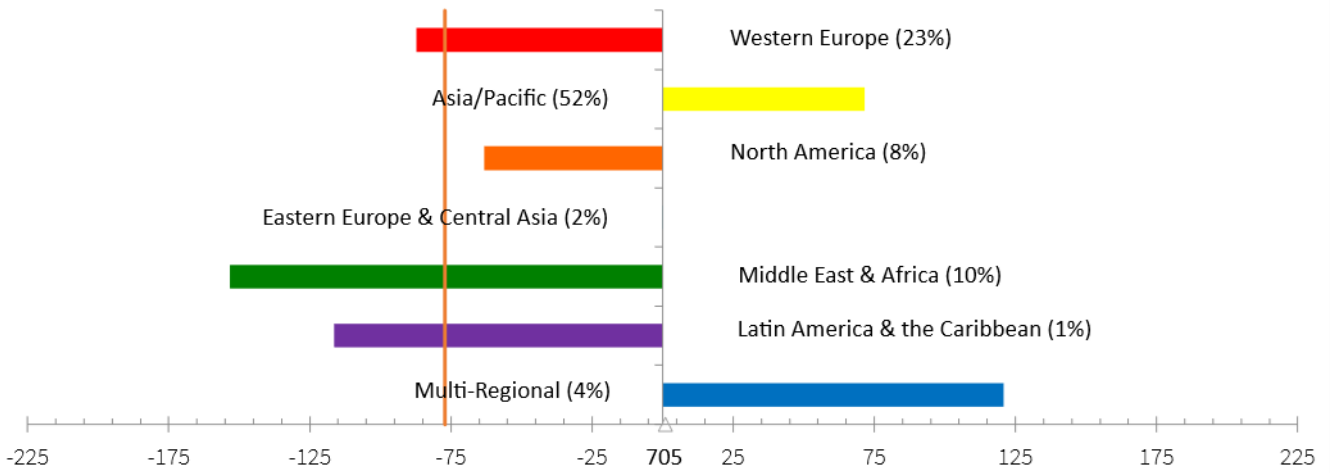


Chart 37 | Regional Assessments For Singapore - Difference From The Mean

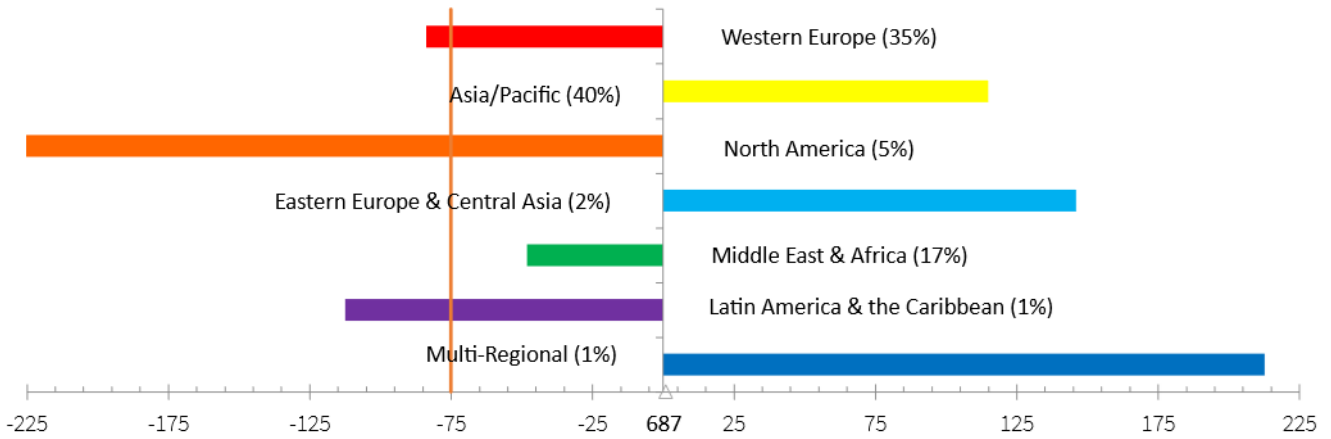
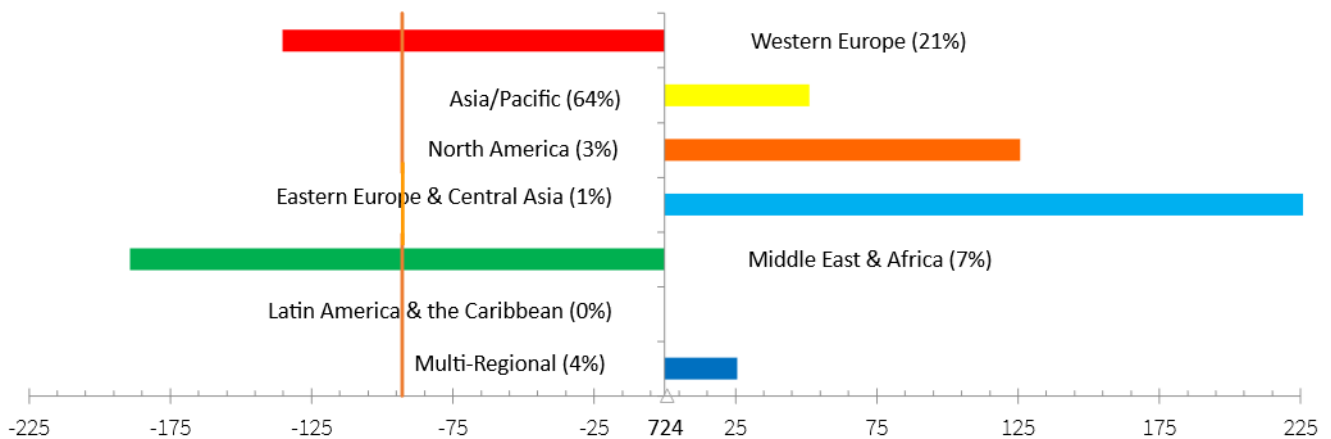


Chart 38 | Regional Assessments For Sydney - Difference From The Mean



Stability

The GGFI model allows for an analysis of the stability of financial centres in the index, which can be useful for centres when assessing their development strategies. Chart 39 contrasts the ‘spread’ or variance of the individual assessments given to the top 40 centres in GGFI 12, with sensitivity to changes in the instrumental factors.

The chart shows three bands of financial centres. In the top right segment, Melbourne, New York, San Diego, and Casablanca have a higher sensitivity to changes in the instrumental factors and a higher variance of assessments than other centres. Centres in this area have the highest potential for future movement in their ranking. The stable centres in the bottom left have a lower sensitivity to change and demonstrate greater consistency in their GGFI ratings.

Chart 39 | Stability In Assessments And Instrumental Factors



Industry Sectors

We can analyse the differing assessments provided by respondents working in various industry sectors by building the index separately using the responses provided only from those industries. This analysis allows a relative measure of the sectoral strengths and weaknesses for each centre.

Table 16 illustrates separate sub-indices for the Policy, Knowledge (incorporating universities and NGOs), Capital Markets, Investment, and Professional Services sectors. The table shows how the index ranking varies according to industry sector. The leading centres in the index generally feature in the higher ranks of the industry sector sub-indices, although there are interesting strengths and weaknesses. For example, New York ranks only 10th in the Policy sub-index, Beijing is second in the Knowledge and Capital Markets sub-indices, and Dubai is third in the Professional Services sub-index.

Table 16 | GGFI 12 Industry Sector Sub-Indices - Top 15

Rank	Industry Sub-Sector				
	Policy	Knowledge	Capital Markets	Investment	Professional Services
1	London	London	New York	London	New York
2	Geneva	Beijing	Beijing	New York	London
3	Luxembourg	New York	Shanghai	Zurich	Dubai
4	Singapore	Amsterdam	Los Angeles	Singapore	San Francisco
5	Zurich	Singapore	Washington DC	Stockholm	Los Angeles
6	Edinburgh	San Francisco	Dubai	Washington DC	Stockholm
7	Beijing	Edinburgh	Chicago	Luxembourg	Washington DC
8	Paris	Los Angeles	San Francisco	Oslo	Zurich
9	Montreal	Shanghai	Shenzhen	Amsterdam	Sydney
10	New York	Stockholm	London	Dubai	Beijing
11	Copenhagen	Luxembourg	Abu Dhabi	Geneva	Luxembourg
12	Amsterdam	Geneva	Boston	Chicago	Geneva
13	Seoul	Chicago	Miami	Montreal	Singapore
14	Los Angeles	Copenhagen	San Diego	Seoul	Copenhagen
15	Chicago	Seoul	Singapore	San Diego	Amsterdam

Taking the sectoral analysis further, we can also calculate the index using the responses only from those working directly in green finance in financial services organisations. The results are shown in table 17.

Table 17 | GGFI 12 Using Responses Only From Respondents Working Directly In Green Finance

Centre	Rating	Adjusted Rank	GGFI 12 Rank	Difference
London	638	1	1	0
New York	618	3	2	-1
Geneva	615	6	3	-3
Zurich	619	2	4	2
Luxembourg	617	4	5	1
Stockholm	607	14	6	-8
Washington DC	604	19	7	-12
Los Angeles	614	7	8	1
Singapore	610	11	9	-2
Copenhagen	612	9	10	1
Amsterdam	616	5	11	6
Montreal	613	8	12	4
San Francisco	603	21	13	-8
Sydney	609	12	14	2
Chicago	608	13	15	2
Melbourne	605	16	16	0
Oslo	595	27	17	-10
Seoul	603	21	18	-3
Edinburgh	604	19	19	0
Shanghai	611	10	20	10
San Diego	583	34	21	-13
Toronto	595	27	22	-5
Paris	599	25	23	-2
Shenzhen	606	15	24	9
Madrid	580	35	25	-10
Boston	576	38	26	-12
Beijing	605	16	27	11
Busan	598	26	28	2
Frankfurt	578	37	29	-8
Vancouver	571	42	30	-12
Wellington	589	31	31	0
Munich	573	41	32	-9
Dubai	600	24	33	9
Tokyo	590	30	34	4
Abu Dhabi	594	29	35	6
Hong Kong	603	21	36	15
Qingdao	557	58	37	-21
Hamburg	575	40	38	-2
Brussels	570	44	39	-5
Casablanca	605	16	40	24
Osaka	585	33	41	8
Tel Aviv	564	48	42	-6
Vienna	554	63	43	-20
Jersey	562	51	44	-7
Helsinki	556	60	45	-15
Glasgow	562	51	46	-5
Berlin	562	51	47	-4

Centre	Rating	Adjusted Rank	GGFI 12 Rank	Difference
Dublin	579	36	48	12
Milan	567	45	49	4
Atlanta	564	48	50	2
Lisbon	567	45	51	6
Calgary	550	66	52	-14
Astana	576	38	53	15
GIFT City-Gujarat	551	65	54	-11
Guangzhou	559	54	55	1
Rome	559	54	56	2
Isle of Man	547	68	57	-11
Guernsey	546	69	58	-11
Philadelphia	546	69	59	-10
Miami	559	54	60	6
Jakarta	538	75	61	-14
Kuala Lumpur	558	57	62	5
Johannesburg	557	58	63	5
Doha	546	69	64	-5
Santiago	571	42	65	23
Rio de Janeiro	526	85	66	-19
Cape Town	553	64	67	3
Mauritius	556	60	68	8
Sao Paulo	523	88	69	-19
New Delhi	567	45	70	25
Mexico City	555	62	71	9
Mumbai	563	50	72	22
Bangkok	527	84	73	-11
Manila	541	73	74	1
Istanbul	586	32	75	43
Riyadh	549	67	76	9
Warsaw	540	74	77	3
Cyprus	529	80	78	-2
Liechtenstein	537	76	79	3
Prague	534	77	80	3
Riga	522	89	81	-8
Malta	546	69	82	13
Monaco	530	79	83	4
Lagos	534	77	84	7
Kigali	524	87	85	-2
Cayman Islands	529	80	86	6
Moscow	519	90	87	-3
Bahrain	512	92	88	-4
Nairobi	525	86	89	3
Almaty	517	91	90	-1
British Virgin Islands	512	92	91	-1
Sofia	528	82	92	10
Bahamas	512	92	93	1
Bermuda	528	82	94	12

GGFI 12 Interest, Impact, And Drivers Of Green Finance

In addition to requesting ratings of depth and quality for financial centres, the GGFI questionnaire asks additional questions concerning the development of green finance. Amongst the topics covered are:

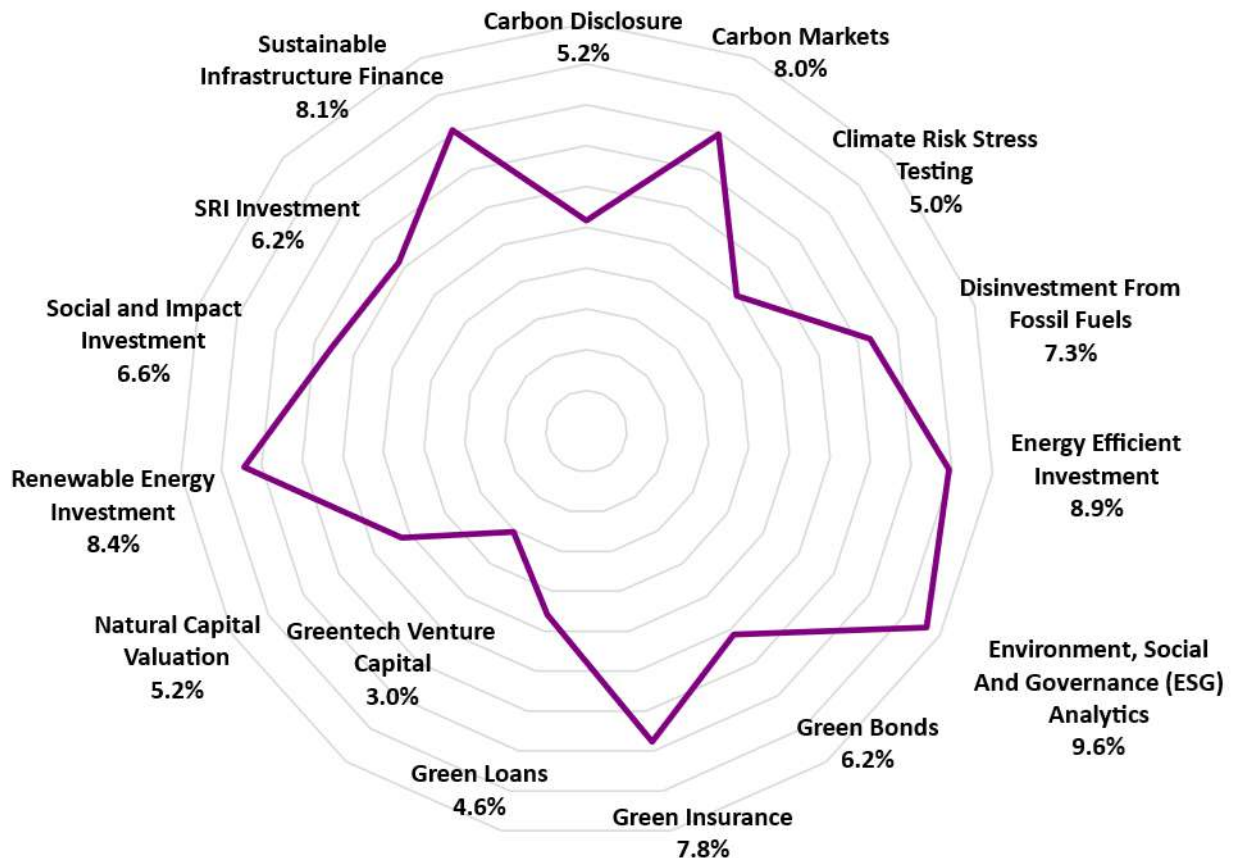
- The areas of green finance considered most interesting by respondents;
- The areas of green finance which respondents consider to have the greatest impact on sustainability; and
- Factors driving the development of green finance.

Areas Of Interest In Green Finance And Areas With The Most Impact

We asked respondents to identify the areas of green finance which they considered most interesting and separately the areas of green finance that they consider have most impact on sustainability. The results are shown in Charts 40 and 41.

With respect to interest, Environment, Social And Governance (ESG) Analytics is the leading issue mentioned by our respondents, just ahead of Energy Efficient Investment Sustainable Infrastructure Finance. Renewable Energy Investment and Sustainable Infrastructure Finance take third and fourth place. Green Bonds, which in the last edition of the index was listed second in terms of interest is now in eighth position. The areas considered least interesting are Greentech Venture Capital and Green Loans.

Chart 40 | Interest - Percentage Of Total Mentions



With respect to impact, Energy Efficient Investment, Sustainable Infrastructure Finance, and Environment, Social, And Governance (ESG) Analytics are rated as the areas of green finance with most impact. GreenTech Venture Capital, Carbon Disclosure, and Green Loans, are ranked lowest on this measure by our respondents.

Chart 41 | Impact - Percentage Of Total Mentions

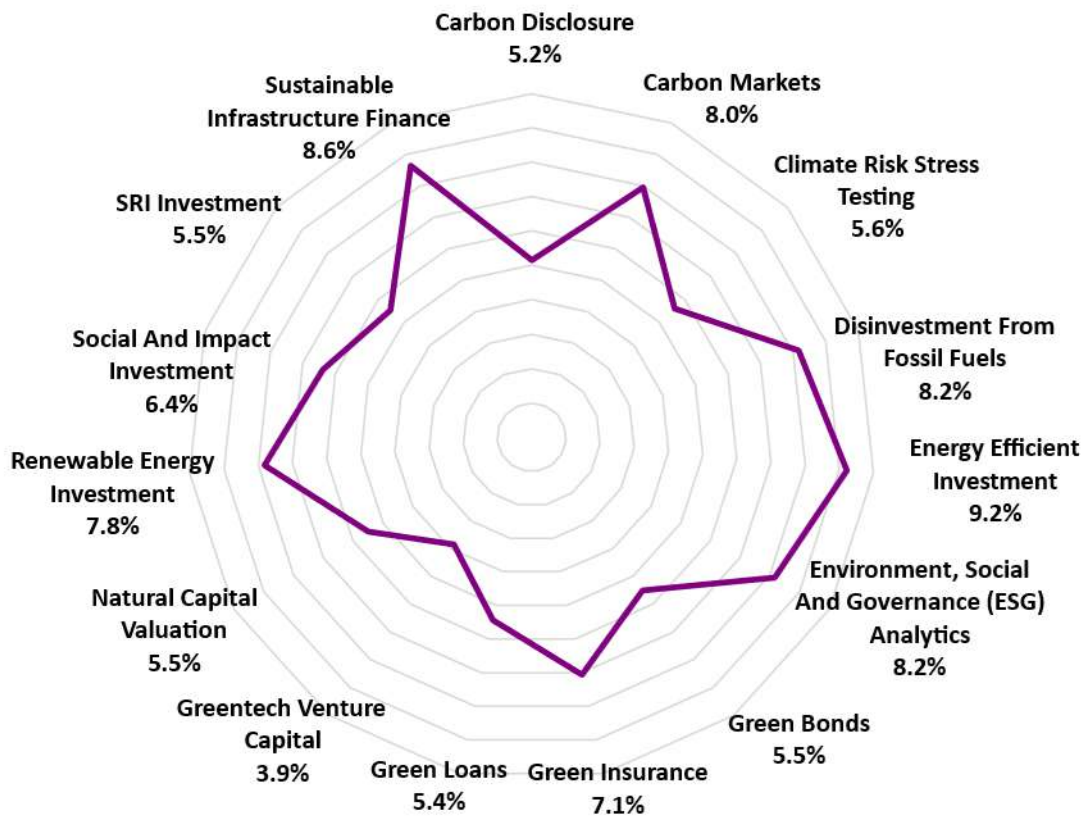
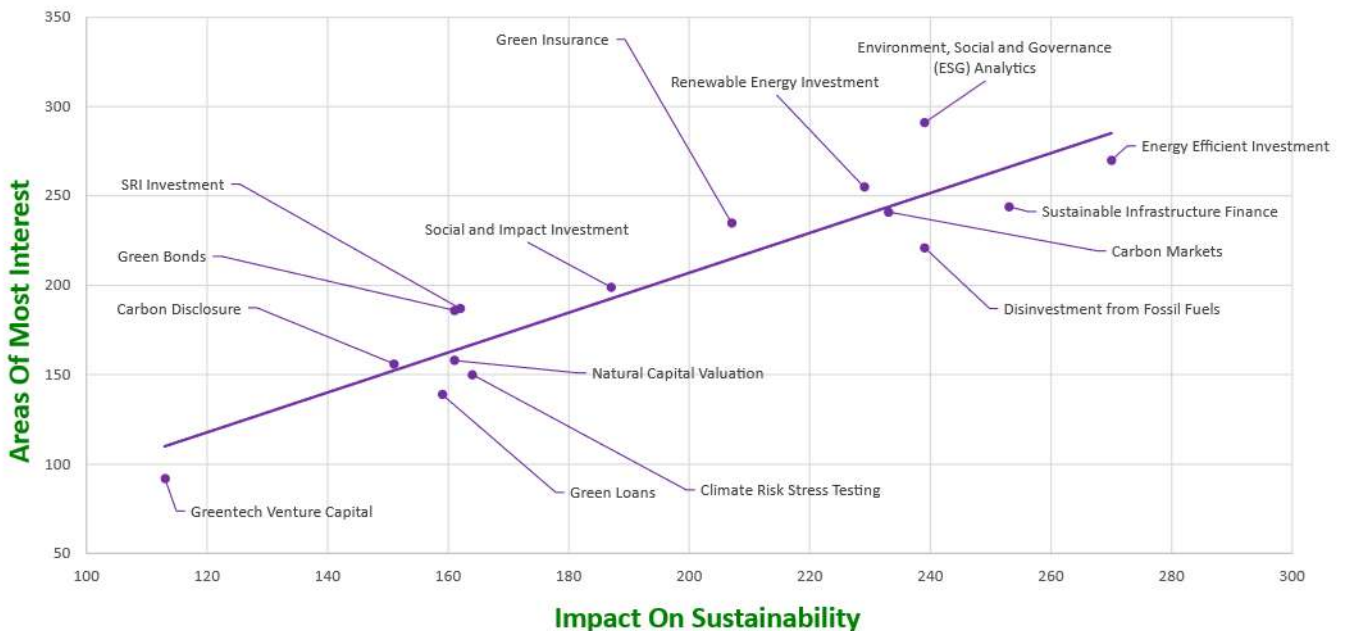
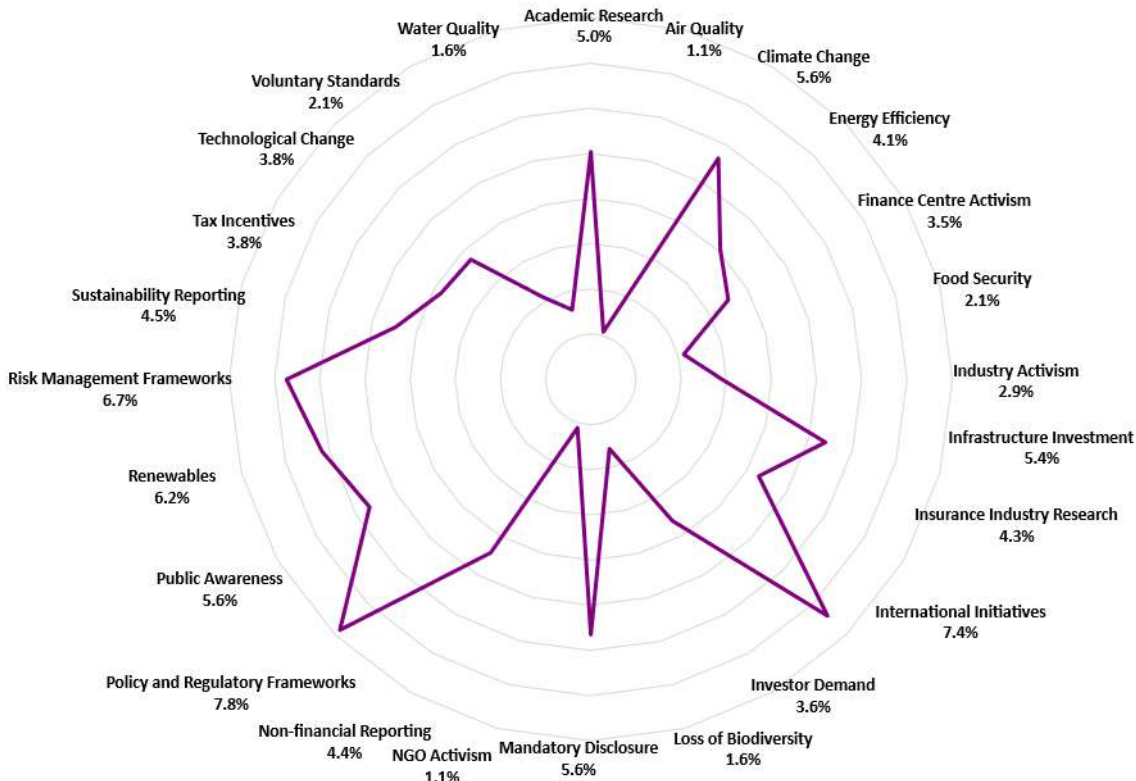


Chart 42 | The Correlation Between Interest And Impact



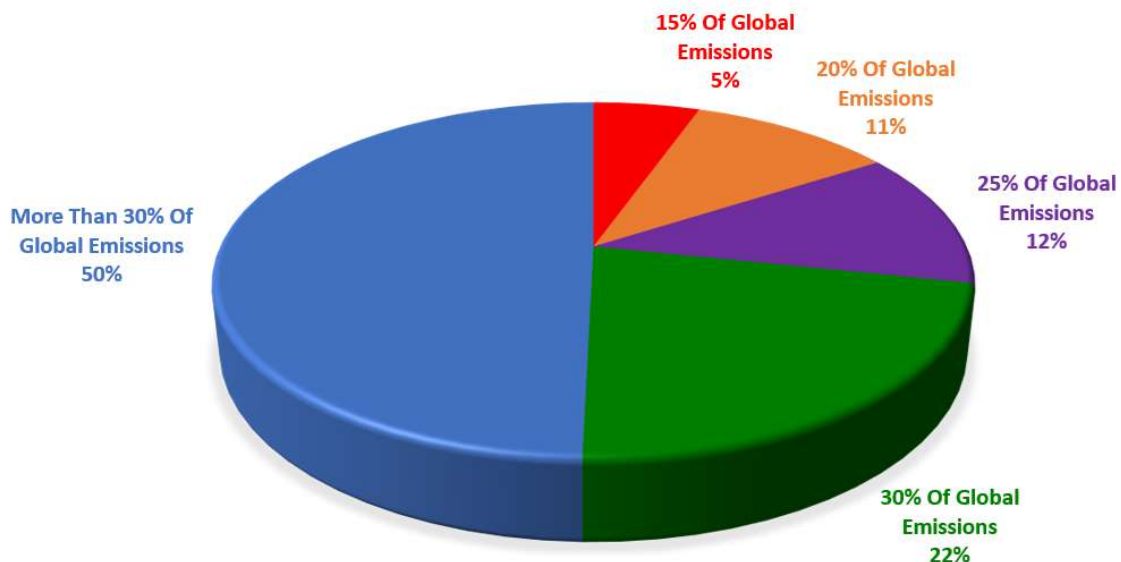
With respect to drivers, Policy & Regulatory Frameworks continues to be rated as the most important driver of green finance, followed by International Initiatives. Risk Management Frameworks and Renewables took third and fourth position. Air Quality, NGO Activism, and Loss Of Biodiversity are mentioned least frequently. These results underline the continuing importance of policy and regulation and international cooperation in the development of green finance.

Chart 43 | Drivers - Percentage Of Total Mentions



We also asked respondents to the GGFI survey to assess the proportion of global emissions that they thought will be covered by carbon pricing schemes by 2030, building on the World Bank’s estimate that 13% of annual global greenhouse gas (GHG) emissions were covered by carbon pricing schemes in June 2022 – both emissions trading schemes and carbon taxation. Chart 44 shows the response, with half of respondents thinking that over 30% of emissions will be within carbon pricing schemes by 2030.

Chart 44 | Expected Proportion Of GHG Emissions To Be Covered By Carbon Pricing By 2030



Appendix 1: Assessment Details

Table 18 | Details Of GGFI 12 Assessments By Centre

Centre	GGFI 12		Assessments		
	Rank	Rating	Number	Average	Std Dev
London	1	631	181	716	215
New York	2	624	249	727	248
Geneva	3	623	66	723	194
Zurich	4	618	72	680	236
Luxembourg	5	616	76	702	184
Stockholm	6	615	41	693	215
Washington DC	7	614	134	790	190
Los Angeles	8	613	103	772	167
Singapore	9	612	139	687	211
Copenhagen	10	611	31	691	162
Amsterdam	11	610	77	672	216
Montreal	12	609	48	774	220
San Francisco	13	608	61	763	193
Sydney	14	607	76	724	165
Chicago	15	606	81	733	177
Melbourne	16	605	42	730	220
Oslo	17	604	22	742	170
Seoul	18	603	53	703	131
Edinburgh	19	602	49	671	179
Shanghai	20	601	87	700	239
San Diego	21	600	26	757	237
Toronto	22	599	82	697	187
Paris	23	598	89	641	231
Shenzhen	24	597	38	745	184
Madrid	25	596	41	668	184
Boston	26	595	67	679	216
Beijing	27	594	101	658	222
Busan	28	593	27	631	196
Frankfurt	29	592	94	641	217
Vancouver	30	591	59	718	148
Wellington	31	590	12	756	159
Munich	32	589	40	648	228
Dubai	33	588	125	547	251
Tokyo	34	587	82	664	215
Abu Dhabi	35	586	55	432	221
Hong Kong	36	585	100	534	229
Qingdao	37	584	409	867	65
Hamburg	38	583	28	663	228
Brussels	39	582	61	650	218
Casablanca	40	581	20	510	220
Osaka	41	580	25	669	193
Tel Aviv	42	579	24	641	167
Vienna	43	578	20	554	234
Jersey	44	577	33	567	228
Helsinki	45	576	21	726	179
Glasgow	46	575	38	664	245
Berlin	47	574	59	641	226

Centre	GGFI 12		Assessments		
	Rank	Rating	Number	Average	Std Dev
Dublin	48	573	64	595	214
Milan	49	572	33	617	218
Atlanta	50	571	39	659	212
Lisbon	51	570	25	693	166
Calgary	52	569	49	719	163
Astana	53	568	22	542	242
GIFT City-Gujarat	54	567	18	692	283
Guangzhou	55	566	27	648	212
Rome	56	565	34	604	217
Isle of Man	57	564	31	598	277
Guernsey	58	563	30	593	214
Philadelphia	59	562	32	749	128
Miami	60	561	26	572	248
Jakarta	61	560	31	581	233
Kuala Lumpur	62	558	39	609	199
Johannesburg	63	553	44	557	235
Doha	64	552	43	560	244
Santiago	65	551	9	531	277
Rio de Janeiro	66	550	16	567	190
Cape Town	67	544	39	537	182
Mauritius	68	543	34	521	264
Sao Paulo	69	542	22	547	240
New Delhi	70	540	25	629	288
Mexico City	71	539	24	542	223
Mumbai	72	538	40	477	223
Bangkok	73	537	31	530	209
Manila	74	536	27	550	215
Istanbul	75	533	25	490	205
Riyadh	76	532	16	472	199
Warsaw	77	531	26	421	218
Cyprus	78	530	30	489	213
Liechtenstein	79	529	24	628	201
Prague	80	528	19	424	191
Riga	81	527	11	525	174
Malta	82	526	21	498	206
Monaco	83	523	27	595	253
Lagos	84	520	32	443	211
Kigali	85	516	32	518	267
Cayman Islands	86	515	39	409	179
Moscow	87	514	34	468	263
Bahrain	88	513	21	469	215
Nairobi	89	512	38	459	191
Almaty	90	511	12	342	134
British Virgin Islands	91	509	50	464	207
Sofia	92	505	7	482	247
Bahamas	93	503	28	391	195
Bermuda	94	499	24	461	190

Table 19 | Details Of Ratings For The GGFI Dimensions By Centre

Centre	Overall Rank	Depth Rating	Quality Rating	Centre	Overall Rank	Depth Rating	Quality Rating
London	1	310	321	Dublin	48	283	290
New York	2	309	315	Milan	49	284	288
Geneva	3	307	316	Atlanta	50	286	285
Zurich	4	302	316	Lisbon	51	283	287
Luxembourg	5	303	313	Calgary	52	292	277
Stockholm	6	308	307	Astana	53	273	295
Washington DC	7	306	308	GIFT City-Gujarat	54	286	281
Los Angeles	8	307	306	Guangzhou	55	289	277
Singapore	9	304	308	Rome	56	286	279
Copenhagen	10	304	307	Isle of Man	57	287	277
Amsterdam	11	299	311	Guernsey	58	285	278
Montreal	12	303	306	Philadelphia	59	289	273
San Francisco	13	301	307	Miami	60	280	281
Sydney	14	302	305	Jakarta	61	277	283
Chicago	15	298	308	Kuala Lumpur	62	268	290
Melbourne	16	299	306	Johannesburg	63	278	275
Oslo	17	299	305	Doha	64	272	280
Seoul	18	300	303	Santiago	65	274	277
Edinburgh	19	294	308	Rio de Janeiro	66	271	279
Shanghai	20	300	301	Cape Town	67	269	275
San Diego	21	299	301	Mauritius	68	265	278
Toronto	22	298	301	Sao Paulo	69	268	274
Paris	23	296	302	New Delhi	70	270	270
Shenzhen	24	301	296	Mexico City	71	271	268
Madrid	25	302	294	Mumbai	72	267	271
Boston	26	295	300	Bangkok	73	263	274
Beijing	27	299	295	Manila	74	260	276
Busan	28	293	300	Istanbul	75	254	279
Frankfurt	29	298	294	Riyadh	76	260	272
Vancouver	30	297	294	Warsaw	77	269	262
Wellington	31	295	295	Cyprus	78	251	279
Munich	32	295	294	Liechtenstein	79	262	267
Dubai	33	288	300	Prague	80	256	272
Tokyo	34	286	301	Riga	81	260	267
Abu Dhabi	35	288	298	Malta	82	260	266
Hong Kong	36	284	301	Monaco	83	264	259
Qingdao	37	297	287	Lagos	84	258	262
Hamburg	38	291	292	Kigali	85	245	271
Brussels	39	293	289	Cayman Islands	86	252	263
Casablanca	40	284	297	Moscow	87	256	258
Osaka	41	286	294	Bahrain	88	243	270
Tel Aviv	42	294	285	Nairobi	89	252	260
Vienna	43	290	288	Almaty	90	253	258
Jersey	44	292	285	British Virgin Islands	91	259	250
Helsinki	45	292	284	Sofia	92	252	253
Glasgow	46	291	284	Bahamas	93	244	259
Berlin	47	294	280	Bermuda	94	243	256

Appendix 2: Interest, Impact, And Drivers Details

Table 20 | Areas Of Green Finance With The Greatest Impact

Area of Green Finance	Number Of Mentions	Percentage Of Total
Energy Efficient Investment	270	9.2%
Sustainable Infrastructure Finance	253	8.6%
Disinvestment From Fossil Fuels	239	8.2%
Environment, Social And Governance (ESG) Analytics	239	8.2%
Carbon Markets	233	8.0%
Renewable Energy Investment	229	7.8%
Green Insurance	207	7.1%
Social And Impact Investment	187	6.4%
Climate Risk Stress Testing	164	5.6%
SRI Investment	162	5.5%
Green Bonds	161	5.5%
Natural Capital Valuation	161	5.5%
Green Loans	159	5.4%
Carbon Disclosure	151	5.2%
Greentech Venture Capital	113	3.9%
Totals	2,928	100.0%

Table 21 | Areas Of Green Finance Of Most Interest To Respondents

Area of Green Finance	Number Of Mentions	Percentage Of Total
Environment, Social And Governance (ESG) Analytics	291	9.6%
Energy Efficient Investment	270	8.9%
Renewable Energy Investment	255	8.4%
Sustainable Infrastructure Finance	244	8.1%
Carbon Markets	241	8.0%
Green Insurance	235	7.8%
Disinvestment From Fossil Fuels	221	7.3%
Social and Impact Investment	199	6.6%
SRI Investment	187	6.2%
Green Bonds	186	6.2%
Natural Capital Valuation	158	5.2%
Carbon Disclosure	156	5.2%
Climate Risk Stress Testing	150	5.0%
Green Loans	139	4.6%
Greentech Venture Capital	92	3.0%
Totals	3,024	100.0%



Table 22 | Drivers Of Green Finance

Driver	Number of Mentions	Percentage Of Total
Policy and Regulatory Frameworks	232	7.8%
International Initiatives	219	7.4%
Risk Management Frameworks	199	6.7%
Renewables	182	6.2%
Climate Change	167	5.6%
Mandatory Disclosure	167	5.6%
Public Awareness	167	5.6%
Infrastructure Investment	159	5.4%
Academic Research	149	5.0%
Sustainability Reporting	132	4.5%
Non-financial Reporting	131	4.4%
Insurance Industry Research	127	4.3%
Energy Efficiency	120	4.1%
Tax Incentives	113	3.8%
Technological Change	111	3.8%
Investor Demand	107	3.6%
Finance Centre Activism	104	3.5%
Industry Activism	86	2.9%
Food Security	63	2.1%
Voluntary Standards	62	2.1%
Loss of Biodiversity	47	1.6%
Water Quality	47	1.6%
NGO Activism	33	1.1%
Air Quality	32	1.1%
Totals	2,956	100.0%

Appendix 3: Respondents' Details

Table 23 | Respondents By Industry Sector

Industry Sector	Number Of Respondents	Percentage Of Respondents
Banking	60	7.8%
Debt Capital Market	27	3.5%
Equity Capital Markets	42	5.4%
Insurance	21	2.7%
Investment	77	10.0%
Knowledge	81	10.5%
Local Green Initiatives	41	5.3%
Policy and Public Finance	127	16.4%
Professional Services	89	11.5%
Trading	172	22.3%
Other	36	4.7%
Total	773	100.0%

Table 24 | Respondents By Engagement In Green Finance

Engagement In Green Finance	Number Of Respondents	Percentage Of Respondents
Working Full-time On Green Finance	141	18.2%
Working Part-time On Green Finance	248	32.1%
Interested in Green Finance	337	43.6%
Other/not given	47	6.1%
Total	773	100.0%

Table 25 | Respondents By Region

Region	Number Of Respondents	Percentage Of Respondents
Asia/Pacific	329	42.6%
Western Europe	209	27.0%
Eastern Europe & Central Asia	23	3.0%
North America	70	9.1%
Middle East & Africa	93	12.0%
Latin America & The Caribbean	15	1.9%
Multi-Regional	34	4.4%
Total	773	100.0%

Table 26 | Respondents By Size Of Organisation

Size of Organisation	Number Of Respondents	Percentage Of Respondents
<100	202	26.1%
100-500	66	8.5%
500-1000	60	7.8%
1000-2000	97	12.5%
2000-5000	85	11.0%
>5000	210	27.2%
Other/not given	53	6.9%
Total	773	100.0%

Table 27 | Respondents By Gender

Gender	Number Of Respondents	Percentage Of Respondents
Female	179	23.16%
Male	333	43.08%
Other	3	0.39%
Prefer not to say/not given	258	33.38%
Total	773	100.00%

Table 28 | Respondents By Age

Age Band	Number Of Respondents	Percentage Of Respondents
18-30	117	15.1%
30-45	202	26.1%
45-60	143	18.5%
60+	61	7.9%
Other/not given	250	32.3%
Total	773	100.0%

Appendix 4: Methodology

The GGFI provides ratings of the green finance offering of financial centres. The process involves taking two sets of ratings – one from survey respondents and one generated by a statistical model – and combining them into a single rating.

For the first set of ratings, the financial centre assessments, respondents use an [online questionnaire](#) to rate the depth and quality of each financial centre's green finance offering, using a 10 point scale ranging from little depth/very poor to mainstream/excellent. Responses are sought from a range of individuals drawn from the financial services sector, non-governmental organisations, regulators, universities, and trade bodies.

For the second set of ratings, we use a database of indicators, or Instrumental Factors, that contains quantitative data about each financial centre. We use a machine learning algorithm to investigate the correlation between the financial centre assessments and these Instrumental Factors to predict how each respondent would have rated the financial centres they do not know. These 130 instrumental factors draw on data from a range of different sources covering sustainability, business, human capital, and infrastructure, including telecommunications and public transport. A full list of the instrumental factors used in the model is in Appendix 5.

The respondents' actual ratings as well as their predicted ratings for the centres they did not rate, are then combined into a single table to produce the ranking. We add the results for depth and quality to produce the GGFI.

Factors Affecting The Inclusion Of Centres In The GGFI

The questionnaire lists a total of 126 financial centres which can be rated by respondents. The questionnaire also asks whether there are financial centres that will improve their green finance offering significantly over the next two to three years. Centres which are not currently within the questionnaire and which receive a number of mentions in response to this question will be added to the questionnaire for future editions.

We give a financial centre a GGFI rating and ranking if it receives a statistically significant minimum number of assessments from individuals based in other geographical locations - at least 25 in GGFI 12. This means that not all 126 centres in the questionnaire receive a ranking.

We will also develop rules as successive indices are published as to when a centre may be removed from the rankings, for example, if over a 24 month period, a centre has not received a minimum number of assessments.

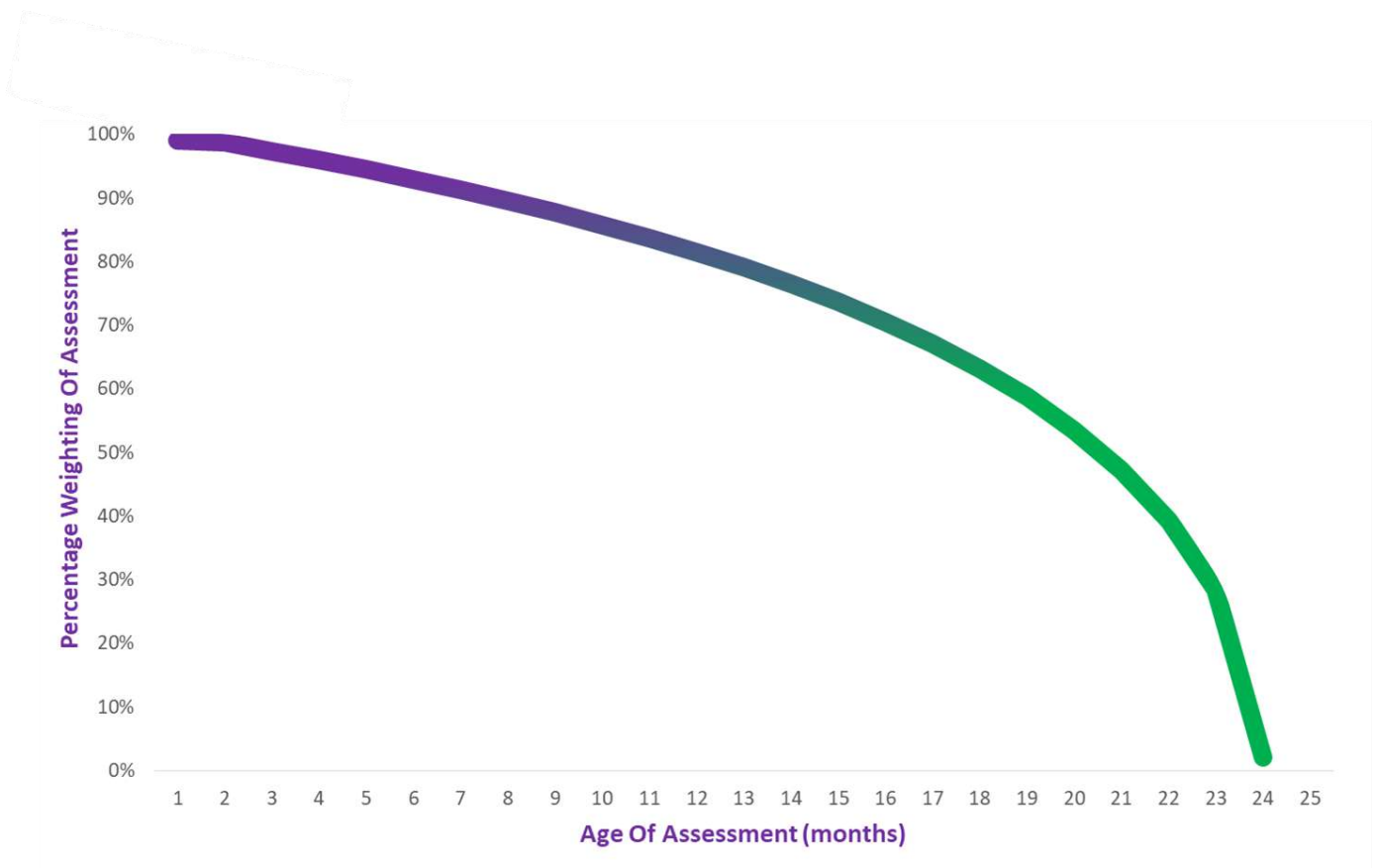
Financial Centre Assessments

Financial centre assessments are collected via an online questionnaire which runs continuously and which is at greenfinanceindex.net/survey/. A link to this questionnaire is emailed to a target list of respondents at regular intervals. Other interested parties can complete the questionnaire by following the link given in GGFI publications.

In calculating the GGFI:

- the score given by a respondent to their home centre, and scores from respondents who do not specify a home centre, are excluded from the model – this is designed to prevent home bias;
- financial centre assessments are included in the GGFI model for 24 months after they have been received – we consider that this is a period during which assessments maintain their validity; and
- financial centre assessments from the month when the GGFI is created will be given full weighting with earlier responses given a reduced weighting on a logarithmic scale as shown in Chart 45 - this recognises that older ratings, while still valid, are less likely to be up-to-date.

Chart 45 | Reduction In Weighting As Assessments Get Older



Instrumental Factor Data

For the instrumental factors, we have the following data requirements:

- data series should come from a reputable body and be derived by a sound methodology; and
- data series should be readily available (ideally in the public domain) and be regularly updated.

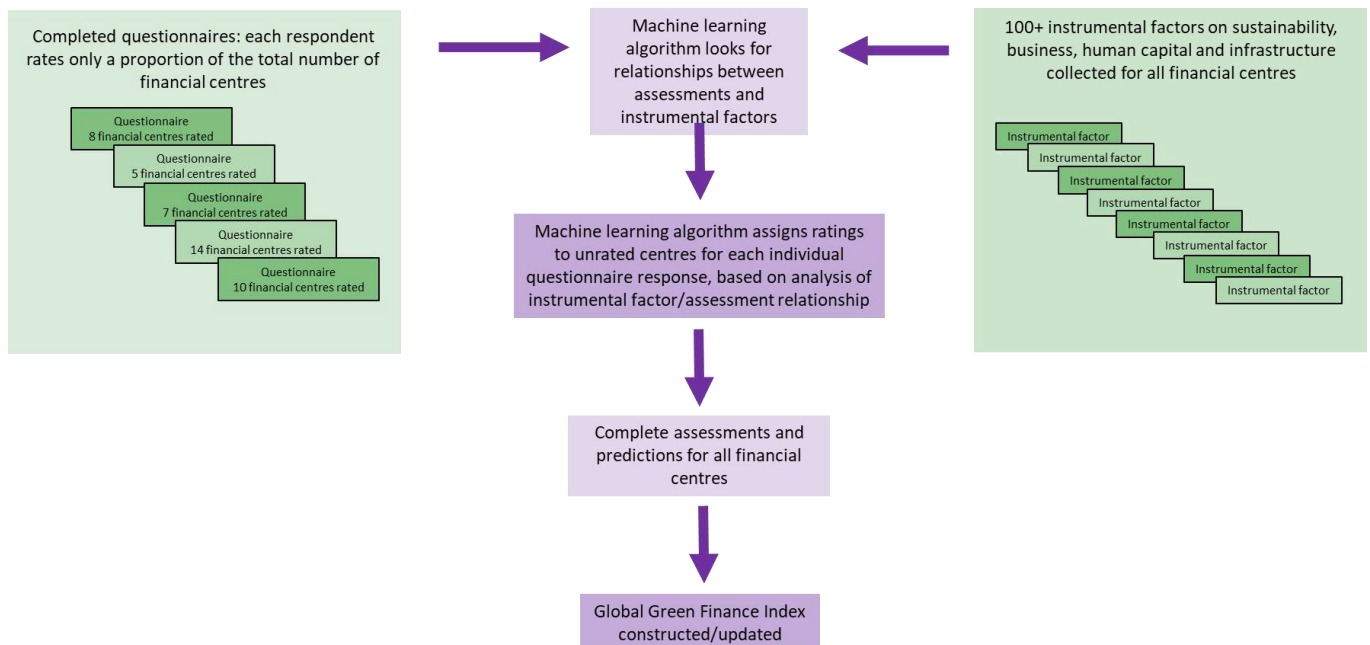
The rules on the use of instrumental factor data in the model are as follows:

- updates to the indices are collected and collated every six months;
- no weightings are applied to indices;
- indices are entered into the GGFI model as directly as possible, whether this is a rank, a derived score, a value, a distribution around a mean or a distribution around a benchmark;
- if a factor is at a national level, the score will be used for all centres in that country; nation-based factors will be avoided if financial centre (city)-based factors are available;
- if an index has multiple values for a city or nation, the most relevant value is used;
- if an index is at a regional level, the most relevant allocation of scores to each centre is made (and the method for judging relevance is noted); and
- if an index does not contain a value for a particular financial centre, a blank is entered against that centre (no average or mean is used).

The details of the methodology can be accessed at <https://www.longfinance.net/programmes/financial-centre-futures/global-green-finance-index/ggfi-methodology/>.

The process of creating the GGFI is outlined in Chart 46.

Chart 46 | The GGFI Process



Appendix 5: Instrumental Factors

Table 29 | Sustainability Instrumental Factor Correlation With GGFI Ratings

Instrumental Factors	R-squared
Urban Mobility Readiness Index	0.666
IESE Cities In Motion Index	0.545
Sustainable Cities Index	0.543
Quality Of Living City Rankings	0.515
Sustainable Economic Development	0.415
Energy Transition Index	0.345
The Green Future Index	0.332
World Energy Trilemma Index	0.331
Global Sustainable Competitiveness Index	0.276
The Global Green Economy Index	0.235
Buildings Energy Efficiency Policies Database (Y/N)	0.226
Quality of Life Index	0.207
Proportion Of Population Using Safely-Managed Drinking-Water Services (%)	0.183
Environmental Performance Index	0.179
Pollution Index	0.174
Share Of Wind And Solar In Electricity Production	0.151
Global Green Growth Index	0.125
City Commitment To Carbon Reduction (Cooperative Action)	0.118
Stock Exchanges With A Green Bond Segment (Y/N)	0.079
CO ₂ Emissions Per Capita	0.071
Energy Intensity Of GDP	0.040
Share Of Renewables In Electricity Production	0.040
Sovereign Green Bond (Y/N)	0.037
City Commitment To Carbon Reduction (Individual Action)	0.016
Forestry Area	0.012
Protected Land Area % Of Land Area	0.010
Climate Change Performance Index	0.005
Sustainable Stock Exchanges (Y/N)	0.004
Average Precipitation In Depth (mm Per Year)	0.001

Table 30 | All Instrumental Factor Correlation With GGFI Ratings - Highest 30 Factors

Instrumental Factors	R-squared
The Global Financial Centres Index	0.761
Urban Mobility Readiness Index	0.666
Safe Cities Index	0.650
Global Innovation Index	0.593
IESE Cities In Motion Index	0.545
Sustainable Cities Index	0.543
Smart City Index	0.539
Logistics Performance Index	0.528
Best Countries For Business	0.527
OECD Country Risk Classification	0.527
International IP Index	0.520
JLL Real Estate Transparency Index	0.519
Quality Of Living City Rankings	0.515
World Talent Rankings	0.490
Corruption Perception Index	0.483
Adjusted Net National Income Per Capita	0.474
Legatum Prosperity Index	0.473
Fintech Activity Index	0.468
Government Effectiveness	0.447
Agility Emerging Markets Logistics Index	0.445
Quality Of Road Infrastructure	0.438
Cost Of Living City Rankings	0.424
Business Environment Rankings	0.423
Sustainable Economic Development	0.415
Innovation Cities Global Index	0.411
Quality Of Domestic Transport Network	0.398
Domestic Credit To Private Sector (% Of GDP)	0.394
World Competitiveness Scoreboard	0.393
Purchasing Power Index	0.389
Country Brand Ranking	0.368

Table 31 | Sustainability Factors

Instrumental Factor	Source	Website	Updated
Average Precipitation In Depth (mm Per Year)	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&series=AG.LND.PRPC.MM	N
Buildings Energy Efficiency Policies Database (Y/N)	IEA	https://www.iea.org/policies	N
City Commitment To Carbon Reduction (Cooperative Action)	UNFCCC	https://climateaction.unfccc.int/	Y
City Commitment To Carbon Reduction (Individual Action)	UNFCCC	https://climateaction.unfccc.int/	Y
Climate Change Performance Index	Germanwatch, NewClimate Institute & Climate Action Network	https://ccpi.org/download/the-climate-change-performance-index-2021/	N
CO2 Emissions Per Capita	World Bank	https://databank.worldbank.org/reports.aspx?source=2&series=EN.ATM.CO2E.PC&country=#	N
Energy Intensity Of GDP	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	Y
Energy Transition Index	World Economic Forum	https://www.weforum.org/reports/1edb4488-deb4-4151-9d4f-ff355ecc499a/in-full/rankings	N
Environmental Performance Index	Yale University	https://epi.yale.edu/epi-results/2020/component/epi	N
Forestry Area	World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=AG.LND.FRST.ZS&country=	N
Global Green Growth Index	GGGI	https://greengrowthindex.gggi.org/wp-content/uploads/2022/12/2021-Green-Growth-Index-1.pdf	N
Global Sustainable Competitiveness Index	Solability	http://solability.com/the-global-sustainable-competitiveness-index/the-index	N
IESE Cities In Motion Index	IESE	http://citiesinmotion.iese.edu/indicecim/?lang=en	N
Pollution Index	Numbeo	https://www.numbeo.com/pollution/rankings.jsp	Y
Proportion Of Population Using Safely-Managed Drinking-Water Services (%)	WHO	https://www.who.int/data/gho/publications/world-health-statistics	N
Protected Land Area % Of Land Area	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=ER.LND.PTLD.ZS&country=	Y
Quality Of Life Index	Numbeo	http://www.numbeo.com/quality-of-life/rankings.jsp	Y
Quality Of Living City Rankings	Mercer	https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings	N
Share Of Renewables In Electricity Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	Y
Share Of Wind And Solar In Electricity Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	Y
Sovereign Green Bond (Y/N)	Climate Bonds Initiative	https://www.climatebonds.net/2021/11/cop26-briefing-sovereign-green-bond-issuance-takes-start-long-boom	N
Stock Exchanges With A Green Bond Segment (Y/N)	CBI	https://www.climatebonds.net/green-bond-segments-stock-exchanges	N
Sustainable Cities Index	Arcadis	https://www.arcadis.com/en/global/our-perspectives/sustainable-cities-index-2018/citizen-centric-cities/	N
Sustainable Economic Development	Boston Consulting Group	https://www.bcg.com/en-gb/publications/2021/prioritizing-societal-well-being-seda-report	N
Sustainable Stock Exchanges (Y/N)	UN Sustainable Stock Exchange Initiative	https://sseinitiative.org/members/	Y
World Energy Trilemma Index	World Energy Council	https://trilemma.worldenergy.org/	N
Urban Mobility Readiness Index	Oliver Wyman	https://www.oliverwymanforum.com/mobility/urban-mobility-readiness-index/rankings.html	N
The Green Future Index	MIT Technology Review	https://www.technologyreview.com/2023/04/05/1070581/the-green-future-index-2023/	Y
The Global Green Economy Index	Dual Citizen	https://dualcitizeninc.com/global-green-economy-index/	N

Table 32 | Human Capital Factors

Instrumental Factor	Source	Website	Updated
Average Wages	OECD	https://data.oecd.org/earnwage/average-wages.htm	Y
Adjusted Net National Income Per Capita	The World Bank	https://data.worldbank.org/indicator/NY.ADJ.NNTY.PC.CD	Y
Corruption Perception Index	Transparency International	https://www.transparency.org/en/cpi/2022	Y
Cost Of Living City Rankings	Mercer	https://www.mercer.com/our-thinking/career/cost-of-living.html	Y
Crime Index	Numbeo	http://www.numbeo.com/crime/rankings.jsp#	Y
Educational Attainment, At Least Bachelor's Or Equivalent, Population 25+, Total (%)	The World Bank	https://data.worldbank.org/indicator/SE.TER.CUAT.BA.ZS	N
Employees Working Very Long Hours	OECD	https://stats.oecd.org/Index.aspx?DataSetCode=BLI	N
English proficiency	Education First	https://www.ef.com/wwen/epi/	N
GDP Per Person Employed (constant 2017 PPP \$)	The World Bank	https://databank.worldbank.org/reports.aspx?source=world-development-indicators&series=SL.GDP.PCAP.EM.KD	N
Global Cities Index	AT Kearney	https://www.kearney.com/global-cities/2022	N
Global Health Security Index	Nuclear Threat Initiative, Johns Hopkins Center for Health Security, and Economist Impact	https://www.ghsindex.org/	N
Global Innovation Index	INSEAD	http://www.globalinnovationindex.org/content.aspx?page=GII-Home	N
Global Peace Index	Institute for Economics & Peace	https://www.visionofhumanity.org/maps/#/	Y
Global Skills Index	Coursera	https://www.coursera.org/skills-reports/global	New
Global Terrorism Index	Institute for Economics & Peace	https://www.visionofhumanity.org/wp-content/uploads/2022/03/GTI-2022-web-09062022.pdf	N
Good Country Index	Good Country Party	https://www.goodcountry.org/index/results	N
Government Effectiveness	The World Bank	http://info.worldbank.org/governance/wgi/	N
Graduates In Social Science, Business And Law (As % Of Total Graduates)	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=Education%20Statistics&series=UIS.FOSGP.5T8.F400	N
Gross Tertiary Graduation Ratio	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=Education%20Statistics&series=SE.TER.CMPL.ZS	N
Health Care Index	Numbeo	http://www.numbeo.com/health-care/rankings.jsp	Y
Henley Passport Index	Henley Partners	https://www.henleypassportindex.com/passport	N
Homicide Rates	UN Office of Drugs & Crime	https://dataunodc.un.org/dp-intentional-homicide-victims	N
Household Net Financial Wealth	OECD	https://stats.oecd.org/Index.aspx?DataSetCode=BLI	N
Human Development Index	UN Development Programme	https://hdr.undp.org/content/human-development-report-2021-22	N
Human Freedom Index	Cato Institute	https://www.cato.org/human-freedom-index	Y
Individual Income Tax Rates	KPMG	https://home.kpmg/vg/en/home/services/tax1/tax-tools-and-resources/tax-rates-online/individual-income-tax-rates-table.html	N
Innovation Cities Global Index	2ThinkNow Innovation Cities	https://www.innovation-cities.com/city-rankings-2021/	Y
International IP Index	GIPC	https://www.uschamber.com/intellectual-property/2023-international-ip-index	Y
Legatum Prosperity Index	Legatum Institute	http://www.prosperity.com/#!/ranking	Y
Life Expectancy At Birth, Total	The World Bank	https://data.worldbank.org/indicator/SP.DYN.LE00.IN	N
Linguistic Diversity	Ethnologue	https://www.ethnologue.com/guides/countries-most-languages	N
Lloyd's City Risk Index 2015-2025	Lloyd's	https://lloyds.spub7.com/locations	N
Number Of High-Net-Worth Individuals	Capgemini	https://www.worldwealthreport.com/	N
Number Of International Association Meetings	World Economic Forum	http://reports.weforum.org/travel-and-tourism-competitiveness-report-2019/rankings/#series=NRFAIREX	N
OECD Country Risk Classification	OECD	http://www.oecd.org/trade/topics/export-credits/documents/cre-crc-current-english.pdf	Y
Open Government	World Justice Project	http://worldjusticeproject.org/rule-of-law-index	N
Patent Applications, Residents	The World Bank	https://data.worldbank.org/indicator/IP.PAT.RESD?end=2020&start=1980	N
People Near Services	ITDP	https://pedestriansfirst.itdp.org/	Y
Personal Tax Rates	OECD	https://stats.oecd.org/index.aspx?DataSetCode=TABLE_I6	Y

Table 32 | (Continued) Human Capital Factors

Instrumental Factor	Source	Website	Updated
Political Stability And Absence Of Violence/ Terrorism	The World Bank	http://info.worldbank.org/governance/wgi/	N
Press Freedom Index	Reporters Without Borders (RSF)	https://rsf.org/en/index?year=2023	Y
Prime International Residential Index	Knight Frank	https://www.knightfrank.com/research/report-library/the-wealth-report-2022-8858.aspx	Y
Purchasing Power Index	Numbeo	https://www.numbeo.com/quality-of-life/rankings.jsp?title=2023&displayColumn=1	Y
Regulatory Quality	The World Bank	http://info.worldbank.org/governance/wgi/	N
Tax Revenue As Percentage Of GDP	The World Bank	https://databank.worldbank.org/reports.aspx?source=2&series=GC.TAX.TOTL.GD.ZS&country=#	N
Top Tourism Destinations	Euromonitor	https://go.euromonitor.com/white-paper-travel-211202-top-100-city-destinations-index.html	N
World Talent Rankings	IMD	https://www.imd.org/centers/world-competitiveness-center/rankings/world-competitiveness/	N

Table 33 | Business Factors

Instrumental Factor	Source	Website	Updated
Best Countries For Business	Forbes	https://www.forbes.com/best-countries-for-business/list/	N
Bilateral Tax Information Exchange Agreements	OECD	http://www.oecd.org/ctp/exchange-of-tax-information/taxinformationexchangeagreementstieas.htm	N
Broad Stock Index Levels	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/april-2023	Y
Business Environment Rankings	EIU	http://country.eiu.com/All	Y
Capitalisation Of Stock Exchanges	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/april-2023	Y
Common Law Countries	CIA	https://www.cia.gov/the-world-factbook/countries/	N
Corporate Tax Rates	KPMG	https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html	N
Country Brand Ranking	Bloom Consulting	https://www.bloom-consulting.com/en/pdf/rankings/Bloom_Consulting_Country_Brand_Ranking_Tourism.pdf	N
Democracy Index	The Economist	https://www.eiu.com/topic/democracy-index	Y
Domestic Credit To Private Sector (% Of GDP)	The World Bank	https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS?most_recent_value_desc=false	Y
Economic Freedom	The Heritage Foundation	https://www.heritage.org/index/ranking	Y
Economic Performance Index	The Brookings Institution	https://www.brookings.edu/research/global-metro-monitor-2018/#rank	N
External Positions Of Central Banks As A Share Of GDP	The Bank for International Settlements	http://www.bis.org/statistics/annex_map.htm	Y
FATF AML Effectiveness	FATF	http://www.fatf-gafi.org/publications/mutualevaluations/documents/assessment-ratings.html	Y
FDI Inward Stock (In Million Dollars)	UNCTAD	https://unctad.org/webflyer/world-investment-report-2021	N
Financial Secrecy Index	Tax Justice Network	http://www.financialsecrecyindex.com/	N
Fintech Activity Index	World Bank	https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099735504212234006/p1730060695b370090908c0bf80ed27eba6	N
Foreign Direct Investment Inflows	UNCTAD	http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740	N
Global Business Complexity Index	TMF Group	https://www.tmf-group.com/en/news-insights/publications/2023/global-business-complexity-index/	Y
Global Connectedness Index	DHL	https://www.dhl.com/global-en/spotlight/globalization/global-connectedness-index.html	Y
Global Services Location	AT Kearney	https://www.kearney.com/digital/article/?a/the-2021-kearney-global-services-location-index	N

Table 33 | (Continued) Business Factors

Instrumental Factor	Source	Website	Updated
Government Debt As % Of GDP	IMF	https://www.imf.org/external/datamapper/GG_DEBT_GDP@GDD/SWE	N
Jurisdictions Participating In The Convention On Mutual Administrative Assistance In Tax Matters	OECD	https://www.oecd.org/ctp/exchange-of-tax-information/Status_of_convention.pdf	Y
Level Of Internet Freedom	Freedom House	https://freedomhouse.org/countries/freedom-net/scores	N
Net External Positions Of Banks	The Bank for International Settlements	http://www.bis.org/statistics/annex_map.htm	Y
Office Occupancy Cost	CBRE Research	https://www.cbre.com/research-and-reports/Global-Prime-Office-Occupancy-Costs-2019	N
Open Budget Survey	International Budget Partnership	http://survey.internationalbudget.org/#download	N
Operational Risk Rating	EIU	http://www.eiu.com/site_info.asp?info_name=VW2_RISK_nib&page=rk&page_title=Risk%20table	N
Percentage Of Firms Using Banks To Finance Investment	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&series=IC.FRM.BNKS.ZS	N
Real Interest Rate	The World Bank	https://databank.worldbank.org/reports.aspx?source=world-development-indicators&series=FR.INR.RINR	N
The Global Financial Centres Index	Z/Yen	https://www.longfinance.net/programmes/financial-centre-futures/global-financial-centres-index/	Y
The Global Fintech Index	Findexable	https://findexable.com/	N
Total Net Assets Of Regulated Open-End Funds	Investment Company Institute	http://www.icifactbook.org/	Y
TRACE Bribery Risk Matrix	Trace International	https://matrixbrowser.traceinternational.org/	N
Value Of Bond Trading	The World Federation of Stock Exchanges	https://statistics.world-exchanges.org/ReportGenerator/Generator#	Y
Value Of Share Trading	The World Federation of Stock Exchanges	https://focus.world-exchanges.org/issue/april-2023	Y
Volume Of Share Trading	The World Federation of Stock Exchanges	https://statistics.world-exchanges.org/ReportGenerator/Generator#	Y
World Competitiveness Scoreboard	IMD	https://www.imd.org/centers/wcc/world-competitiveness-center/rankings/world-competitiveness-ranking/2023/	Y



Table 34 | Infrastructure Factors

Instrumental Factor	Source	Website	Updated
Agility Emerging Markets Logistics Index	Agility	https://www.agility.com/en/emerging-markets-logistics-index/rankings/	Y
Global Competitiveness Index	World Economic Forum	http://reports.weforum.org/global-competitiveness-report-2019/competitiveness-rankings/	N
INRIX Traffic Scorecard	INRIX	http://inrix.com/scorecard/	N
JLL Real Estate Transparency Index	Jones Lang LaSalle	https://www.jll.co.uk/en/trends-and-insights/research/global-real-estate-transparency-index	N
Liner Shipping Connectivity Index	The World Bank	http://databank.worldbank.org/data/reports.aspx?source=2&series=IS.SHP.GCNW.XQ	Y
Logistics Performance Index	The World Bank	http://lpi.worldbank.org/international/global	Y
Metro Network Length	Metro Bits	http://mic-ro.com/metro/table.html	Y
Quality Of Domestic Transport Network	World Economic Forum	http://reports.weforum.org/travel-and-tourism-competitiveness-report-2019/rankings/#series=TRSP EFFICY	N
Quality Of Road Infrastructure	World Economic Forum	https://www.weforum.org/reports/travel-and-tourism-development-index-2021/	N
Railways Per Land Area	CIA	https://www.cia.gov/the-world-factbook/field/railways/country-comparison	N
Refined Oil Products Production	Enerdata Statistical Yearbook	https://yearbook.enerdata.net/download/	Y
Roadways Per Land Area	CIA	https://www.cia.gov/the-world-factbook/field/roadways/country-comparison	N
Smart City Index	IMD	https://www.imd.org/smart-city-observatory/smart-city-index/	N
Telecommunication Infrastructure Index	United Nations	https://publicadministration.un.org/egovkb/en-us/Data-Center	N
TomTom Traffic Index	TomTom	https://www.tomtom.com/en_gb/traffic-index/ranking/	Y



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For financial institutions searching for an ideal location to set up an intelligent service centre and operationalize their digital transformation, Finance Montréal can advise on the advantageous tax incentives aimed at facilitating the establishment and development of financial services corporations in the city.

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Supported by the industry, the Financial Services Development Council (FSDC) is a high-level, cross-sectoral advisory body to the Hong Kong Special Administrative Region Government.

FSDC formulates proposals to promote the further development of Hong Kong's financial services industry and to map out the strategic direction for the development. As of March 2020, 110 of the 137 policy recommendations had been adopted by the Government and relevant regulators since FSDC's inception in 2013. On top of research, FSDC also carries out market promotion and human capital development functions.

Among others, FSDC focuses on topics including Mainland and international connectivity, green and sustainable finance, FinTech, as well as asset and wealth management.

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Seoul is a rising star among the financial cities of the world. It is already one of the top 10 cities in the world based on various indices, and it has many more opportunities to offer as a financial hub and great growth potential. Seoul believes global financial companies are our true partners for growth. There are many incentives provided to global financial companies that enter into Seoul, such as the financial incentives provided when moving into IFC, so that we can all jointly work towards the growth and development of the financial market.

It is sure that Seoul will become a top star of global financial hubs in the near future! Pay close attention to Seoul's potentials and pre-emptively gain a foothold in the Seoul financial hub. Seoul is the gateway to Northeast Asia and the world.

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Established in 2001, the Financial Services Commission, Mauritius ('FSC') is the integrated regulator for the non-bank financial services sector and global business and is mandated to license, regulate, and supervise the conduct of business activities in the non-bank financial services sector and global business.

Our vision is to be an internationally recognised financial supervisor committed to the sustained development of Mauritius as a sound and competitive financial services centre.

The FSC aims to:

- promote the development, fairness, efficiency and transparency of financial institutions and capital markets;
- suppress crime and malpractices so as to provide protection to members of the public investing in non-banking financial products; and
- ensure the soundness and stability of the financial system in Mauritius.

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BFC offers an attractive incentive package to global financial leaders and cooperation network of Busan Metropolitan City, and Busan Finance Center will support you to identify opportunities in Busan, one of the fastest developing cities in Asia.

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Dubai International Financial Centre (DIFC) is one of the world's most advanced financial centres, and the leading financial hub for the Middle East, Africa and South Asia (MEASA) region, which comprises 72 countries with an approximate population of 3 billion and a nominal GDP of US\$ 7.7 trillion.

DIFC is home to an internationally recognised, independent regulator and a proven judicial system with an English common law framework, as well as the region's largest financial ecosystem of more than 24,000 professionals working across over 2,300 active registered companies – making up the largest and most diverse pool of industry talent in the region. The Centre's vision is to drive the future of finance. Today, it offers one of the region's most comprehensive FinTech and venture capital environments, including cost-effective licensing solutions, fit-for-purpose regulation, innovative accelerator programmes, and funding for growth-stage start-ups.

Comprising a variety of world-renowned retail and dining venues, a dynamic art and culture scene, residential apartments, hotels and public spaces, DIFC continues to be one of Dubai's most sought-after business and lifestyle destinations.

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The Long Finance initiative grew out of the London Accord, a 2005 agreement among investment researchers to share environmental, social and governance research with policy-makers and the public. Long Finance was established more formally by Z/Yen Group and Gresham College from 2007 with the aim of exploring long-term thinking across a global network of people.

We work on researching innovative ways of building a more sustainable financial system. In so doing, we try to operate openly and emulate scientific ideals. At the same time, we are looking to create a supportive and caring community where people can truly question the accepted paradigms of risk and reward.

www.longfinance.net



AIFC is an all-around financial centre located in Astana, the capital of Kazakhstan, which offers ample opportunities for businesses to grow. AIFC provides greater access to world-class capital markets and the asset management industry. It also promotes financial technology and drives the development of niche markets such as Islamic and green finance in the region.

AIFC provides unprecedented conditions and opportunities for its participants and investors: legal system based on the principles of English law, independent judicial system, regulatory framework consistent with internationally recognised standards, wide range of financial services and instruments, simplified visa and labour regimes, zero corporate tax rate, and English as a working language.

Located in the heart of Eurasia, AIFC is striving to become the gateway to the Eurasian Economic Union, Central Asia and Caucasus, and play a key role in the Belt and Road Initiative. AIFC is already gaining tremendous recognition as a leading financial hub in the region: recently, Asiamoney Awards recognised it as the best Belt and Road Initiative project of 2019.

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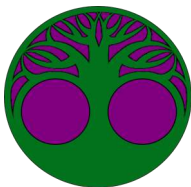
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THE GLOBAL GREEN FINANCE INDEX



www.greenfinanceindex.net

The Global Green Finance Index provides a measure of how financial centres are responding to the challenge of developing a sustainable economy, enabling centres to compare their performance with their peers, improve policy makers' understanding of the drivers of green growth, and assist them in shaping the financial system to support sustainability goals.

SUSTAINABLE FUTURES



<https://www.longfinance.net/programmes/sustainable-futures/>

The sustainable futures programme focuses on ways in which the financial system supports the transition to a sustainable economic model. Alongside the GGFI, the programme supports the [London Accord](#), a free to access collection of over 700 environmental social and governance research reports from over 120 financial services, NGO, academic and policy making institutions.

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Long Finance is a Z/Yen initiative designed to address the question **"When would we know our financial system is working?"** This question underlies Long Finance's goal to improve society's understanding and use of finance over the long-term. In contrast to the short-termism that defines today's economic views the Long Finance timeframe is roughly 100 years.



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Financial Centre Futures is a programme within the Long Finance initiative that initiates discussion on the changing landscape of global finance. Financial Centre Futures comprises the Global Green Finance Index and other research publications that explore major changes to the way we will live and work in the financial system of the future.