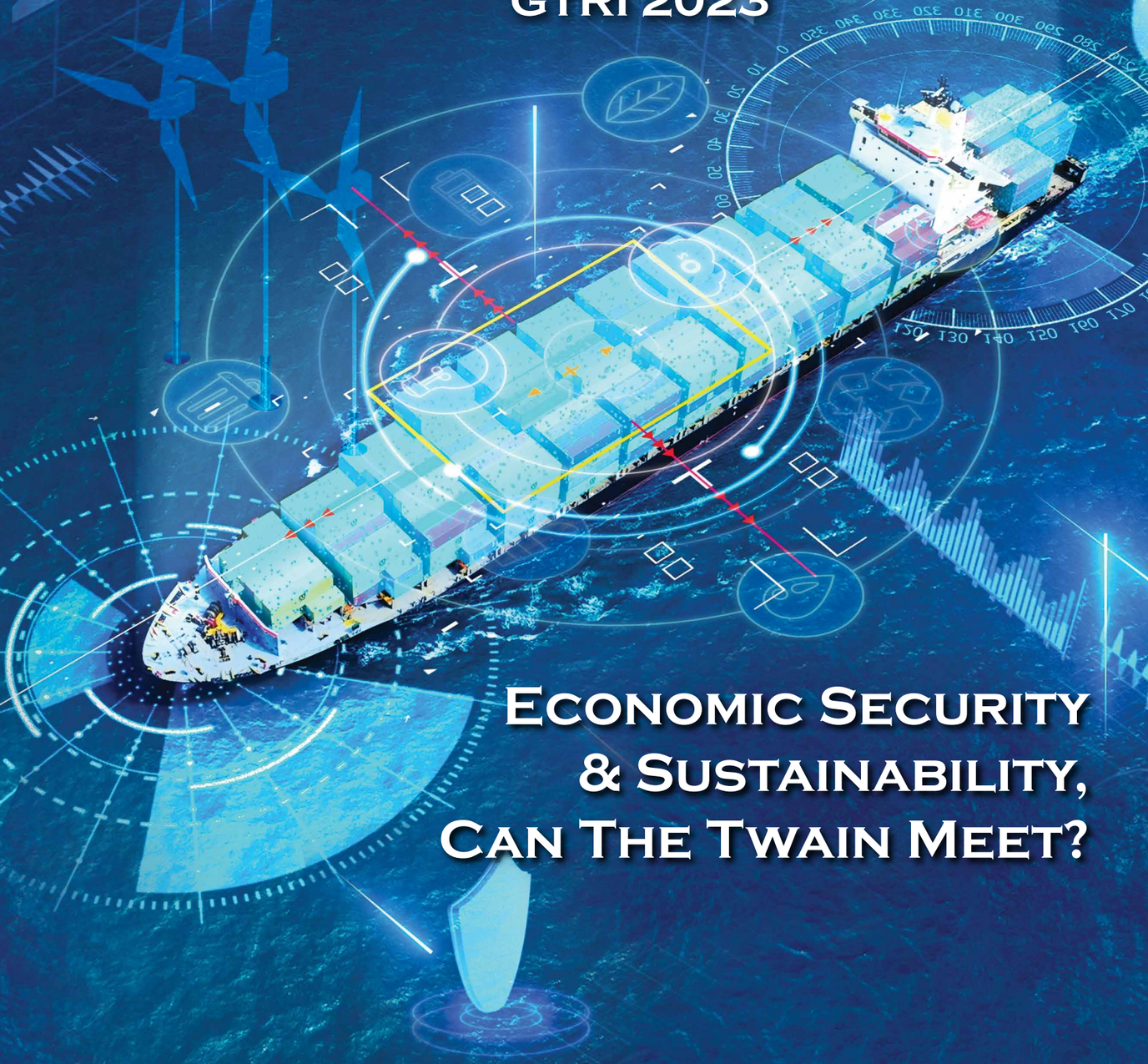
Global Trade Resilience Index

GTRI 2023



Economic Security & Sustainability, Can The Twain Meet?

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DISCLAIMER

The analysis and drafting of the Global Trade Resilience Index Report 2023 (hereafter: "Report") was conducted by Whiteshield based on a methodology integrating a proprietary approach to measuring resilience of countries in trade networks and statistics from international organisations.

The Report and any opinions expressed in this publication are the sole responsibility of the authors. All efforts were made to compile data that is as accurate and recent as possible based on available international sources. Whiteshield, and all entities or partners associated to this Report, do not take any responsibility for data that may be inaccurate.

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FOREWORD

Raed Safadi
Chief Economist at Whiteshield

The GTRI is published at a time when severe disruptions to global markets have undermined trade resilience and exposed vulnerabilities to the security of supply of many raw materials. Many of these materials are deemed critical to the transition to a climate neutral economy, digital transformation and the manufacturing of key technologies. While these on-going transformations are spearheading an industrial revolution at unprecedented scale and speed, they also imply that demand for certain critical industrial raw materials will multiply by 2040. For example, the International Energy Agency has estimated that the scaling up of green technologies necessary to meet the Paris Agreement goals would increase the global demand for lithium 42 times between 2020 and 25,2040 times for graphite, 21 times for cobalt and magnesium, 19 times for nickel, 7 times for rare earth minerals and 3.5 times for borates [1].

On the supply side, many critical raw materials are concentrated in a few, mainly developing countries that see the prospects of increases in demand for these materials as an opportunity to develop their own processing industries. Developed countries that are lacking in the supply of CRMs consider such a "strategic dependency" inimical to their supply security and are adopting "decoupling" or "de-risking" strategies. Both groups have so far missed the opportunity to find mutually beneficial, cooperative solutions to develop thicker and more competitive markets for these materials. Worse still, tit-for-tat discriminatory trade, investment and sectoral policy interventions have been introduced and are undermining supply chains security and our shared goal of transitioning to a more sustainable global environment. In our present context, de-coupling translates into deteriorating trade resilience, and if de-risking constitutes a quest for diversifying supplies, then this will lead to greater trade resilience. Whiteshield is currently engaged with a group of experts to shed further light on the importance of solving the critical raw materials conundrum. The final section in this report contains an initial analysis of the issues at stake.

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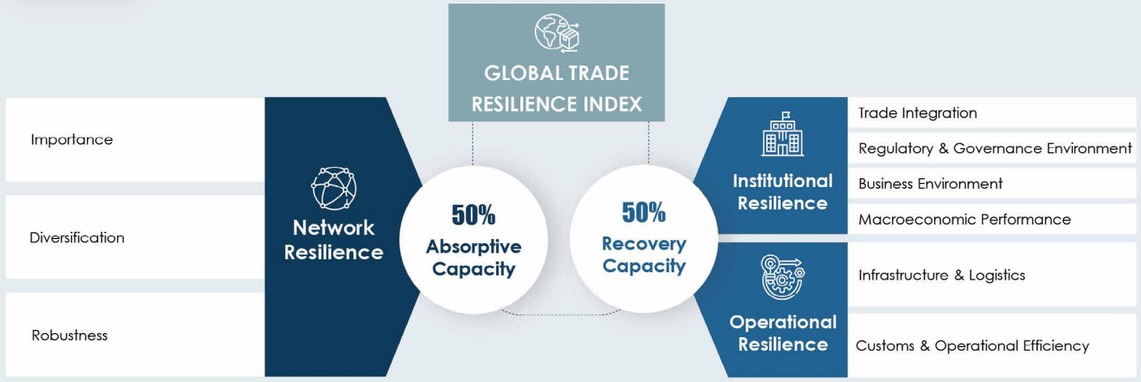
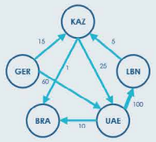
THE GLOBAL TRADE RESILIENCE INDEX

STRUCTURE



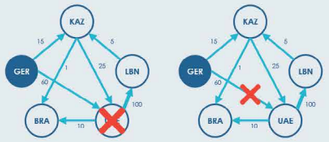
NETWORK RESILIENCE

Reflects the current positioning of countries in trade networks based on the set of network theory-based indicators.



Up to 96 product networks

Exporter and importer perspectives



Robustness of countries to the simulated shocks

INSTITUTIONAL RESILIENCE

Captures the institutional factors that support or hamper trade resilience in short-to medium-term and is constructed as a composite index based on the related indicators.

OPERATIONAL RESILIENCE

Captures "on-the-ground" operational factors that facilitate or hamper trade resilience in short-to medium-term and is constructed as a composite index based on the related indicators.

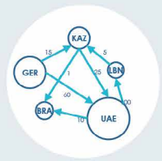
ABSORPTIVE CAPACITY

1. NETWORK RESILIENCE PILLAR

1.1 IMPORTANCE

Countries' market power at the product level.

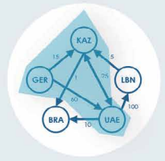
A total of 4 indicators:



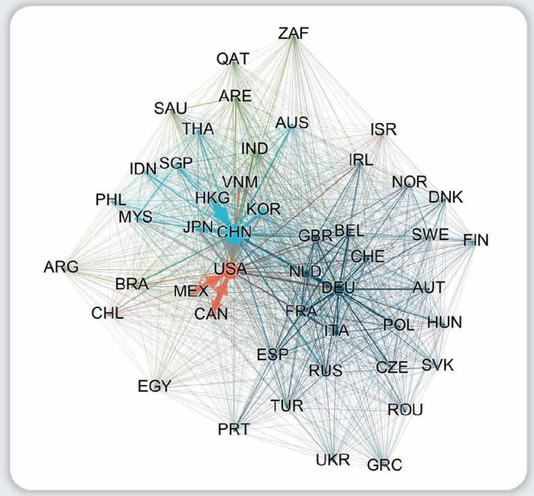
Strength

Importance of trade connections

Complexity of trade



Clustering



Note: The graph shows a total trade network of the major trade flows. Nodes are the countries, edges show trade flows, colours show trade communities.

1.2 DIVERSIFICATION

The extent to which countries' exports or imports can be reoriented to other countries.

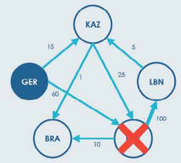
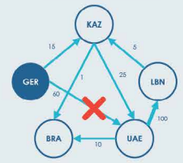
A total of 4 indicators:

	By Product	By Trade Partners
Export		
Import		

1.3 ROBUSTNESS

The extent to which countries' exports and imports can withstand shocks.

A total of 8 indicators:

Metrics	Flows	Shocks	
		Major trade partner blockage	Major trade route blockage
Strength	Export		
Importance of trade connections	Import		

2. INSTITUTIONAL RESILIENCE PILLAR

2.1 Trade Integration

Integration
- Number of RTAs covering goods and services trade
- Foreign direct investment
- Involvement of the trade community
- External border agency cooperation

Border measures
- Applied weighted tariffs
- Import tariff rates on non-agricultural and non-fuel products
- Trade distorting policies
- Trade enhancing policies

2.2 Regulatory & Governance Environment

Exchange rate volatility
- Real effective exchange rate volatility

Credit rating
- Credit rating

Regulatory environment
- Corruption index
- Regulatory quality
- Government effectiveness
- Intellectual property rights
- Governance and impartiality

Law protection
- Rule of law
- Privacy protection by law content

Political stability
- Political stability and absence of violence/terrorism index

2.3 Business Environment

Access to loans
- Domestic credit to the private sector

Competitiveness
- Impact of a country on MVA and world manufactures trade
- Shares of medium & high tech MVA and manufactured exports

Innovation
- Share of ICT goods in total trade
- Computer software spending
- Adoption of emerging technologies
- Investment in emerging technologies

2.4 Macroeconomic Performance

- GDP per capita

3. OPERATIONAL RESILIENCE PILLAR

3.1 Infrastructure & Logistics

Infrastructure
- Infrastructure

Customs capacity
- Container port throughput

Logistics quality
- Logistics quality and competence
- Tracking and tracing
- Timeliness

Connectivity
- Liner shipping connectivity index

3.2 Customs & Operational Efficiency

Efficiency of customs
- Customs
- Information availability
- Advance rulings
- Appeal procedures
- Fees and charges discipline
- Documents
- Automation
- Procedures
- Internal border agency cooperation
- International shipments

KEY FINDINGS

THE LARGEST TRADING NATIONS DOMINATE THE RANKINGS

- The Global Trade Resilience Index (GTRI) aims to capture the multi-dimensional facets of trade resilience. It ranks countries according to their capacity to absorb shocks to their trade in the immediate term and recover from it in the short- to medium- term.

The GTRI measures the ability of countries to withstand shocks to their trade and recover rapidly back to their potential.

- The GTRI results show that countries' capacities to absorb and recover from shocks are strongly connected and reinforce each other. Achieving overall trade resilience requires a balanced approach that considers all the factors that affect, directly or indirectly, the trade networks and the domestic institutional and operational capacities.

- The GTRI scores were tested against the Covid-19 shock and proved to be statistically significant in predicting the impact of the shock on countries' trade as well as the speed of their recovery following the disruption.

- There is a strong correlation between the GTRI and countries' level of economic development, highlighting the positive relationship between trade resilience and growth; importantly in the present context, strong trade institutions and trade facilitation measures play a critical role in helping countries recover faster from trade shocks. Indeed, seven out of the top 10 GTRI performers are European countries, while nine of them are high-income countries.

- Germany stands at the top of the GTRI ranking followed by the Netherlands and the United States (Figure 1). The last two nations exhibit strong performances in all of the three pillars. Germany performs best on absorptive capacity, which means the high positioning in trade networks and strong diversification and robustness of its exports and imports. At the same time, it scores lower on its recovery capacity being only 9th in both institutional and operational resilience.

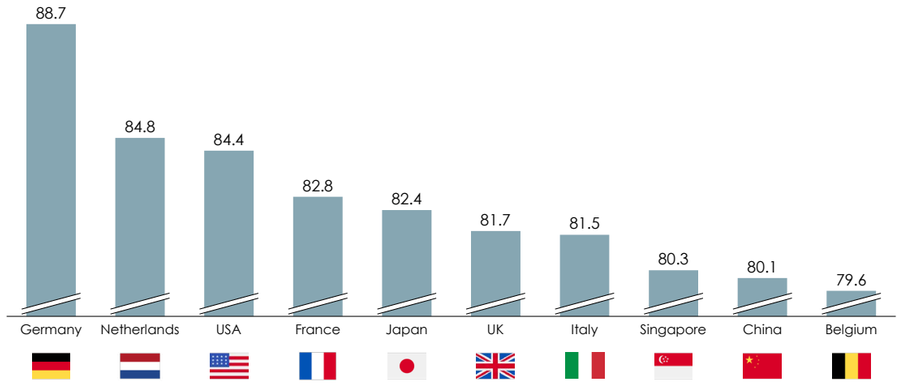
- Several upper-middle-income countries, including China, Malaysia, and Thailand, are ranked high in the GTRI due to their robust links with global trade hubs.

The GTRI can predict the depth of impacts of shocks like the COVID-19 pandemic on a country's trade.

- China ranks 9th in the GTRI and is the only upper middle-income country in the top 10 list. China, the world's top exporting country with the largest customs capacity, scores high on the network and operational resilience. However, China lags behind the other top performers, mainly in its institutional resilience, on account of its border trade-distorting policies and low privacy protection.

- Countries with the lowest trade resilience scores are located primarily in Sub-Saharan Africa, South Asia, and Latin America & the Caribbean, lagging behind across all the GTRI dimensions.

Figure 1: GTRI Top Performers



Source: Whiteshield

- Landlocked nations often exhibit notably low rankings on the GTRI owing to relatively high transit costs and low levels of trade integration.

- Interestingly, the higher the volume of a country's trade – both in absolute terms and relative to the contribution of trade to its national income, the higher its GTRI score.

The largest trading countries exhibit higher resilience to trade shocks particularly when they serve as trade hubs.

- Smaller trading nations have demonstrated the ability to develop and maintain efficient institutional frameworks.

Trade resilience is strongly affected by the complexity of the products that a country trades.

- The global trade hubs are all among the top 10 countries in operational resilience.

- Countries that trade simple products such as animals, vegetables, textiles, wood, and basic metals and stones, tend to be less diversified and less robust compared to countries that trade in research-intensive and complex commodities like chemicals and pharmaceuticals. Thus, trading in simple agriculture and textile products lead to lower scores on importance, diversification and robustness in global trade.

THE GTRI

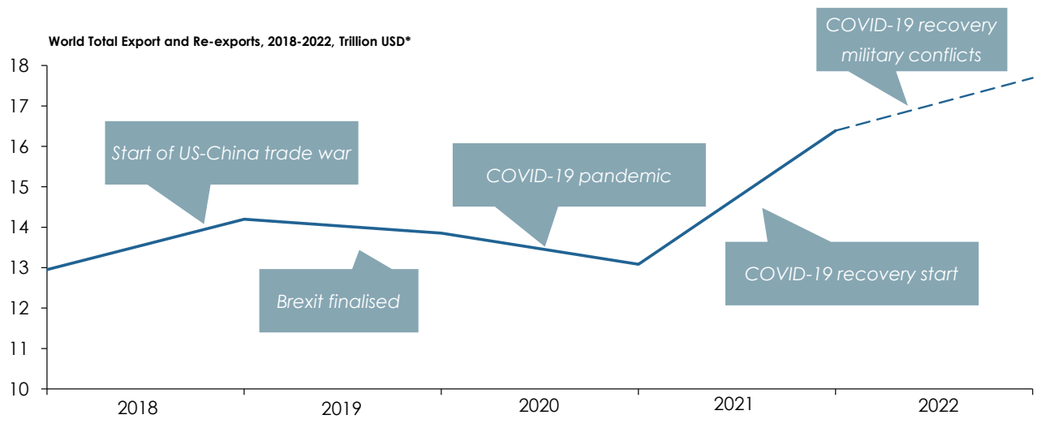
A TOOL TO UNLOCK TRADE RESILIENCE

We live in unprecedented times with the world economy witnessing policy-driven geopolitical fragmentation and geo-economic challenges. Trade tensions are increasing and, together with the military conflicts are causing massive disruptions to the financial, food, raw materials and energy flows across the globe. According to the Global Trade Alert, in 2022 new restrictions on goods, services, and investment increased by 14% from the previous year, reaching more than 2600 [2].

International cooperation can play a pivotal role in resolving the widening mismatch between the supply of and demand for raw materials.

Runaway fragmentation could be costly for the global economy. For example, according to the WTO, a world economy that divided into two separate trading blocks – one aligned to the US and the EU, and another aligned with China and Russia, would lead to a 5% drop in global GDP [3]. An IMF review of recent economic modelling studies puts losses from such fragmentation in the range of 0.2 to 7% of GDP [4] depending on modelling assumptions. While approaches to "near shoring" or "friend shoring" can increase resilience to geo-political risks in the short term, they make countries less resilient to other types of shocks such as the recent COVID-19 pandemic. Multilateral cooperation, and not fragmentation remains the best approach to make progress towards shared goals. In a world dominated by trade in intermediate inputs, decoupling is not a viable option

Figure 2: Recent Global Trade Disruptions Overview – An Illustration



Note: The data for 2022 is not full and preliminary. Missing data is refilled by the data from previous periods. Missing data of 2017 is refilled by the data from 2018.

Source: Whiteshield, Comtrade [6]

The GTRI provides insights to building institutions and adopting policies that would serve to cushion the impact of any shock on trade and ensure an uninterrupted path towards sustainable growth.

especially when considering the geo-spatial supply of critical raw materials that are essential ingredients to green transition. Enhancing the open, rules-based multilateral trading system as embodied in the WTO is an indispensable part of the solution for achieving a low carbon and inclusive transition.

Indeed, trade is a fundamental part of economic activity everywhere in the world and a major driver of efficiency and growth. However, trade is also a propagator of shocks, ranging from supply chain disruptions and political tensions to natural disasters and other unforeseen shocks (Figure 2).

As nations navigate the aftermath of the COVID-19 pandemic, the imperative to build strong trade resilience has been underscored with unprecedented urgency. The pandemic, acting as a catalyst for change, has revealed both the strengths and vulnerabilities of the global trade network, demonstrating the necessity for countries to not only safeguard their trade relationships but also to enhance their capacity to adapt swiftly to disruptions. The recent military conflicts serve as a stark reminder of the geopolitical risks that can impact global trade, making it even more crucial for nations to enhance their trade resilience in these turbulent times.

This report focuses on identifying and measuring the drivers of trade resilience that affect the smooth flow of trade within and across borders.

THE BUILDING BLOCKS OF TRADE RESILIENCE

The Global Trade Resilience Index (GTRI) is an initiative funded and developed by Whiteshield, a public policy and strategy advisory firm originating from the Harvard and OECD communities.

Whiteshield has developed the GTRI to support countries in their efforts to enhance their trade integration while at the same time minimise the impact of shocks on their economy. Indeed, crises such as the 2007-09 Global Financial Crisis, the COVID-19 pandemic in 2020, the recent military conflicts and ongoing US-China tensions have dramatically demonstrated what can happen when risks become reality and resilience is put to the test. Understanding and anticipating the nature of these and other shocks and how they affect countries at different levels of economic development, and building appropriate institutions and policy frameworks for trade integration are key to sustainable growth.

Recent trade disruptions have highlighted the need for a metric to measure countries' trade resilience.

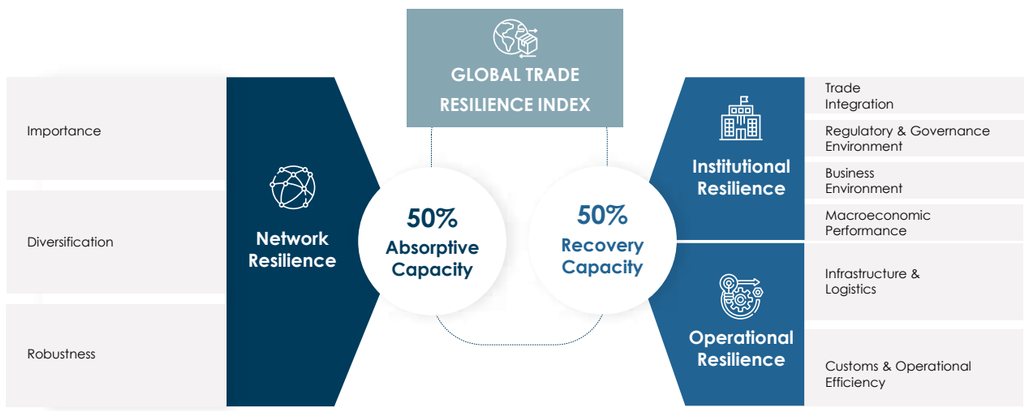
The GTRI is a comprehensive and holistic measure that captures a country's level of trade resilience. The Index is built on a rich dataset – the collection of 58 indicators, 16 of which are estimated based on the trade data and 42 are from international public sources, going beyond conventional measures of economic diversification and integration. Specifically, our approach incorporates innovative methods rooted in the network theory and embeds simulations of trade shocks and trace their potential impact on trade flows.

The GTRI captures the capacity of a country to absorb and recover from a trade shock.

The GTRI sheds light on the overall capacity of a country to withstand and recover from trade shocks. It rests on two dimensions: 1) Absorptive Capacity, and 2) Recovery Capacity (Figure 3).

The Absorptive Capacity captures a country's ability to absorb the initial impacts of a shock and maintain a certain level of stability in trade activities in the immediate aftermath. This includes a country's ability to manage sudden changes in demand or supply, adapt to new trade restrictions, and minimise disruptions in essential services. Therefore, the absorptive capacity of a country allows one to estimate the depth of a potential trade shock. This dimension is represented via the "Network Resilience" pillar.

Figure 3: GTRI Framework



Source: Whiteshield

The Recovery Capacity refers to a country's ability to return to normal trade activity levels in the short- to medium-term after a shock occurs. This involves the ability to rebuild supply chains, restore trade relationships, and recover economic output. This dimension is captured by the "Institutional Resilience" and "Operational Resilience" pillars.

The GTRI not only anticipates a nation's overall exposure to trade risks but can also identify areas for targeted interventions to mitigate such risks by addressing underperforming sub-pillars and indicators. Understanding these aspects is crucial for policymakers and for businesses to develop and implement strategic measures that enhance trade resilience and, consequently, contribute to the overall stability and prosperity of the global economy.

The GTRI is a new, innovative index which is inspired by the graph-based network approach.

The Network Resilience pillar represents a novelty in the global trade analysis, which lies in the application of network theory to the estimation of countries' resilience in product networks. Within this approach, exports and imports of each product are examined by the application of graph theory-based metrics of centrality and clustering, as well as the diversification measures. These metrics are complemented by a trade data-based indicator of economic complexity.

Within this pillar, three aspects of network resilience are investigated: Importance, Diversification, and Robustness. Importance indicators reflect the current market power of a country in the trade networks based on the rationale that countries with significant market power attract strong trade partners, exert influence on the global network, and can affect global trade dynamics. Diversification indicators evaluate the diversity in trade portfolios both across products and trade partners, as putting all eggs in one basket could be risky. In fact, the diversification reflects the opportunity to re-orient the existing trade flows towards other products or trade partners in the case of shocks. Robustness indicators explicitly estimate countries' sensitivity to simulated trade network disruptions like blockage of major trade routes or trade partners.

The Institutional Resilience pillar captures factors that support or hamper recovery from trade shocks and plays a crucial role in helping countries return as fast as possible to pre-shock trade trajectory. It combines countries' levels of trade integration, their regulatory, governance, and business environment, as well as their macroeconomic performance. It is structured as a composite index based on data from publicly-available international sources.

The Operational Resilience pillar represents the "on-the-ground" aspect of trade. This is a composite pillar that captures the capacity and quality of the operational trade support system, by investigating the infrastructure and logistics capacity and quality, as well as customs' operational efficiency.

RANKS AND BEYOND

THE ROAD TO TRADE RESILIENCE

Country name	GTRI	Rank	Network Resilience*	Rank	Institutional Resilience	Rank	Operational Resilience	Rank
Germany	**88.7**	**1**	96.5	1	76.6	9	85.0	9
Netherlands	**84.8**	**2**	86.2	6	78.2	4	88.7	4
USA	**84.4**	**3**	86.5	5	77.3	6	87.2	5
France	**82.8**	**4**	88.9	3	72.9	19	80.5	13
Japan	**82.4**	**5**	84.9	8	74.7	13	84.9	10
UK	**81.7**	**6**	85.7	7	75.2	12	80.1	14
Italy	**81.5**	**7**	90.0	2	68.0	26	78.1	18
Singapore	**80.3**	**8**	71.5	16	83.1	1	95.2	1
China	**80.1**	**9**	87.6	4	62.3	36	82.8	12
Belgium	**79.6**	**10**	81.1	10	70.6	21	85.8	7
Korea	**79.6**	**11**	79.0	11	73.8	16	86.6	6
Spain	**79.0**	**12**	81.2	9	68.3	25	85.2	8
Switzerland	**78.5**	**13**	70.6	18	81.3	2	91.2	2
Sweden	**76.7**	**14**	75.0	12	78.6	3	78.2	17
Denmark	**72.7**	**15**	68.1	19	76.8	8	78.0	19
Austria	**71.0**	**16**	62.2	36	75.3	11	84.3	11
Hong Kong	**70.5**	**17**	59.8	42	73.5	18	88.9	3
Poland	**70.0**	**18**	72.5	14	62.6	32	72.2	26
Finland	**69.5**	**19**	64.1	34	74.3	14	75.3	23
Malaysia	**68.4**	**20**	67.1	23	62.6	33	77.0	20
Portugal	**67.0**	**21**	63.1	35	69.9	23	72.2	27
Thailand	**66.7**	**22**	70.8	17	55.5	48	69.8	31
Ireland	**66.7**	**23**	61.5	40	77.0	7	66.8	37
Turkey	**66.6**	**24**	75.0	13	46.2	65	70.1	29
Czechia	**66.3**	**25**	66.9	24	65.6	28	65.6	41
Israel	**65.6**	**26**	64.6	31	63.2	31	69.9	30
Norway	**65.1**	**27**	57.1	50	77.5	5	68.7	34
Slovakia	**65.0**	**28**	65.9	26	62.4	35	65.6	42
Hungary	**64.1**	**29**	67.2	22	59.6	40	62.5	50
Lithuania	**64.0**	**30**	65.7	27	61.1	38	63.6	46
UAE	**64.0**	**31**	57.5	48	61.9	37	79.1	16
Estonia	**63.9**	**32**	62.0	38	66.8	27	65.0	43
New Zealand	**63.8**	**33**	57.5	49	69.2	24	71.2	28
Vietnam	**63.5**	**34**	67.4	21	51.1	55	68.3	35

Country name	GTRI	Rank	Network Resilience*	Rank	Institutional Resilience	Rank	Operational Resilience	Rank
Latvia	**63.2**	**35**	65.3	29	59.5	41	62.7	48
Luxembourg	**63.1**	**36**	50.0	66	76.3	10	76.4	21
Greece	**63.1**	**37**	58.9	43	60.2	39	74.4	25
Croatia	**62.7**	**38**	64.8	30	58.8	43	62.6	49
Australia	**62.4**	**39**	50.2	65	73.7	17	75.6	22
India	**62.1**	**40**	67.6	20	43.3	78	69.7	32
Romania	**61.6**	**41**	66.4	25	55.4	49	58.2	54
Russia	**61.0**	**42**	72.4	15	45.9	67	53.4	67
Bulgaria	**60.7**	**43**	65.5	28	56.8	45	55.0	63
Canada	**60.6**	**44**	44.3	86	74.1	15	79.7	15
South Africa	**60.4**	**45**	61.6	39	49.4	58	69.2	33
Qatar	**58.6**	**46**	53.8	56	63.3	30	63.6	45
Saudi Arabia	**58.3**	**47**	57.8	47	51.8	54	66.0	40
Morocco	**58.0**	**48**	57.0	51	43.3	79	74.7	24
Cyprus	**57.9**	**49**	54.6	55	65.1	29	57.2	58
Malta	**57.1**	**50**	45.6	80	70.5	22	66.7	38
Indonesia	**56.8**	**51**	62.2	37	47.8	60	55.2	62
Slovenia	**56.6**	**52**	48.7	68	62.5	34	66.6	39
Brazil	**56.5**	**53**	60.6	41	42.1	85	62.7	47
Iceland	**56.3**	**54**	46.8	74	70.9	20	60.6	51
Philippines	**53.4**	**55**	56.3	53	44.6	71	56.3	61
Serbia	**53.3**	**56**	64.5	32	45.6	68	38.6	90
Oman	**53.2**	**57**	46.2	77	53.7	50	66.8	36
Chile	**52.5**	**58**	48.4	70	55.7	47	57.5	56
Argentina	**52.3**	**59**	58.5	44	38.9	92	53.1	68
Panama	**52.1**	**60**	45.5	81	53.4	51	63.9	44
Mexico	**51.9**	**61**	45.7	79	55.9	46	60.3	52
B&H	**51.4**	**62**	58.4	45	42.2	83	46.8	74
Colombia	**51.4**	**63**	50.9	61	43.9	75	59.9	53
Uruguay	**51.1**	**64**	50.3	63	49.8	57	53.8	65
Egypt	**50.8**	**65**	57.9	46	35.0	102	52.4	69
Kuwait	**50.7**	**66**	50.3	64	59.3	42	43.1	80
Ukraine	**50.5**	**67**	64.3	33	41.0	87	32.3	105
Peru	**48.9**	**68**	47.7	72	43.7	76	56.5	60

Country name	GTRI	Rank	Network Resilience*	Rank	Institutional Resilience	Rank	Operational Resilience	Rank
Mauritius	**48.6**	**69**	46.7	75	52.4	53	48.8	72
Tunisia	**48.6**	**70**	56.7	52	42.4	82	38.5	91
Montenegro	**48.2**	**71**	51.9	58	46.9	63	41.9	84
Georgia	**48.0**	**72**	51.5	59	43.5	77	45.7	77
Costa Rica	**47.9**	**73**	42.2	90	52.7	52	54.6	64
Ecuador	**47.6**	**74**	50.5	62	37.7	95	51.6	70
Bahrain	**47.0**	**75**	41.8	92	50.9	56	53.4	66
Jordan	**46.9**	**76**	52.6	57	39.9	89	42.6	82
Sri Lanka	**46.8**	**77**	51.1	60	37.0	99	48.2	73
Macedonia	**46.2**	**78**	41.0	93	46.3	64	56.6	59
Pakistan	**45.2**	**79**	48.2	71	26.8	119	57.3	57
Albania	**45.0**	**80**	48.6	69	43.1	80	39.7	87
Brunei	**44.3**	**81**	39.0	97	58.7	44	40.8	86
Guatemala	**44.1**	**82**	45.5	82	40.1	88	45.5	78
Botswana	**43.5**	**83**	37.8	99	48.1	59	50.5	71
El Salvador	**43.2**	**84**	44.4	85	42.1	84	41.7	85
Moldova	**43.0**	**85**	54.6	54	35.6	101	27.3	115
Kazakhstan	**42.9**	**86**	42.1	91	44.9	70	42.5	83
Senegal	**42.5**	**87**	46.1	78	34.7	104	43.2	79
Lebanon	**42.3**	**88**	47.3	73	35.9	100	39.0	88
Azerbaijan	**41.8**	**89**	35.4	107	38.2	94	58.1	55
Dominican Rep.	**41.7**	**90**	37.7	100	45.9	66	45.7	76
Kenya	**41.1**	**91**	43.6	88	31.1	112	46.3	75
Armenia	**40.3**	**92**	39.3	96	39.5	91	42.9	81
Nigeria	**38.8**	**93**	49.1	67	24.3	125	32.9	102
Uzbekistan	**38.2**	**94**	46.5	76	33.2	106	26.4	119
Belarus	**37.9**	**95**	44.2	87	33.2	107	30.2	111
Jamaica	**37.5**	**96**	36.4	105	44.4	72	32.8	103
Honduras	**37.4**	**97**	36.5	104	37.6	96	38.9	89
Trinidad&Tobago	**37.0**	**98**	32.8	114	47.6	61	34.7	98
Paraguay	**36.9**	**99**	37.0	103	39.7	90	33.9	100
Malawi	**36.4**	**100**	44.6	84	20.8	134	35.7	93
Cambodia	**36.4**	**101**	35.6	106	38.8	93	35.7	94
Zambia	**35.0**	**102**	43.0	89	25.0	122	29.1	112
Nicaragua	**34.9**	**103**	34.8	109	34.8	103	35.2	95
Fiji	**34.7**	**104**	32.7	115	45.4	69	28.0	114
Ethiopia	**34.4**	**105**	44.7	83	21.7	131	26.6	117
Togo	**34.2**	**106**	40.2	95	24.0	127	32.3	106
Namibia	**33.7**	**107**	29.2	120	41.8	86	34.6	99
Bolivia	**33.5**	**108**	37.2	102	34.6	105	25.1	120
Barbados	**33.4**	**109**	35.2	108	44.2	73	19.1	129
Maldives	**33.1**	**110**	38.1	98	37.0	98	19.1	128
Benin	**32.6**	**111**	32.4	116	30.5	115	35.1	96
Madagascar	**32.1**	**112**	40.6	94	24.1	126	23.2	124
Rwanda	**31.3**	**113**	28.8	122	30.6	114	37.1	92
Myanmar	**30.8**	**114**	33.7	112	20.9	133	34.9	97
Mozambique	**30.8**	**115**	34.1	111	23.9	128	31.0	108
Tanzania	**30.7**	**116**	32.2	117	25.7	121	32.6	104
Samoa	**30.4**	**117**	30.4	118	42.6	81	18.0	130
Congo	**29.2**	**118**	28.4	123	29.4	116	30.3	109
Niger	**28.8**	**119**	34.5	110	22.5	130	23.9	123
Belize	**28.0**	**120**	33.3	113	37.1	97	8.5	135
Angola	**27.9**	**121**	30.1	119	24.7	124	26.9	116
Guyana	**26.9**	**122**	22.2	128	47.3	62	16.0	132
Laos	**26.2**	**123**	23.6	126	33.1	108	24.6	122
Mongolia	**25.4**	**124**	13.1	135	43.9	74	31.7	107
Suriname	**25.4**	**125**	29.0	121	31.5	111	12.0	133
Swaziland	**25.0**	**126**	19.0	132	32.8	109	29.1	113
Kyrgyzstan	**24.9**	**127**	21.9	129	30.8	113	25.0	121
Nepal	**23.7**	**128**	20.6	131	32.6	110	20.8	126
Burundi	**23.5**	**129**	37.3	101	10.5	136	9.0	134
Gambia	**23.5**	**130**	21.6	130	29.3	117	21.5	125
Burkina Faso	**22.0**	**131**	24.3	124	23.0	129	16.6	131
Zimbabwe	**20.5**	**132**	17.1	133	21.2	132	26.5	118
Tajikistan	**20.4**	**133**	13.1	134	24.9	123	30.3	110
Congo DR	**20.3**	**134**	22.9	127	16.1	135	19.3	127
Comoros	**20.0**	**135**	24.0	125	26.4	120	5.9	136
Lesotho	**18.7**	**136**	6.3	136	28.2	118	33.9	101

Note: *The Network Resilience pillar indicators are estimated based on the 2021 trade data.

Source: Whiteshield

First, we begin by presenting the overall GTRI's rankings and analysing its top ranked countries and noteworthy performers by income groups. Next, we move to establish the relationship between countries' trade resilience and income levels. Then, we examine the regional aspects of the GTRI and the role trade hubs play in bolstering trade resilience. After that, we explore the predictive power of the GTRI by using the COVID-19 shock. And last, we deep dive into the GTRI pillars. We conclude this section with an analysis of resilience at the product level.

Germany holds the leading position in the GTRI, with a substantial lead ahead of the Netherlands and the United States (ranked 2nd and 3rd, respectively, see Figure 2). Germany achieved the best in trade network resilience which ensured its top position in the index. At the same time, Germany displays relative weaknesses in its institutional trade environment and trade-related

The GTRI ranking is dominated by high-income countries from Europe and Asia.

operations, being ranked only 9th in both. The Netherlands and the United States have a more balanced performance in all of the 3 GTRI dimensions.

The best GTRI performers are primarily high-income European countries. Asian economies also demonstrate noteworthy resilience in global trade. Japan, Singapore, and China stand out as the 3 Asian nations within the top 10 list. Korea follows closely behind in 11th place. All the best performers are high-income countries, with the exception of China. Notably, the only countries from the Middle East and wider Western Asia regions among the top 30 countries are Israel and Turkey respectively.

China's Trade Resilience

Among the top performing countries, China stands out as a prominent representative of upper middle-income economies. China's 9th position underscores its strong trade resilience and its status as an emerging economic powerhouse. The country exports mostly electrical machinery and equipment, mechanical appliances, furniture, plastics, vehicles and games and sport equipment. Its main trading partners are the United States, Hong Kong, Japan, Germany, South Korea, and Australia.

The China Box

Case Study – China

GTRI Overall Rank – 9th

Legend: Strengths | Weaknesses

Pillar Name	Pillar Rank	Sub-pillar Name	Sub-pillar Rank	Indicator Name	Indicator Rank
1. Network Resilience Rank	4th	1.1 Importance rank	5th	1.1.1 Strength rank	1st
				1.1.2 Importance of trade connections rank	1st
				1.1.3 Complexity of trade rank	18th
				1.1.4 Clustering rank	1st
		1.2 Diversification rank	16th	1.2.1 Product diversification rank	19th
				1.2.2 Trade partners diversification rank	20th
		1.3 Robustness rank	23rd	1.3.1 Strength resilience rank	24th
				1.3.2 Importance of trade connections resilience rank	30th
2. Institutional Resilience Rank	36th	2.1 Trade agreements & integration rank	70th	2.1.3 Integration rank	57th
				2.1.4 Border measures rank	82nd
		2.2 Regulatory & governance environment rank	61st	2.2.1 Real effective exchange rate volatility rank	65th
				2.2.2 Credit rating rank	27th
				2.2.3 Regulatory environment rank	49th
				2.2.4 Law protection rank	112th
				2.2.5 Political stability rank	99th
		2.4 Business environment rank	4th	2.4.1 Access to loans rank	1st
				2.4.2 Competitiveness rank	4th
				2.4.4 Innovation rank	29th
		2.5 Macroeconomic performance rank	57th	2.5.1 Macroeconomic performance rank	57th
3.Operational Resilience Rank	12th	3.1 Infrastructure & logistics rank	3rd	3.1.1 Infrastructure rank	14th
				3.1.2 Customs capacity rank	1st
				3.1.3 Logistics quality rank	27th
				3.1.4 Connectivity rank	1st
		3.2 Customs & operational efficiency rank	39th	3.2.1 Efficiency of customs rank	39th

Source: Whiteshield

China's Trade Resilience (continued)

China is the world's largest exporter and ranks 9th on the GTR. Its high rank is driven by both its relatively high scores on the network resilience and the operational resilience indexes and earning it the 4th and 12th ranks, respectively. *China's strengths in the absorption capacity are driven mainly by its market power and strong trade connections, with a slightly weaker complexity of traded products. China performs well in the diversification of its trade flows and across its products.*

However, China's exports of agriculture and food products are less diversified, which is not as consequential given that its total exports of food products are relatively low. Food security laws, which maintain stores of vital grains and staple products, could provide a framework for diversification of imports.

China's strong customs capabilities earns it a high operational capacity score; *however, there is room for improvement in areas such as customs documentation, automation, and procedures [7]. Despite China's impressive performance in global production and trade, there remain opportunities for further soft infrastructure improvement, including where matters concern the implementation of key provisions related to advanced customs rulings and simplified customs clearance procedures.*

China's overall GTRI ranking could have been higher had it not been for the relatively low score in the institutional resilience pillar that gives it a ranking of 36. *The primary factor contributing to this lower position is the insufficient attention given to integration and border measures. China exhibits relatively limited investment flow and border agency cooperation, such as through the Foreign Investment Law (FIL 2020) that continue to maintain restrictions and regulatory barriers in sectors deemed strategically relevant [8]. Additionally, its trade-distorting practices remain prevalent both in absolute terms and relative to other large trading nations. Furthermore, China's notably low level of privacy protection hinders the development of a trade-friendly regulatory environment. However, despite these challenges, the country continues to exhibit one of the most competitive business environments globally.*

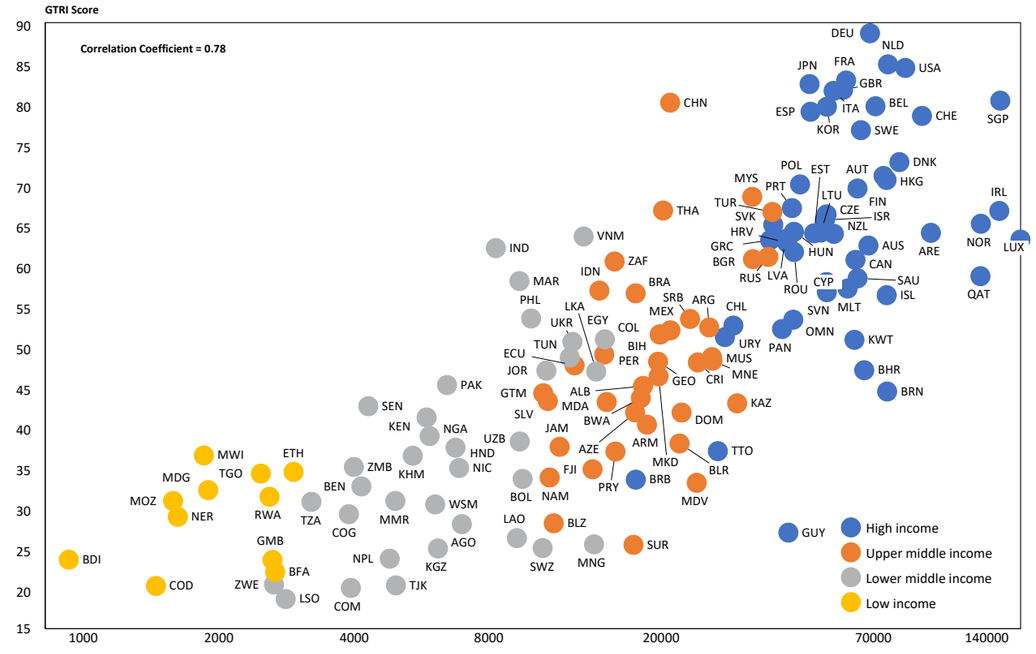
The level of economic development of a country is closely linked to its trade resilience score. The GTRI reveals that countries with higher GDP per capita levels tend to exhibit higher trade resilience – indicators have a robust correlation of 0.78 (Figure 4). Remarkably, 26 out of the top 30 countries featured in the index are categorised as high-income economies. This underscores the notion that economic prosperity often aligns with the capacity to withstand and recover from trade disruptions.

Yet, there are some high-income countries that display a lower trade resilience than anticipated. For example, Canada, one of the top 10 economies in the world in terms of GDP, ranks 44th on the GTRI. It performs well on institutional and operational resilience, but significantly lower on network resilience, securing only the 86th spot. This is due to a low diversification of

China can enhance its resilience by softening trade-distorting measures and addressing privacy protection issues.

trade partners, with over ¾ of its exports destined to the United States from where it sources about half of its imports.
The positive and high correlation between the GTRI and countries' income levels is not surprising. On the one hand, wealthier countries have the means to invest in infrastructure development and wield relatively higher market power to both sustain integration and steer global trade in alignment with their own interests. On the other hand, robust trade networks, efficient supply chains, and

Figure 4: GTRI Correlation with GDP per capita



Source: Whiteshield, World Bank [9]

The higher the level of economic development of a country – the higher its trade resilience.

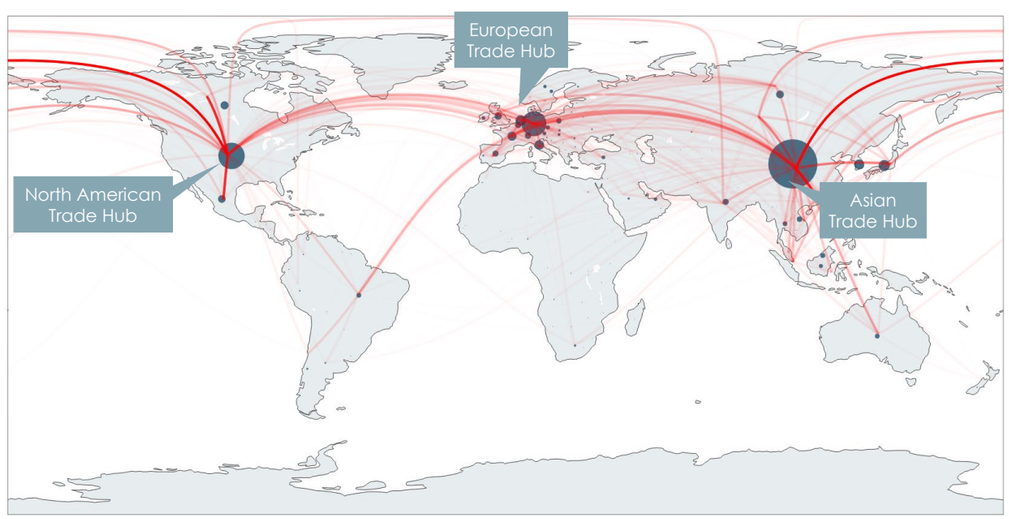
Canada's trade is mostly focused on one trading partner leading to vulnerabilities in its trade resilience.

adaptive strategies for handling disruptions contribute significantly to a nation's economic prosperity. Trade network embeddedness thus serves as an indicator of economic development, making the curation of trade network evolution an effective development policy.

Nonetheless, several upper-middle-income nations, including China, Malaysia, and Thailand, secure prominent positions in the rankings. Their presence at the top is attributed to their integral role within a trade hub, where they play a central role in global trade networks. These countries have forged strong connections with one another in the Asian region, which stands as one of the world's three primary and most resilient trade hubs. The other two leading trade hubs are Europe and North America (Figure 5).

At the regional level, North America exhibits a higher level of trade resilience when compared to Europe and East Asia & Pacific (Figure 6). The United States plays a pivotal role in driving North America's trade hub performance, with its total trade volume more than twice as that of Mexico and Canada combined.

Figure 5: Global Total Trade Network, 2021

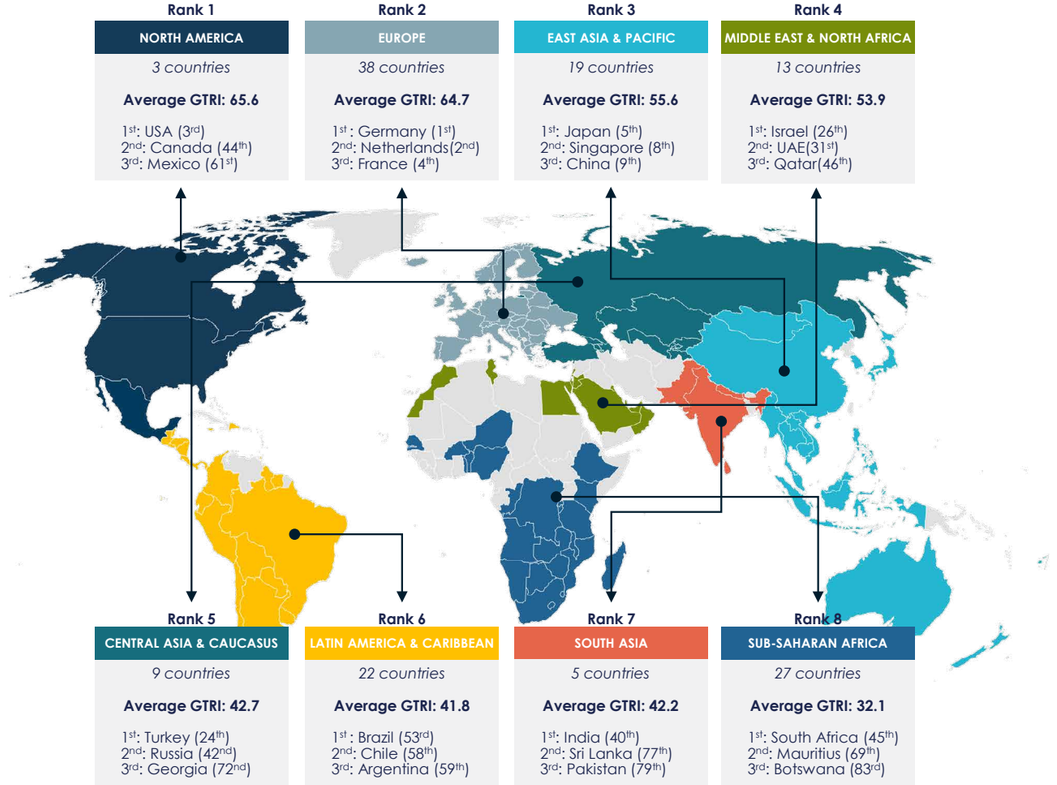


Source: Whiteshield, Comtrade

"Rich Countries Clubs" in Trade

Developed countries form a deeply interconnected "rich club". *The 10 largest trading countries, 8 of which are developed economies, contribute more than 50% to global trade. International trade network analysis supports the evidence that richer countries tend to cluster together and create a "rich countries club" with significant advantages that respond to geographical, political, and economic factors. These clusters carry an important amount of global trade imbalances, where market leaders display resilience across various trade dimensions. This observation reinforces the idea that strong trade performance often goes hand in hand with overall economic strength and influence. Developing economies, on the other hand, have asymmetrical relationships with the developed ones. They are also significantly less resilient, as demonstrated by the fact that all income groups except for high income countries perform below the average score across all pillars.*

Figure 6: Regional GTRI Performance



Source: Whiteshield

The North American trade hub is supported by the United States' strong trade resilience.

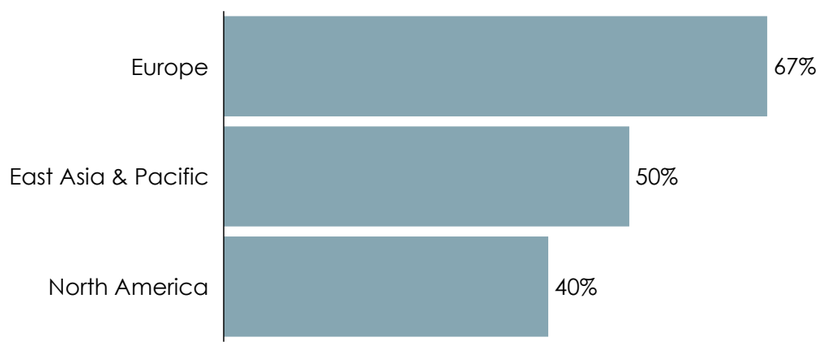
The United States has more diversified trade, with only 30% of trade being intraregional, and is much more resilient to trade shocks than Canada or Mexico, making the North America region ranked 1st. In contrast to the United States, over 60% of Canada's and Mexico's trade is with the United States, rendering their trade less diversified among trade partners. Consequently, this high dependence on a single trade partner makes Canada and Mexico more susceptible to trade shocks and, as a result, less trade resilient.

The main distinguishing aspects among the above three trade hubs relate to the different policy frameworks and

Participation in a major trade hub enhances countries' trade resilience.

governance approaches each hub has adopted (Figure 7). In Asia and Europe, intra-regional trade was promoted several decades ago through the offshoring of less advanced industries and labour-intensive work by industrial countries to neighbouring nations. In Europe, countries have actively established a regional framework for cooperation and deeper integration through the European Union. While in Asia, the integration was facilitated by a combination of state industrial policies and private sector firms closely aligned with the state, starting with the Asian Tigers like Japan and South Korea that outsourced production to nearby

Figure 7: Intraregional Trade of Major Trade Hubs in %



Source: Eurostat, World Integrated Trade Solution [10] [11]

Countries in Sub-Saharan Africa, South Asia, and Latin America & the Caribbean exhibit relatively low trade resilience in each of the 3 GTRI dimensions.

countries with lower labour costs such as Thailand and Malaysia. In contrast, North America adopted a more laissez-faire approach, primarily driven by private firms outsourcing to Asia in search for relatively lower costs. It wasn't until 1994 that NAFTA facilitated closer intra-regional integration in North America, which was much slower compared to the other leading trade hubs. Today, all three major trade hubs are seeking to increase the locally produced and traded goods by nearshoring industry, exemplified by large-scale policies such as the CHIPS Act in the US, Net-Zero Industry Act in the EU or RCEP in Asia Pacific [12].

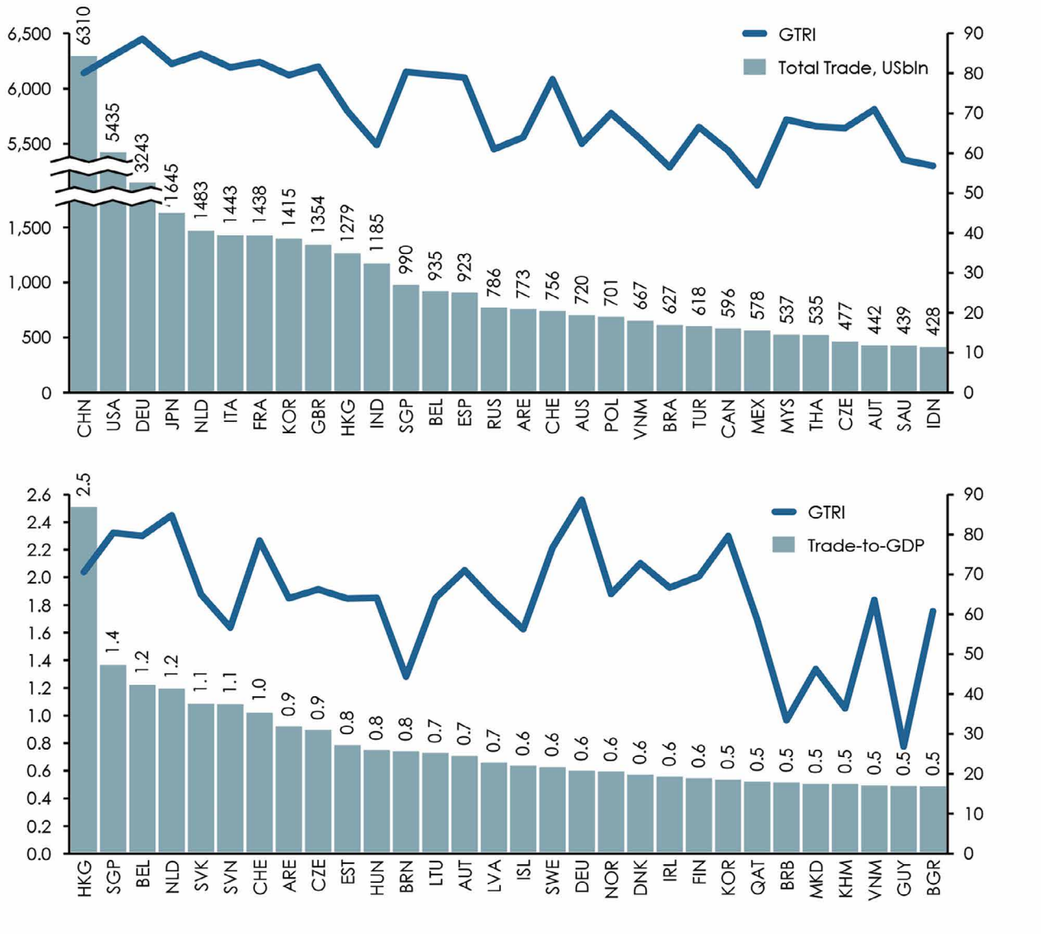
Conversely, regions with the lowest trade resilience levels are Sub-Saharan Africa, South Asia, and Latin America & the Caribbean. Within these regions, there exists notable diversity in the resilience of individual countries. For example, it is noteworthy that even India, the highest-ranked country from these regions is positioned only at the 40th spot in the global rankings. Furthermore, the average resilience scores for these regions lags considerably behind the leading trade hubs, with Sub-Saharan Africa registering less than half the score of Europe and North America. **Overall, the trade resilience of a country is positively correlated with its trade volumes and its trade share in national income.** The more actively a country participates in trade, the higher its resilience. A similar relationship can be seen between the GTRI and Trade-to-GDP ratio (Figure 8).

It is important to note that in principle higher trade values and trade shares make countries more exposed to trade shocks. However, these countries obtain relatively higher GTRI scores. This is due to the fact that countries that are dependent on global trade naturally have more resources and options to protect themselves against trade shocks: they are often well diversified across both trade partners and products, with a strong institutional and operational environment.

Countries with high trade volumes and high trade contribution to national income tend to be more resilient.

Landlocked nations often exhibit notably low rankings on the GTRI with an average score of only 38.8, which would be equivalent to rank 93 if these nations were a country. Notably, approximately 40% of the lowest scored 30 countries fall into this category. Their lack of direct access to the sea results in escalated

Figure 8: GTRI in the Countries with High Total Trade & Trade-to-GDP Ratio (Top 30)



Source: Whiteshield, Comtrade, World Bank

transit expenses and isolation from global trade, presenting substantial trade barriers and undermining the overall resilience of these nations. It is worth mentioning, however, that there are exceptions to this trend, as exemplified by Switzerland and Austria. These two countries perform exceptionally well due to their strategic geographical positioning within Europe, their favourable business environment, and high-quality infrastructure. It is important to acknowledge that historically, being landlocked acted as a deterrent to a country's trade prospects. Given that much of the existing trade network structure is a product of historical development, the landlocked status has historically hampered these countries' ability to foster higher levels of trade integration.

GTRI and Quantum*

The same government policies implemented in different countries can yield varying results. Governments have heavily invested in numerous policies that have fallen short of their intended outcomes. *This is because policy effectiveness depends not only on the incentives and soundness of the policies but also on the capacity of the population to absorb the policy. The recent "Quantum Governance" publication explores in details the factors influencing governance.*

In essence, the "Quantum Governance" framework introduces an innovative approach to measure development as a product of policy energy and quantum learning:

- *The "Policy Energy" block captures the amount of Energy introduced in societies to drive development through public policy interventions and formal institutions. It is influenced by four key factors: a country's policy mix, legitimacy, administrative efficiency, and narrative.*

- *The "Quantum Learning" block refers to citizens' and individuals' ability to absorb public interventions and translate them into tangible achievements and benefits. It captures two factors: Individual meaning and the Community. "Individual meaning" is intimately tied to the abilities, aspirations, and motivations of individuals, influenced by their economic, social, and cultural backgrounds, which form the basis of their unique identities. "Community" encompasses a set of informal institutions, including norms, beliefs, traditions, history and values prevalent in a society, extending beyond the individual backgrounds of citizens, and shaping the collective identity of that society.*

The Quantum framework can also be applied to trade resilience*. The Institutional and operational resilience pillars reflect the "Policy energy" within trade resilience governance. The network resilience, in turn, represents the outcome of trade policies and provides a real assessment of resilience within the trade network. The gap between the network resilience and the institutional/operational pillars sheds light on Trade Quantum, which encompasses exporters' and importers' capacity to absorb policies.*

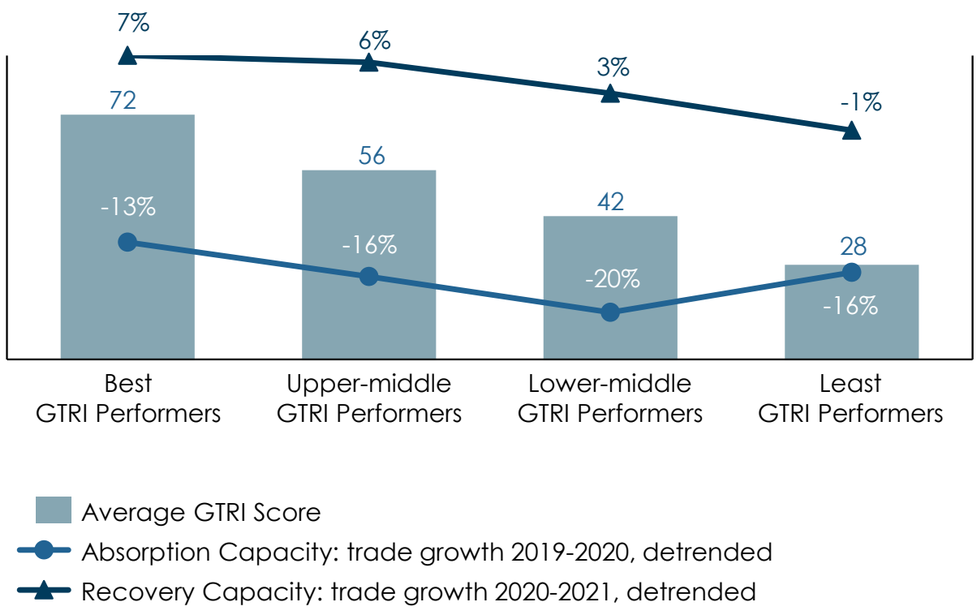
***Based on** The "Quantum Governance" book of Fadi Farra, Senior Managing Partner of Whiteshield in collaboration with Christopher Pissarides, Whiteshield Special Advisor and Director and recipient of the 2010 Nobel Prize in Economics [13].

The GTRI can predict the depth of a trade shock in real-life events such as the COVID-19 pandemic.

The GTRI can predict the extent to which countries will be affected by trade disruptions like the COVID-19 pandemic. To evaluate the predictive capability of the GTRI, we conducted a correlation analysis with various indicators of countries' trade growth. The period from 2019 to 2020 represents the peak impact of the COVID-19 pandemic on global trade, and the trade growth during this period serves as an indicator of a country's absorptive capacity. The subsequent period, from 2020 to 2021, signifies the recovery phase from this shock and the trade growth during this period serves as an indicator of recovery capacity.

The correlations between GTRI scores and countries' absorption and recovery growth rates confirm the predictive power of the GTRI. To illustrate this, in Figure 9, we categorised countries into four groups based on their GTRI performance and compared their average de-trended trade growth rates over both periods of absorption and recovery. The graph below provides compelling evidence that countries with higher GTRI scores experienced less adverse effects from COVID-related trade shocks in 2020 and exhibited a stronger recovery in 2021.

Figure 9: Absorptive & Recovery Capacity during COVID-19



Note: The least GTRI performance have felt less decline in trade in the pandemic absorption period due to the fact that most of countries in this group are engaged to global trade significantly less than other countries.

Source: Whiteshield, Comtrade

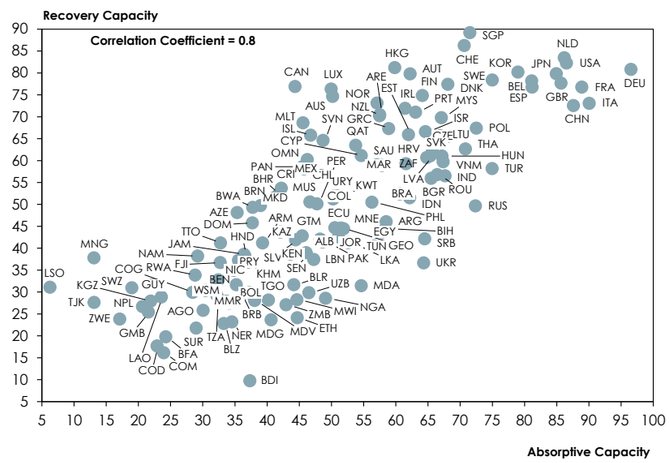
This finding underscores the strength of the GTRI as a forward-looking indicator that goes beyond a snapshot of a country's current trade resilience. The relationship between the GTRI scores and trade performance during the Covid-19 pandemic reaffirms the importance of proactively investing in building trade resilience capabilities.

Countries that prioritise enhancing their trade resilience capacities are better positioned to mitigate the impact of disruptions, whether driven by pandemics, geopolitical tensions, or other factors. The GTRI serves as a valuable guide for policymakers, businesses, and stakeholders, offering actionable insights to strengthen trade networks, optimise supply chains, and foster an environment conducive to resilience in the face of uncertainty.

The absorptive and recovery capacities of a country are closely interconnected.

The absorption and recovery capacities of countries are strongly related. The examination of the GTRI pillar scores, which were determined using entirely different and unrelated methodologies, yielded an astonishing finding: a strong correlation of 0.8 between absorption and recovery capacity. This implies that countries overall maintain a harmonious equilibrium between safeguarding their trade routes from disruptions and cultivating the institutional and operational infrastructure to support trade (Figure 10).

Figure 10: Correlation between Absorptive & Recovery Capacity



Source: Whiteshield

Achieving overall trade resilience requires a balanced approach across all the three pillars.

A closer examination of the individual pillars within the GTRI **shows significant disparities in network resilience rankings when compared to a country's overall GTRI ranking.** Prominent examples of countries performing less favourably in network resilience than in the broader GTRI include Singapore and Hong Kong (Figure 11), indicating that their absorptive capacity is lower than their recovery capacity. In the immediate aftermath of a shock, these countries exhibit a relatively higher susceptibility to trade disruptions, but they are expected to rebound to normal trade levels shortly afterwards. In similar cases, it would be worthwhile to consider reshaping the trade strategies by focusing on more resilient product categories and fostering partnerships with more resilient trade counterparts to enhance the network resilience.

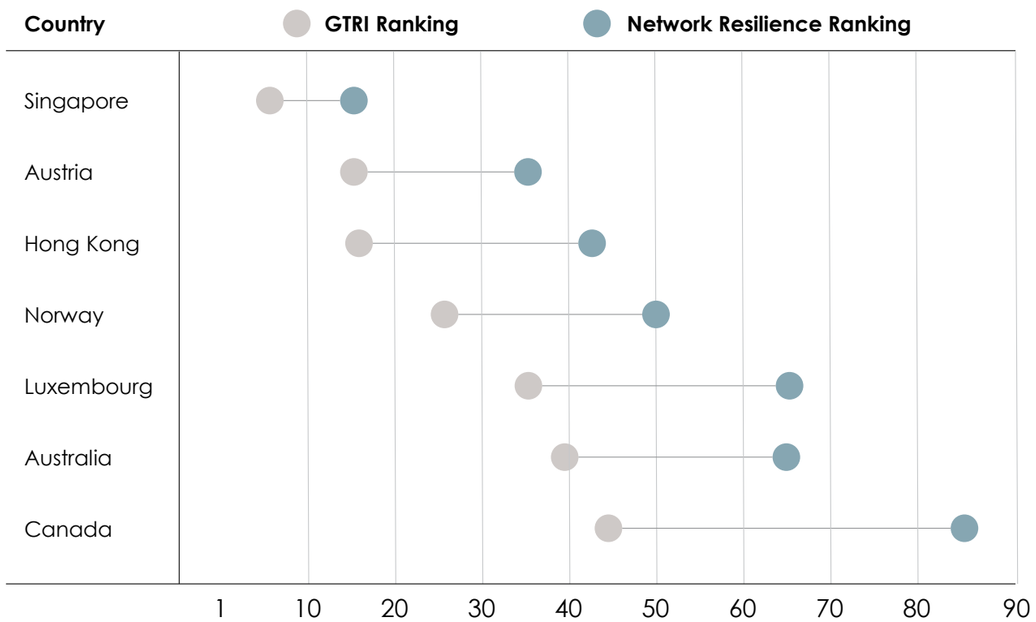
The top 30 positions in institutional resilience are exclusively held by high-income countries which **highlights the correlation between economic prosperity and the establishment of robust institutions that underpin trade resilience.** While Europe dominates the rankings, showcasing the proactive measures taken by its nations to cultivate a sound institutional environment, African and Middle East countries except Qatar lack representation, underscoring the two regions' challenges to establishing strong institutions.

The data underscores that **a country's trade power doesn't in and by itself determine its institutional resilience.** Smaller trading nations have demonstrated the ability to develop and maintain efficient institutional frameworks that promote sound trade practices and policies, irrespective of their trade volumes, demonstrated by the fact that only 4 of the top 10 leaders in institutional resilience also hold positions among the GTRI's overall top performers.

Global trade hubs make up the top 10 countries for operational resilience, with a strong representation of European, Asian, and North American countries. These hubs exhibit robust systems to manage operational disruptions effectively. While high-income countries are predominant among operational resilience leaders, 4 upper middle-income nations - China, Malaysia, Morocco, and Turkey - showcase their ability to maintain efficient trade operations in case of an external shock. In addition, some countries rankings are significantly better on operational resilience than on their overall GTRI, while others like France and Italy show an opposite performance (Figure 12).

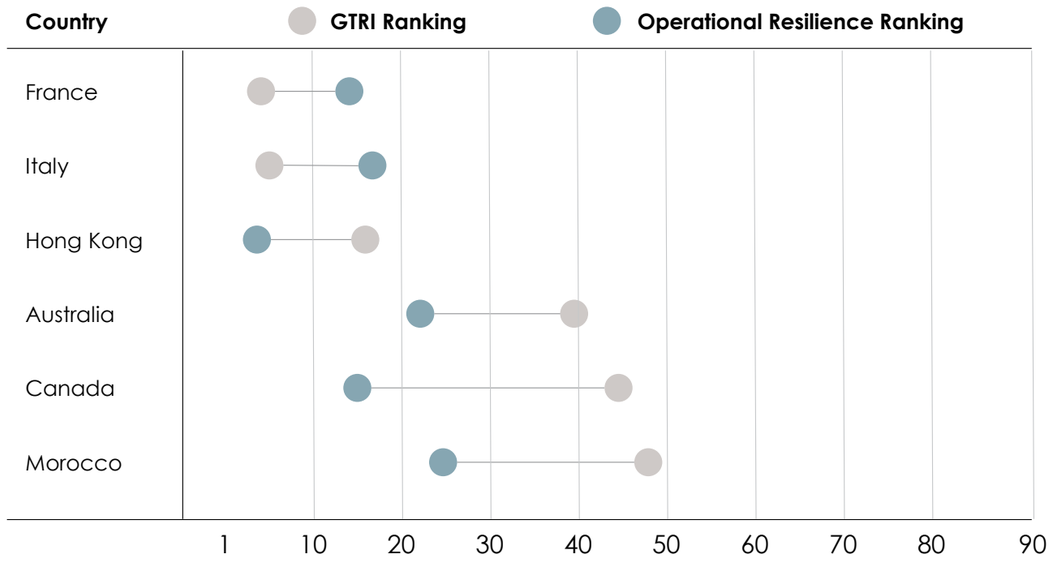
Countries that have high overall resilience often lack in their absorptive capacity.

Figure 11: GTRI vs Network Resilience Ranking



Source: Global Trade Resilience Index 2023

Figure 12: GTRI vs Operational Resilience Ranking



Source: Global Trade Resilience Index 2023

In essence, **achieving overall trade resilience requires a balanced approach that considers network resilience, institutional strength, as well as operational resilience.** The countries with large ranking gaps across the GTRI dimensions highlight the need to recognise and leverage strengths, while also addressing underperforming dimensions of trade resilience.

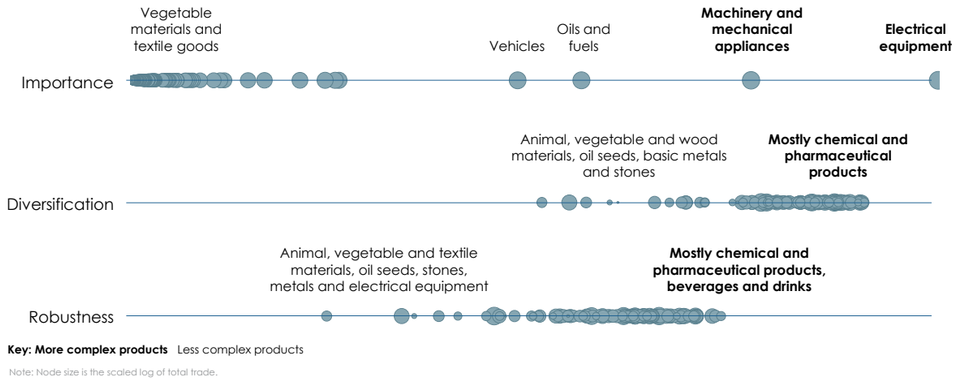
An examination of product resilience reveals that **complex products like machinery and electrical equipment hold the highest importance,** while relatively simple agriculture and textile products occupy a less important role in global trade. The diversification and robustness scores follow a similar pattern: "natural" commodities like animals, vegetables, textiles, wood, and basic metals and stones, which have lower Product Complexity Index scores (PCI), tend to be less diversified and less robust compared to research-intensive and complex commodities like chemicals and pharmaceuticals.

Interestingly, the most complex products like electrical equipment and optical devices are not necessarily marked as the most robust or diversified. This is

Trading the most complex products such as electrical equipment has the highest importance but is not necessarily marked as the most robust or diversified.

because only a few countries possess the knowledge and capabilities to produce these commodities, limiting trade diversification in these products. Trade in average and upper-average complexity products, such as pharmaceuticals, **tends to be most diverse and robust compared to more simple products.** Figure 13 displays the average scores for product importance, diversification, and robustness. The diversification scores represent the weighted average of a country's scores in diversifying its trade partners within each product network, weighted by its trade flow values. The robustness scores are estimated by the same logic. Importance score reflects the scaled share of a product's export in global exports.

Figure 13: Resilience Scores of Product Categories



Note: Node size is the scaled log of total trade.
Source: Whiteshield, Comtrade

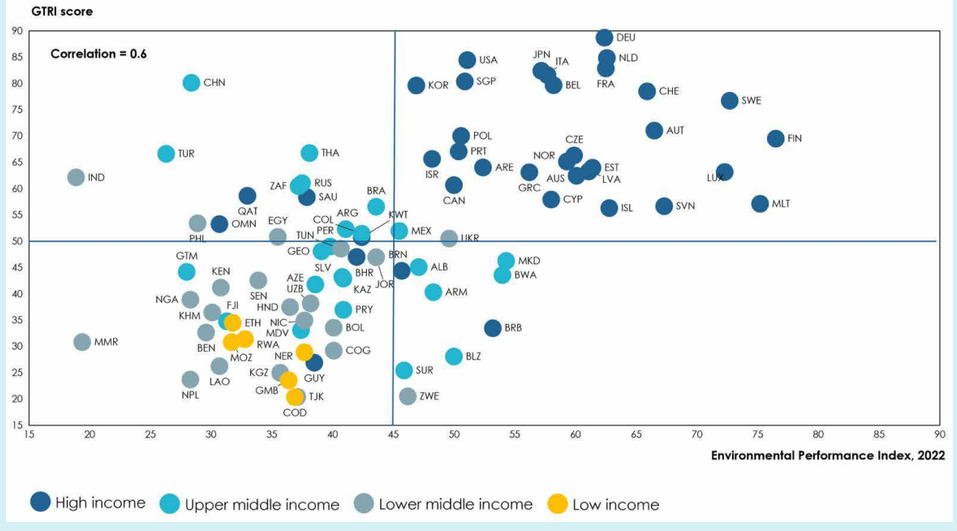
GTRI and Environmental Performance Index

The GTRI results show that countries that have built strong trade resilience have also managed to improve their environmental performance as depicted in the figure below.

However, among the top performers, there are a few ‹outliers› whose trade resilience levels do not correspond to their environmental performance, suggesting untapped potential for environmental improvement. The clear environmental "laggards" appear to be China, India, Turkey and Myanmar.

China (the world factory) and India, with large population, continue to rely on non-renewable sources of energy and they both face scarcity in water resources and biodiversity losses. Turkey continues to experience high levels of air pollution from the use of heating fuels and vehicular emissions.

Despite recent efforts to combat soil erosion, over-fertilisation and overgrazing continue to cause environmental damage. Myanmar continues to experience unsustainable agricultural development, illegal logging and unresolved land disputes.



The UAE's Trade Resilience

The UAE holds the 31st position globally and ranks as the second-highest performer in the Middle East after Israel which takes the 26th spot.

***However, when examining the network resilience, the UAE falls behind at the 48th position, despite its prominent status as a major trade hub in the MENA region**, boasting a strength rank of 29. This ranking is largely attributed to the composition of the UAE's exports, primarily consisting of mineral fuels and oils (70%) and precious metals (12%), both of which are products of low complexity [14]. In contrast, its re-exports display a higher level of complexity, with 47% comprising electrical machinery and transport equipment.*

*Product diversification remains a challenge for the UAE, as it mainly exports two types of products and re-exports three, and therefore **its product diversification is one of the lowest among the high-income countries** (ranked 119th). However, it excels in diversification across trade partners, ranking 19th, ultimately leading to a robust trade profile that ranks 14th in terms of resilience. For example, to enhance its trade resilience further, the UAE could consider diversifying its nickel exports away from India, which currently receives 75% of nickel articles, toward more resilient destinations, given India's current 40th position in resilience. Notably, re-exports are factored into diversification and resilience calculations, as they significantly contribute to trade resilience and are susceptible to trade shocks.*

***The UAE's high GDP per capita strongly influences its institutional resilience.** The country boasts an "AA-" credit rating, effective governance and regulatory environment, and a thriving innovation environment. However, areas such as privacy law protection and business competitiveness lag behind, negatively impacting the UAE's institutional resilience.*

***The UAE performs the best in the operational aspect of resilience** owing to its well-structured logistics infrastructure, customs capacity, logistics quality, and connectivity. Nevertheless, the overall efficiency of customs remains a significant performance challenge, mainly attributed to issues with internal border agency cooperation.*

The UAE Box

Case Study – UAE

GTRI Overall Rank – 31st **Legend:** Strengths Weaknesses

Pillar Name	Pillar Rank	Sub-pillar Name	Sub-pillar Rank	Indicator Name	Indicator Rank
1. Network Resilience Rank	48th	1.1 Importance rank	38th	1.1.1 Strength rank	29th
				1.1.2 Importance of trade connections rank	31st
				1.1.3 Complexity of trade rank	56th
				1.1.4 Clustering rank	44th
		1.2 Diversification rank	89th	1.2.1 Product diversification rank	119th
				1.2.2 Trade partners diversification rank	19th
		1.3 Robustness rank	14th	1.3.1 Strength resilience rank	17th
				1.3.2 Importance of trade connections resilience rank	16th
2. Institutional Resilience Rank	37th	2.1 Trade agreements & integration rank	71st	2.1.3 Integration rank	69th
				2.1.4 Border measures rank	61st
		2.2 Regulatory & governance environment rank	41st	2.2.1 Real effective exchange rate volatility rank	107th
				2.2.2 Credit rating rank	16th
				2.2.3 Regulatory environment rank	28th
				2.2.4 Law protection rank	80th
				2.2.5 Political stability rank	38th
		2.4 Business environment rank	32nd	2.4.1 Access to loans rank	35th
				2.4.2 Competitiveness rank	47th
				2.4.4 Innovation rank	22nd
		2.5 Macroeconomic performance rank	15th	2.5.1 Macroeconomic performance rank	15th
3.Operational Resilience Rank	16th	3.1 Infrastructure & logistics rank	12th	3.1.1 Infrastructure rank	9th
				3.1.2 Customs capacity rank	8th
				3.1.3 Logistics quality rank	11th
				3.1.4 Connectivity rank	13th
		3.2 Customs & operational efficiency rank	41st	3.2.1 Efficiency of customs rank	41st

Source: Whiteshield

Democratic Republic of Congo (DRC) Trade Resilience

The DRC is a very important critical raw material supplier, providing ¾ of the total volume of mined cobalt. Its 134th position globally, places it among the bottom three countries in the GTRI. Despite this low trade resilience, the country has a substantial reliance on trade, comprising on average 43% of its annual GDP over the past decade [15].

Ranked 115th in trade complexity, the DRC heavily relies on mineral exports that have low product complexity scores. *Specifically, cobalt and copper ores contribute about 95% of total exports between 2015 to 2019, with significant growth of 291% in ores and concentrates exports during the same period. This overreliance on these commodities exposes the DRC's economy to commodity price fluctuations.*

In regard to trade partners diversification, the DRC ranks 131st, primarily exporting to selected regional partners and extra-regional partners like China and the United Arab Emirates. *Notably, exports to China saw a significant increase between 2015 to 2020 with an annual growth rate of 43.2%. This concentration of trade with a limited number of partners heightens vulnerability to market disruptions.*

When it comes to institutional resilience, the DRC ranks 135th, marked by a low credit rating of CCC+ and widespread corruption and governance mismanagement. *These factors discourage trade and investment in the country. Additionally, the DRC's slow progress in trade agreements and integration is evident, as exemplified by the prolonged ratification of the African Continental Free Trade Area (AfCFTA) agreement.*

The country ranks only 117th on operational resilience, primarily due to a poorly developed transport system and inadequate supporting infrastructure. *These issues result in low connectivity between the central and peripheral regions of the country, hindering the movement of goods both domestically and across borders.*

The DRC Box

Case Study – DRC

GTRI Overall Rank – 134th **Legend:** Strengths Weaknesses

Pillar Name	Pillar Rank	Sub-pillar Name	Sub-pillar Rank	Indicator Name	Indicator Rank
1. Network Resilience Rank	127th	1.1 Importance rank	117th	1.1.1 Strength rank	59th
				1.1.2 Importance of trade connections rank	55th
				1.1.3 Complexity of trade rank	115th
				1.1.4 Clustering rank	101st
		1.2 Diversification rank	126th	1.2.1 Product diversification rank	124th
				1.2.2 Trade partners diversification rank	88th
		1.3 Robustness rank	124th	1.3.1 Strength resilience rank	87th
				1.3.2 Importance of trade connections resilience rank	131st
2. Institutional Resilience Rank	135th	2.1 Trade agreements & integration rank	133rd	2.1.3 Integration rank	130th
				2.1.4 Border measures rank	125th
		2.2 Regulatory & governance environment rank	128th	2.2.1 Real effective exchange rate volatility rank	99th
				2.2.2 Credit rating rank	-
				2.2.3 Regulatory environment rank	135th
				2.2.4 Law protection rank	127th
				2.2.5 Political stability rank	130th
		2.4 Business environment rank	136th	2.4.1 Access to loans rank	126th
				2.4.2 Competitiveness rank	-
				2.4.4 Innovation rank	119th
		2.5 Macroeconomic performance rank	132nd	2.5.1 Macroeconomic performance rank	132nd
3.Operational Resilience Rank	127th	3.1 Infrastructure & logistics rank	117th	3.1.1 Infrastructure rank	95th
				3.1.2 Customs capacity rank	92nd
				3.1.3 Logistics quality rank	96th
				3.1.4 Connectivity rank	99th
		3.2 Customs & operational efficiency rank	127th	3.2.1 Efficiency of customs rank	127th

Source: Whiteshield

CRITICAL RAW MATERIALS & TRADE RESILIENCE

AVOIDING A GREEN-METAL BATTLE

As countries embrace the transition towards net-zero, the importance of availability of and access to critical raw materials has come to the forefront for businesses and policymakers alike. The high raw material intensity of clean technologies as well as advanced electronics lies at the heart of this transition. Automotive firms, advanced electronics manufacturers, and energy companies are seeing first-hand the paradigm shift from a reliance on primarily oil and gas in their production processes towards an increased reliance on critical raw materials such as lithium, copper, cobalt, nickel, and rare earth elements. For example, an onshore wind plant requires 9 times as many raw materials compared to a gas-fired plant of the same capacity and a medium-sized electric vehicle uses 6 times as many raw materials compared to a conventional internal combustion engine car of the same size (see Figure 14).

Figure 14: Raw Material Intensity of Clean vs Conventional Technologies

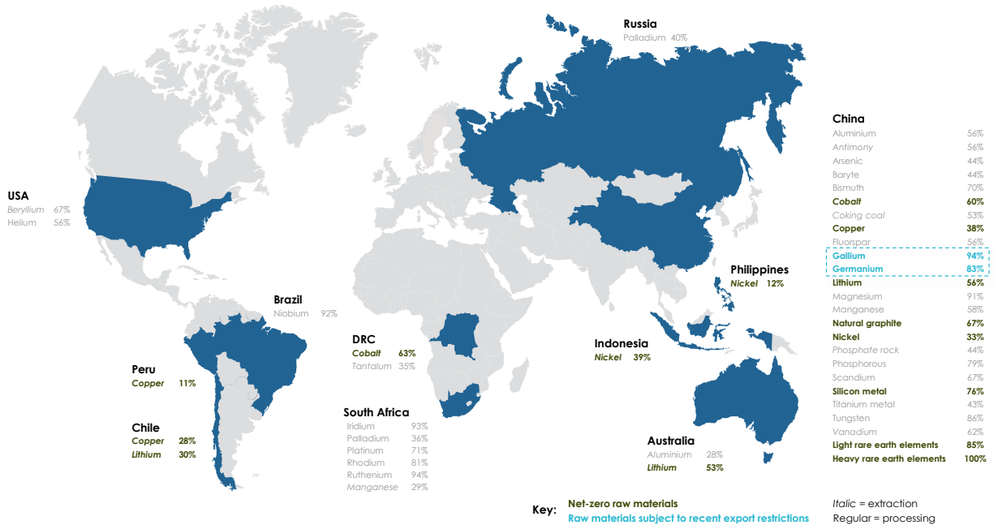
Source: IEA

A combination of the high mineral intensity of clean technologies with the even higher necessary deployment levels to achieve net-zero leads to a massive surge in demand for critical raw materials (CRM). According to forecasts by the International Energy Agency (IEA), some CRMs are projected to significantly increase in demand, including lithium, cobalt and nickel, with demand rising by a factor of 42, 21, and 19 by 2040 compared to 2020, respectively [4].

There is a looming supply deficit for CRMs within the next decade driven by the Net-Zero commitments.

On the supply-side, these critical raw materials are highly concentrated in few countries and are primarily provided by developing nations outside of the Western World. Thus, there is a high dependency of the West on these countries. To illustrate, the top 3 countries that mine lithium have a combined market share exceeding 80%, and in the case of cobalt over ¾ is mined in the Democratic Republic of Congo according to the IEA. For the processing of these critical raw materials, China dominates this step of the value chain ranging up to 90% for rare earth elements (Figure 15).

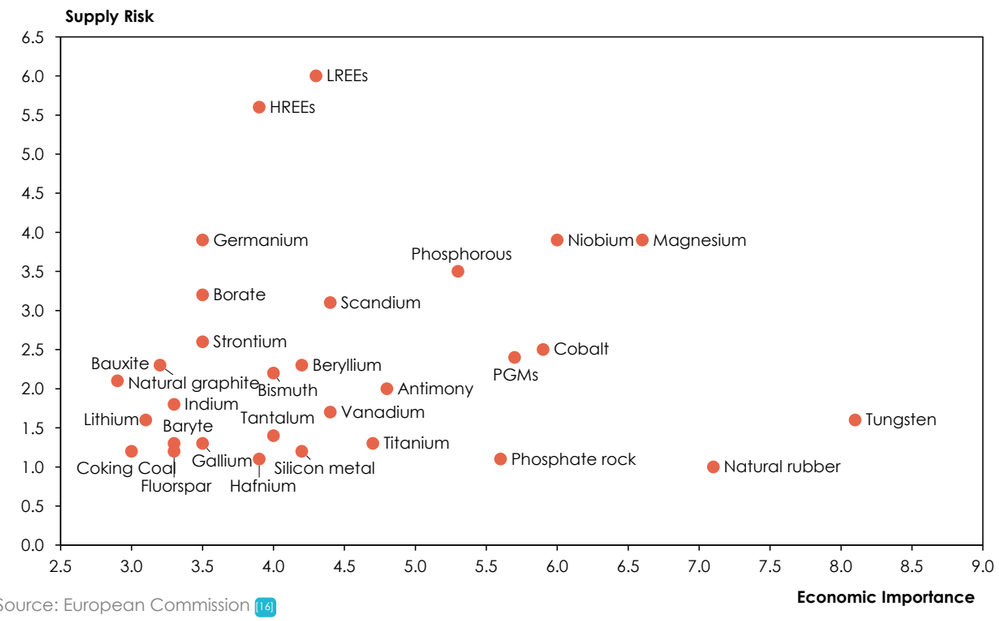
Figure 15: Supply of Critical Raw Materials



Source: European Commission

Governments have given increasingly more attention to identifying and ensuring a sufficient supply of CRMs over the last decade, underlined by the fact that the US, EU, and Japan each have developed their own frequently updated list of critical raw materials that they monitor closely. For example, Figure 16 shows the EU critical raw materials list based on the supply risk and the economic importance in 2020.

Figure 16: EU List of Critical Raw Materials



Source: European Commission [16]

The latest developments in US-China trade tensions provide a case-in-point for why it is crucial to understand the trade resilience of critical raw materials in more detail. In August 2023, China introduced export licensing requirements for Gallium and Germanium in response to US-led export controls on advanced semiconductors. These two rare earth elements are critical inputs for the semiconductor industry, and with China controlling over 80% of their supply. any restrictions in their export could have far-reaching consequences. These recent developments may provide us with a glimpse of what is to come if trade tensions escalate further. It highlights the vulnerability of global supply chains, especially for critical raw materials, and underscores the possibility of more severe disruptions if additional export restrictions are introduced by supplying countries.

Whiteshield is currently in the process of preparing a report that will delve into this intricate and ever more significant topic, illuminating the trade resilience of critical raw materials (CRMs). To achieve this, the GTRI methodology will be refined to a granular level, tailored specifically to CRM networks and value chains. The resulting index will provide a comparative assessment of countries' resilience in the CRM market and offer an in-depth analysis of selected countries' vulnerabilities and sources of resilience throughout the CRM value chain.

There is a widening mismatch between CRMs supply and demand that can be resolved through international cooperation.

LOOKING AHEAD

MAKING TRADE WORK FOR CLIMATE CHANGE

For several decades, international trade has been a catalyst for promoting growth and poverty alleviation as well as higher standards of living. However, it is also true that the trade tide did not lift all boats equally, whether across or within countries: the benefits from trade were disproportionately distributed to the owners of capital and skills.

Nevertheless, studies and practical experience show that no country has successfully developed its economy by turning its back on international trade and long-term foreign investment. But despite its clear benefits, discontent with liberal trade policy has been rising and has fuelled populism and political tensions. The result has seen countries moving towards "de-risking" or "de-coupling" by deploying a battery of industrial policy instruments including subsidies, tariffs, export restrictions and other economic interventions to advance national strategic goals. Importantly, industrial policy has now moved into the centre of climate and economic policy making. While such interventions may give rise to some strategic advantages for some countries, they also involve significant costs in the aggregate including limiting the ability of many vulnerable countries to combat climate change. Rather than engaging in an endless cycle of retaliatory actions and trade conflicts, countries need to shift their focus towards cooperation and collaboration. The benefits of such an approach are multifaceted, offering a pathway to more sustainable economic growth, enhanced global resilience, and a better and less costly path to achieving our shared goals of saving our environment.

By working together to address shared challenges, forging mutually beneficial trade relations, and fostering an environment of cooperation, nations can unlock new opportunities for economic prosperity, combat climate change and safeguard the stability of the global trading system. This approach is not just a lofty ideal; it represents a pragmatic strategy that would lead to more prosperous and harmonious international trade relations, even in the face of ongoing trade tensions. The WTO offers the ideal forum to building trust among countries and to crafting cooperative solutions targeted at achieving a low carbon and inclusive transition.

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