

COVID-19 Regional Safety Assessment

Methodology and Analytical Framework

20 Regions Assessment and 5 Special Case
Studies: Israel, Germany, Switzerland,
Singapore, Japan

COVID-19 Regional Safety Assessment

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Introduction

A comprehensive and quantitative analysis of the far-reaching global pandemic arising from the novel coronavirus is a critical challenge that must be carried out in order to plan the best strategic measures to reduce and neutralize negative repercussions of the outbreak until the final solution of a vaccine are within the reach of the scientific and medical community. With this in mind, Deep Knowledge Group's new COVID-19 special analytical case study is designed to classify, analyze and rank the economic, social and health stability achieved by each of the 20 regions included in its analysis, as well as the strengths, weaknesses, opportunities, and threats or risks that they present in the battle against the global health and economic crisis triggered by COVID-19.

The pool of the 20 selected regions is made up of Israel, Germany, Switzerland, Singapore, China, Japan, Austria, Australia, New Zealand, Canada, South Korea, United Arab Emirates, Norway, Hong Kong, Denmark, Saudi Arabia, Hungary, Netherlands, Taiwan and Vietnam, and more than 130 qualitative and quantitative parametric variables have been developed, tuned, and grouped into 6 broad and top-level categories capable of comprehensively describing the health and economic status of each region in terms of their absolute and relative stability and risks.

It is Deep Knowledge Group's aim that, regardless of whether the conclusions and recommendations presented in this special analytical case study are adopted wholesale, the present analysis can serve as a starting point for discussion and a resource for governments to optimize current and post-pandemic safety and stability, and as a toolset for establishing the best possible action plans for each particular region, in order to maintain the health and economic well-being of their populations and reverse the collateral damage caused by COVID- 19.

2600 Data Points

30 Indicators

6 Categories

130 Parameters

20 Regions

6 Proprietary Indicators

60+ Data Sources

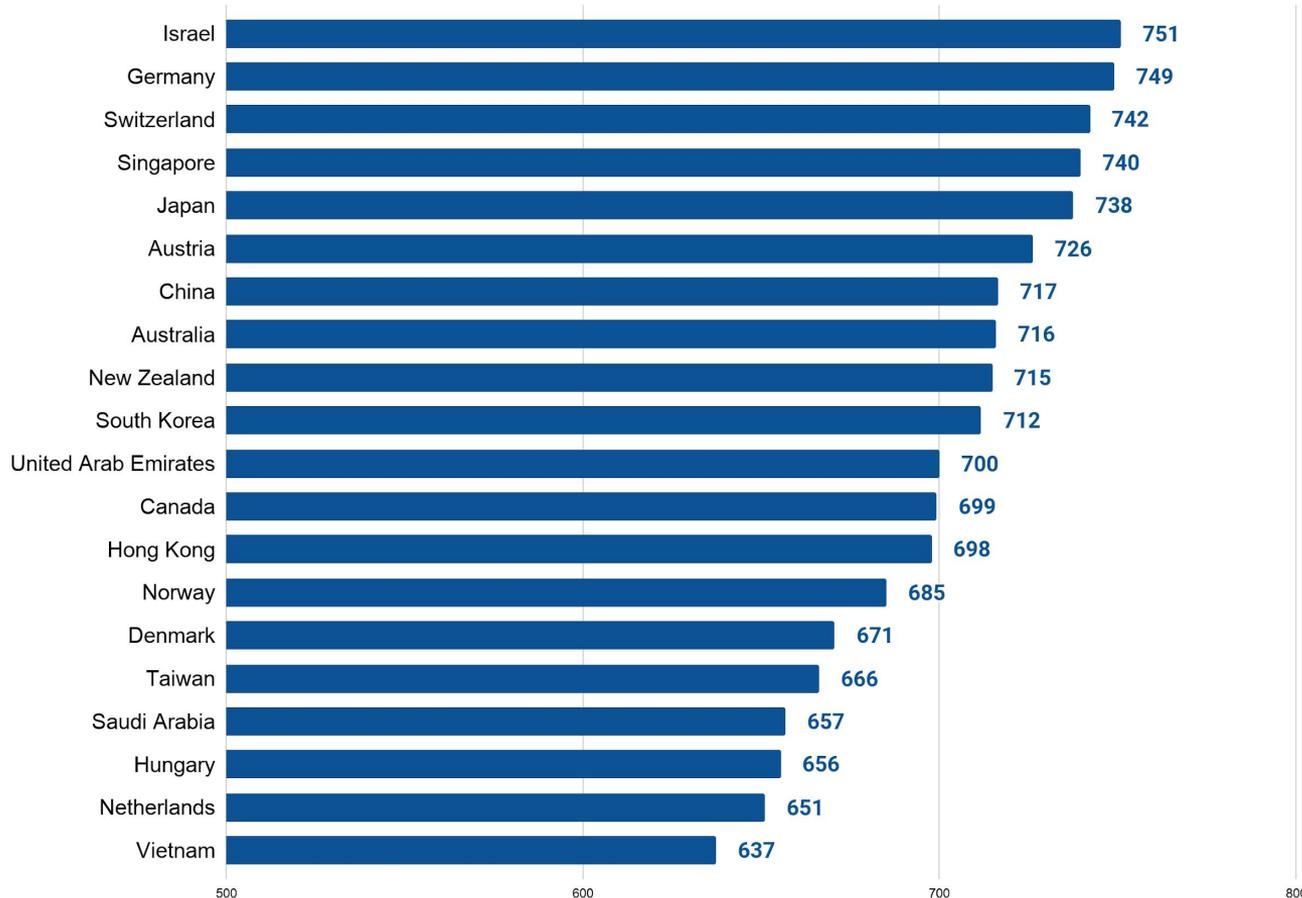
11 Proprietary Parameters

3 Data Classes

Safety Score of 20 Regions



20 Regions COVID-19 Safety Cumulative Ranking



General overview of 20 regions classified using the specific list of 130 parameters. Top regions with the highest total score are Israel, Germany and Switzerland, which means they have some of the highest overall levels of stability along the 20 regions analyzed, both in terms of optimizing current health and disease outcomes of their population amid the COVID-19 pandemic, as well as in terms of optimizing the ongoing management, monitoring and neutralization of the pandemic across longer time horizons.

20 Regions COVID-19 Safety Ranking

#1		ISRAEL	751
#2		GERMANY	749
#3		SWITZERLAND	742
#4		SINGAPORE	740
#5		JAPAN	738
#6		AUSTRIA	726
#7		CHINA	717
#8		AUSTRALIA	716
#9		NEW ZEALAND	715
#10		SOUTH KOREA	712

#11		UNITED ARAB EMIRATES	700
#12		CANADA	699
#13		HONG KONG	698
#14		NORWAY	685
#15		DENMARK	671
#16		TAIWAN	666
#17		SAUDI ARABIA	657
#18		HUNGARY	656
#19		THE NETHERLANDS	651
#20		VIETNAM	637

Israel: #1 Region by COVID-19 Safety Ranking

COVID-19 Quarantine Efficiency

Weight 2.2 Category Score 55.41

<input type="checkbox"/> Scale of Quarantine	10.10
<input type="checkbox"/> Quarantine Timeline	10.63
<input type="checkbox"/> Criminal Penalties for Violating Quarantine	7.67
<input type="checkbox"/> Economic Support for Quarantined Citizens	6.30
<input type="checkbox"/> Economic and Supply Chain Freezing	12.4
<input type="checkbox"/> Travel Restrictions	8.30

122
POINTS

COVID-19 Healthcare Readiness

Weight 1.3 Category Score 65.38

<input type="checkbox"/> COVID-19 Equipment Availability	11.12
<input type="checkbox"/> Mobilization of New Healthcare Resources	17.50
<input type="checkbox"/> Quantity and Quality of Medical Staff	11.38
<input type="checkbox"/> Level of Healthcare Progressiveness	9.67
<input type="checkbox"/> Level of Technological Advancement	7.90
<input type="checkbox"/> Epidemiology System Level of Development	7.80

85
POINTS

COVID-19 Government Efficiency of Risk Management

Weight 2.2 Category Score 86.66

<input type="checkbox"/> Level of Security and Defense Advancement	17.00
<input type="checkbox"/> Rapid Emergency Mobilization	16.00
<input type="checkbox"/> Efficiency of Government Structure	13.69
<input type="checkbox"/> Economic Sustainability	11.31
<input type="checkbox"/> Legislative Efficiency	16.00
<input type="checkbox"/> Political Stability	12.66

191
POINTS

COVID-19 Regional Resiliency

Weight 1.3 Category Score 68.63

<input type="checkbox"/> Infection Spread Risk	13.21
<input type="checkbox"/> Culture Specifics and Societal Discipline	13.50
<input type="checkbox"/> Level of Modern Sanitization Methods	15.00
<input type="checkbox"/> Demography	11.19
<input type="checkbox"/> Chronic Diseases	7.93
<input type="checkbox"/> Societal Risks	7.80

89
POINTS

COVID-19 Monitoring and Detection

Weight 1.5 Category Score 95.38

<input type="checkbox"/> Monitoring Systems and Disaster Management	18.00
<input type="checkbox"/> Scope of Diagnostic Methods	15.00
<input type="checkbox"/> Testing Efficiency	14.40
<input type="checkbox"/> AI for Diagnostics and Prognostics	15.00
<input type="checkbox"/> Government Surveillance Technology for Monitoring	15.98
<input type="checkbox"/> Reliability and Transparency of Data	17.00

143
POINTS

COVID-19 Emergency Preparedness

Weight 1.5 Category Score 80.83

<input type="checkbox"/> Societal Emergency Resilience	27.00
<input type="checkbox"/> Emergency Military Mobilization Experience	15.33
<input type="checkbox"/> Surveillance Capabilities (Scale, Scope and Technological Sophistication)	27.00
<input type="checkbox"/> Previous National Emergency Experience	11.50

121
POINTS



Germany: #2 Region by COVID-19 Safety Ranking

COVID-19 Quarantine Efficiency

Weight 2.2 Category Score 59.45

<input type="checkbox"/> Scale of Quarantine	16.51
<input type="checkbox"/> Quarantine Timeline	4.25
<input type="checkbox"/> Criminal Penalties for Violating Quarantine	10.24
<input type="checkbox"/> Economic Support for Quarantined Citizens	13.02
<input type="checkbox"/> Economic and Supply Chain Freezing	9.30
<input type="checkbox"/> Travel Restrictions	6.12

131
POINTS

COVID-19 Government Efficiency of Risk Management

Weight 2.2 Category Score 88.13

<input type="checkbox"/> Level of Security and Defense Advancement	17.00
<input type="checkbox"/> Rapid Emergency Mobilization	14.57
<input type="checkbox"/> Efficiency of Government Structure	14.26
<input type="checkbox"/> Economic Sustainability	11.38
<input type="checkbox"/> Legislative Efficiency	16.00
<input type="checkbox"/> Political Stability	14.92

194
POINTS

COVID-19 Monitoring and Detection

Weight 1.5 Category Score 91.97

<input type="checkbox"/> Monitoring Systems and Disaster Management	18.00
<input type="checkbox"/> Scope of Diagnostic Methods	15.00
<input type="checkbox"/> Testing Efficiency	13.37
<input type="checkbox"/> AI for Diagnostics and Prognostics	15.00
<input type="checkbox"/> Government Surveillance Technology for Monitoring	13.60
<input type="checkbox"/> Reliability and Transparency of Data	17.00

138
POINTS

COVID-19 Healthcare Readiness

Weight 1.3 Category Score 83.31

<input type="checkbox"/> COVID-19 Equipment Availability	17.10
<input type="checkbox"/> Mobilization of New Healthcare Resources	17.50
<input type="checkbox"/> Quantity and Quality of Medical Staff	14.08
<input type="checkbox"/> Level of Healthcare Progressiveness	12.59
<input type="checkbox"/> Level of Technological Advancement	11.15
<input type="checkbox"/> Epidemiology System Level of Development	10.89

102
POINTS

COVID-19 Regional Resiliency

Weight 1.3 Category Score 71.66

<input type="checkbox"/> Infection Spread Risk	11.09
<input type="checkbox"/> Culture Specifics and Societal Discipline	15.16
<input type="checkbox"/> Level of Modern Sanitization Methods	14.29
<input type="checkbox"/> Demography	5.02
<input type="checkbox"/> Chronic Diseases	9.1
<input type="checkbox"/> Societal Risks	17.00

105
POINTS

COVID-19 Emergency Preparedness

Weight 1.5 Category Score 52.92

<input type="checkbox"/> Societal Emergency Resilience	20.25
<input type="checkbox"/> Emergency Military Mobilization Experience	7.67
<input type="checkbox"/> Surveillance Capabilities (Scale, Scope and Technological Sophistication)	13.50
<input type="checkbox"/> Previous National Emergency Experience	11.50

79
POINTS



Switzerland: #3 Region by COVID-19 Safety Ranking

COVID-19 Quarantine Efficiency

Weight 2.2 Category Score 65.26

<input type="checkbox"/> Scale of Quarantine	15.36
<input type="checkbox"/> Quarantine Timeline	10.63
<input type="checkbox"/> Criminal Penalties for Violating Quarantine	6.42
<input type="checkbox"/> Economic Support for Quarantined Citizens	10.44
<input type="checkbox"/> Economic and Supply Chain Freezing	12.40
<input type="checkbox"/> Travel Restrictions	10.01

144
POINTS

COVID-19 Healthcare Readiness

Weight 1.3 Category Score 78.82

<input type="checkbox"/> COVID-19 Equipment Availability	14.40
<input type="checkbox"/> Mobilization of New Healthcare Resources	17.50
<input type="checkbox"/> Quantity and Quality of Medical Staff	14.99
<input type="checkbox"/> Level of Healthcare Progressiveness	12.19
<input type="checkbox"/> Level of Technological Advancement	8.68
<input type="checkbox"/> Epidemiology System Level of Development	11.06

97
POINTS

COVID-19 Government Efficiency of Risk Management

Weight 2.2 Category Score 82.73

<input type="checkbox"/> Level of Security and Defense Advancement	17.00
<input type="checkbox"/> Rapid Emergency Mobilization	14.29
<input type="checkbox"/> Efficiency of Government Structure	14.65
<input type="checkbox"/> Economic Sustainability	9.64
<input type="checkbox"/> Legislative Efficiency	12.00
<input type="checkbox"/> Political Stability	15.15

182
POINTS

COVID-19 Regional Resiliency

Weight 1.3 Category Score 78.21

<input type="checkbox"/> Infection Spread Risk	12.78
<input type="checkbox"/> Culture Specifics and Societal Discipline	16.46
<input type="checkbox"/> Level of Modern Sanitization Methods	14.94
<input type="checkbox"/> Demography	5.17
<input type="checkbox"/> Chronic Diseases	11.87
<input type="checkbox"/> Societal Risks	17.00

93
POINTS

COVID-19 Monitoring and Detection

Weight 1.5 Category Score 91.03

<input type="checkbox"/> Monitoring Systems and Disaster Management	18.00
<input type="checkbox"/> Scope of Diagnostic Methods	15.00
<input type="checkbox"/> Testing Efficiency	13.45
<input type="checkbox"/> AI for Diagnostics and Prognostics	15.00
<input type="checkbox"/> Government Surveillance Technology for Monitoring	12.58
<input type="checkbox"/> Reliability and Transparency of Data	17.00

137
POINTS

COVID-19 Emergency Preparedness

Weight 1.5 Category Score 59.67

<input type="checkbox"/> Societal Emergency Resilience	20.25
<input type="checkbox"/> Emergency Military Mobilization Experience	7.67
<input type="checkbox"/> Surveillance Capabilities (Scale, Scope and Technological Sophistication)	20.25
<input type="checkbox"/> Previous National Emergency Experience	11.50

90
POINTS

742
CUMULATIVE
SCORE

Singapore: #4 Region by COVID-19 Safety Ranking

COVID-19 Quarantine Efficiency

Weight 2.2 Category Score 63.79

<input type="checkbox"/> Scale of Quarantine	13.65
<input type="checkbox"/> Quarantine Timeline	10.63
<input type="checkbox"/> Criminal Penalties for Violating Quarantine	9.20
<input type="checkbox"/> Economic Support for Quarantined Citizens	9.04
<input type="checkbox"/> Economic and Supply Chain Freezing	15.50
<input type="checkbox"/> Travel Restrictions	5.78

140
POINTS

COVID-19 Healthcare Readiness

Weight 1.3 Category Score 66.00

<input type="checkbox"/> COVID-19 Equipment Availability	14.40
<input type="checkbox"/> Mobilization of New Healthcare Resources	17.50
<input type="checkbox"/> Quantity and Quality of Medical Staff	10.99
<input type="checkbox"/> Level of Healthcare Progressiveness	6.91
<input type="checkbox"/> Level of Technological Advancement	6.52
<input type="checkbox"/> Epidemiology System Level of Development	9.69

86
POINTS

COVID-19 Government Efficiency of Risk Management

Weight 2.2 Category Score 80.14

<input type="checkbox"/> Level of Security and Defense Advancement	8.50
<input type="checkbox"/> Rapid Emergency Mobilization	16.00
<input type="checkbox"/> Efficiency of Government Structure	15.33
<input type="checkbox"/> Economic Sustainability	11.02
<input type="checkbox"/> Legislative Efficiency	16.00
<input type="checkbox"/> Political Stability	13.29

176
POINTS

COVID-19 Regional Resiliency

Weight 1.3 Category Score 78.21

<input type="checkbox"/> Infection Spread Risk	11.13
<input type="checkbox"/> Culture Specifics and Societal Discipline	16.23
<input type="checkbox"/> Level of Modern Sanitization Methods	15.00
<input type="checkbox"/> Demography	9.76
<input type="checkbox"/> Chronic Diseases	13.49
<input type="checkbox"/> Societal Risks	12.60

102
POINTS



COVID-19 Monitoring and Detection

Weight 1.5 Category Score 96.41

<input type="checkbox"/> Monitoring Systems and Disaster Management	18.00
<input type="checkbox"/> Scope of Diagnostic Methods	15.00
<input type="checkbox"/> Testing Efficiency	16.45
<input type="checkbox"/> AI for Diagnostics and Prognostics	15.00
<input type="checkbox"/> Government Surveillance Technology for Monitoring	14.96
<input type="checkbox"/> Reliability and Transparency of Data	17.00

145
POINTS

COVID-19 Emergency Preparedness

Weight 1.5 Category Score 60.58

<input type="checkbox"/> Societal Emergency Resilience	20.25
<input type="checkbox"/> Emergency Military Mobilization Experience	15.33
<input type="checkbox"/> Surveillance Capabilities (Scale, Scope and Technological Sophistication)	13.50
<input type="checkbox"/> Previous National Emergency Experience	11.50

91
POINTS

Japan: #5 Region by COVID-19 Safety Ranking

COVID-19 Quarantine Efficiency

Weight 2.2 Category Score 57.62

<input type="checkbox"/> Scale of Quarantine	17.81
<input type="checkbox"/> Quarantine Timeline	10.63
<input type="checkbox"/> Criminal Penalties for Violating Quarantine	4.47
<input type="checkbox"/> Economic Support for Quarantined Citizens	8.16
<input type="checkbox"/> Economic and Supply Chain Freezing	9.30
<input type="checkbox"/> Travel Restrictions	7.18

127
POINTS

COVID-19 Healthcare Readiness

Weight 1.3 Category Score 83.31

<input type="checkbox"/> COVID-19 Equipment Availability	16.80
<input type="checkbox"/> Mobilization of New Healthcare Resources	14.25
<input type="checkbox"/> Quantity and Quality of Medical Staff	12.03
<input type="checkbox"/> Level of Healthcare Progressiveness	13.62
<input type="checkbox"/> Level of Technological Advancement	12.74
<input type="checkbox"/> Epidemiology System Level of Development	13.87

108
POINTS

COVID-19 Government Efficiency of Risk Management

Weight 2.2 Category Score 83.76

<input type="checkbox"/> Level of Security and Defense Advancement	17.00
<input type="checkbox"/> Rapid Emergency Mobilization	16.00
<input type="checkbox"/> Efficiency of Government Structure	13.41
<input type="checkbox"/> Economic Sustainability	10.93
<input type="checkbox"/> Legislative Efficiency	12.00
<input type="checkbox"/> Political Stability	14.42

184
POINTS

COVID-19 Regional Resiliency

Weight 1.3 Category Score 65.62

<input type="checkbox"/> Infection Spread Risk	5.39
<input type="checkbox"/> Culture Specifics and Societal Discipline	13.11
<input type="checkbox"/> Level of Modern Sanitization Methods	15.00
<input type="checkbox"/> Demography	5.20
<input type="checkbox"/> Chronic Diseases	13.92
<input type="checkbox"/> Societal Risks	13.00

85
POINTS

COVID-19 Monitoring and Detection

Weight 1.5 Category Score 94.70

<input type="checkbox"/> Monitoring Systems and Disaster Management	18.00
<input type="checkbox"/> Scope of Diagnostic Methods	15.00
<input type="checkbox"/> Testing Efficiency	14.40
<input type="checkbox"/> AI for Diagnostics and Prognostics	15.00
<input type="checkbox"/> Government Surveillance Technology for Monitoring	15.30
<input type="checkbox"/> Reliability and Transparency of Data	17.00

142
POINTS

COVID-19 Emergency Preparedness

Weight 1.5 Category Score 60.58

<input type="checkbox"/> Societal Emergency Resilience	20.25
<input type="checkbox"/> Emergency Military Mobilization Experience	15.33
<input type="checkbox"/> Surveillance Capabilities (Scale, Scope and Technological Sophistication)	13.50
<input type="checkbox"/> Previous National Emergency Experience	11.50

91
POINTS

738
CUMULATIVE
SCORE

COVID-19 Regional Safety Assessment: Report Scope and Aim

The global challenge of this particular moment in history, which keeps the world's population in constant vigilance and hopeful for an immediate solution, is not only a medical and scientific challenge; it is also a political and governmental challenge, an economic and trade challenge, the trigger for a global monetary transition, a reconfiguration of what national and international security means in practice, and a technological opportunity. And above all these things, it can be considered as a data science and an analytical challenge. Deep Knowledge Group recognizes that we are faced with the obligation, not only for ourselves but for society as a whole, to analytically disentangle the different facets of the crisis caused by the global pandemic of COVID-19, in order to establish optimal risk reduction and conflict resolution strategies to accelerate regional recoveries and the transition to a positive post-pandemic era.

Deep Knowledge Group seeks to utilize equally complex analytical frameworks to derive actionable insights and answers into how different aspects of the COVID-19 pandemic should be addressed: attending to all available data resources, using them to achieve a systemic approach to the different variables or dimensions that pre-determine it, in such a way that allows decision makers to influence these variables in practice and achieve the most positive outcomes in terms of reducing collateral damage and maximizing the likelihood of optimal post-pandemic national healthcare systems and economies.

These assessments present particular opportunities that the regions included in the present analysis may employ to improve their performance and outputs in the short and medium term in the fight against the pandemic, and to establish themselves as solid economies in the post-pandemic era. In the same way, the study has also allowed us to identify and characterize essential risks and threats that must be addressed early to avoid further outbreaks, deepening of economic damage and the collapse of healthcare systems.

The ultimate aim of the framework is to analyze and score different regions according to their overall level of stability, both in terms of optimizing current health and wellness outcomes of their population amid the COVID-19 pandemic, as well as their prospects and likelihood of enabling geopolitical stabilization and economic recovery in the post-pandemic era.

COVID-19 Regional Safety Assessment: Brief Methodology Description

Deep Knowledge Group's COVID-19 Regional Safety Assessment is a hybrid index compiled from specific parameters and indicators originally formulated as part of the group's Global COVID-19 Safety and Risk Ranking Frameworks, in order to create a new framework designed to take into account safety and vulnerability factors simultaneously.

Certain metrics used for advanced and qualitative assessment were formulated by Deep Knowledge Group analysts in coordination with specific experts and consultants using proprietary sources and techniques. Therefore, such rankings may be adjusted over time depending on the corresponding underlying information and in coordination with ongoing enhancements to our underlying analytical methodologies.

The current global COVID-19 pandemic is a complex system involving more than typical disease tracking and management techniques, affected not just by biology but by the behaviour of individual humans, and the larger-scale actions of companies, institutions and governments. It is heavily influenced by the current healthcare, medical, economic, governance and geopolitical actions, behaviours and situations of entire nations. Our consortium's various analytical subsidiaries have extensive experience in conducting Big Data Analytics for highly complex topics, industries and domains. *Now, Deep Knowledge Group has adapted its existing analytical frameworks, previously applied to the Longevity Industry, AI for Drug Discovery, GovTech and NeuroTech, to conduct analytics, ranking and forecasting on the global COVID-19 pandemic.*

From the multiparameter analysis of 20 selected regions, encompassing more than **130 variables**, this study has been able to identify, and qualitatively and quantitatively characterize the 3 best-positioned regions in terms of safety, stability and resilience against the myriad effects of the COVID-19 crisis.

COVID-19 Regional Safety Assessment Analytical Framework



Quarantine Efficiency

Scale of Quarantine

Quarantine Timeline

Criminal Penalties for Violating Quarantine

Economic Support for Quarantined Citizens

Economic Supply Chain Freezing

Travel Restrictions

Government Efficiency of Risk Management

Level of Security and Defense Advancement

Rapid Emergency Mobilization

Efficiency of Government Structure

Economic Sustainability

Pandemic Readiness

Legislative Efficiency

Monitoring and Detection

Monitoring Systems & Disaster Management

Scope of Diagnostic Methods

Testing Efficiency

AI for Diagnostics and Prognostics

Government Surveillance Technology for Monitoring

Reliability and Transparency of Data

Healthcare Readiness

COVID-19 Equipment Availability

Mobilization of New Healthcare Resources

Quantity and Quality of Medical Staff

Level of Healthcare Progressiveness

Level of Technological Advancement

Epidemiology System Level of Development

Regional Resiliency

Infection Spread Risk

Culture Specifics and Societal Discipline

Level of Modern Sanitization Methods

Demography

Chronic Diseases

Geopolitical Vulnerability

Emergency Preparedness

Societal Emergency Resilience

Emergency Military Mobilization Experience

Surveillance Capabilities

Previous National Emergency Experience

Index Category Weight

2.2
WEIGHT

COVID-19 Quarantine Efficiency

Weighting factor

- ❑ Scale of Quarantine 18%
- ❑ Quarantine Timeline 17%
- ❑ Criminal Penalties for Violating Quarantine 14%
- ❑ Economic Support for Quarantined Citizens 18%
- ❑ Economic and Supply Chain Freezing 15.50%
- ❑ Travel Restrictions 17.50%

2.2
WEIGHT

COVID-19 Government Efficiency of Risk Management

Weighting factor

- ❑ Level of Security and Defense Advancement 17%
- ❑ Rapid Emergency Mobilization 16%
- ❑ Efficiency of Government Structure 18%
- ❑ Economic Sustainability 17%
- ❑ Legislative Efficiency 16%
- ❑ Political Stability 16%

1.5
WEIGHT

COVID-19 Monitoring and Detection

Weighting factor

- ❑ Monitoring Systems and Disaster Management 18%
- ❑ Scope of Diagnostic Methods 15%
- ❑ Testing Efficiency 18%
- ❑ AI for Diagnostics and Prognostics 15%
- ❑ Government Surveillance Technology for Monitoring 17%
- ❑ Reliability and Transparency of Data 17%

1.5
WEIGHT

COVID-19 Emergency Preparedness

Weighting factor

- ❑ Societal Emergency Resilience 27%
- ❑ Emergency Military Mobilization Experience 23%
- ❑ Surveillance Capabilities (Scale, Scope and Technological Sophistication) 27%
- ❑ Previous National Emergency Experience 23%

1.3
WEIGHT

COVID-19 Healthcare Readiness

Weighting factor

- ❑ COVID-19 Equipment Availability 18%
- ❑ Mobilization of New Healthcare Resources 17.50%
- ❑ Quantity and Quality of Medical Staff 16%
- ❑ Level of Healthcare Progressiveness 15%
- ❑ Level of Technological Advancement 17%
- ❑ Epidemiology System Level of Development 16.50%

1.3
WEIGHT

COVID-19 Regional Resiliency

Weighting factor

- ❑ Infection Spread Risk 6.50%
- ❑ Culture Specifics and Societal Discipline 18%
- ❑ Level of Modern Sanitization Methods 15%
- ❑ Demography 15.50%
- ❑ Chronic Diseases 18%
- ❑ Societal Risks 17%

COVID-19 Regional Safety Index: Data Sources

Data collection is an essential stage of the research. Accurate data collection is essential to maintaining the integrity of research. To answer relevant questions of the working paper and evaluate outcomes, data used for this analysis was collected from credible sources.

World Health Organization

World Bank Open Data

Peer-Reviewed Scientific Publications

E-Government Development Index

UNdata

IndexMundi

World Population Review

EuropePMC

GHS Index

WCRF International

OECD Data

Government Reports

Worldometers

Human Development Index

Corruption Perceptions Index

Our World in Data

TheGlobalEconomy.com

The Lancet

WORLD LIFE EXPECTANCY

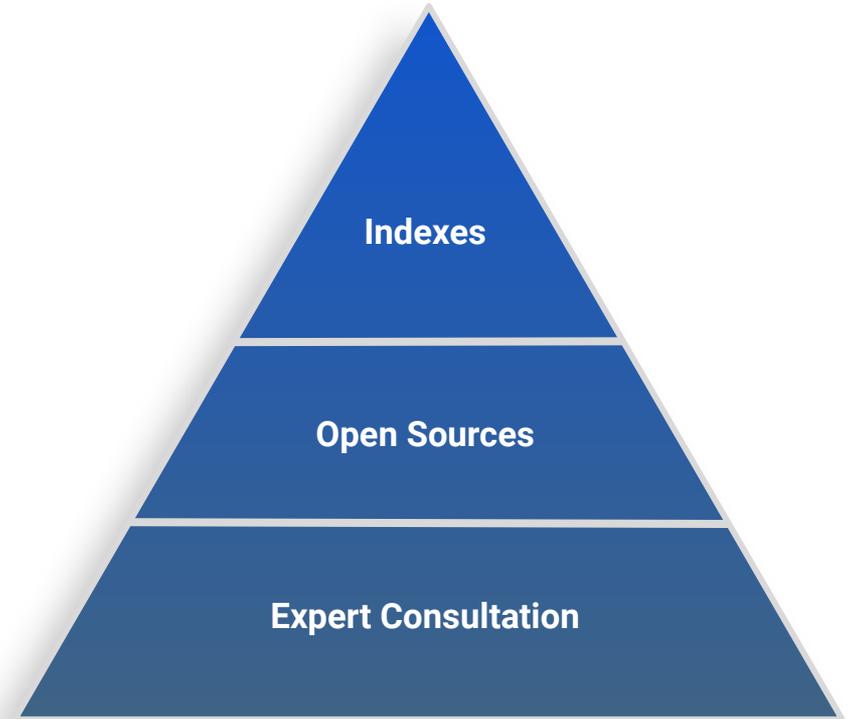
ProCon.org

COVID-19 Regional Safety Index: Data Accuracy Review

The index utilizes a combination of publicly available databases (including but not limited to indexes and region statistics), as well as manually-curated and researched quantitative and qualitative data obtained by manual searches using search engines, media and governmental reports, and the use of expert opinions and consultations in cases where data was not available.

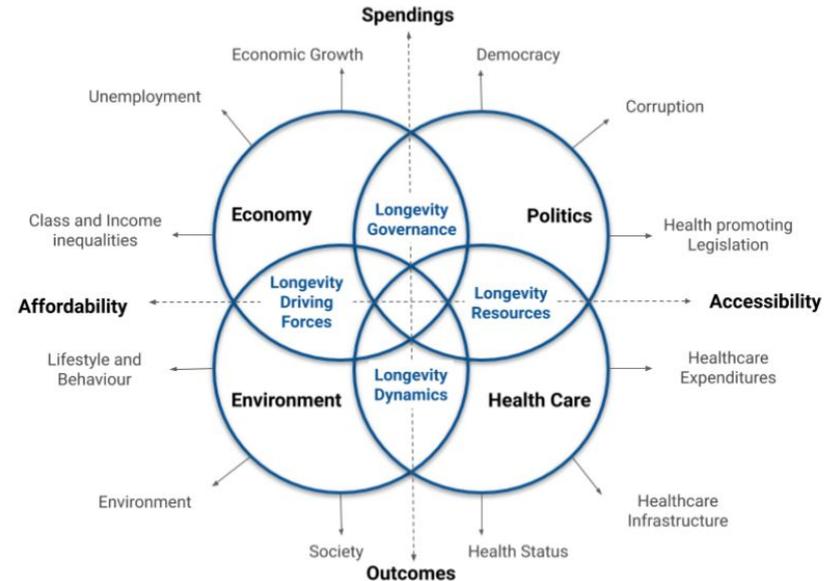
In utilizing three qualitatively distinct sources of data, Deep Knowledge Group analysts have attempted to overcome barriers in conducting a robust and comprehensive, yet reliable and methodologically-rigorous analysis by utilizing the largest and most reputable databases (usually constructed by an unbiased international group or foundation) where possible, by consulting region-specific resources in cases when open-source international databases are not possible, and finally by utilizing expert opinion in all cases where publicly-accessible regional and/or international sources of data are unavailable.

By utilizing this approach, the present analysis attempts to find an optimal balance between using maximally transparent and reliable sources of data, and including data which are only obtainable from expert consultation.



Previous Analytical Precedents: Big Data Analysis of 50 Countries Healthcare Progressiveness

One of the analytical precedents used in the creation of the present special case study (and its corresponding analytical framework) is "[*Global Longevity Governance Landscape: 50 regions Big Data Comparative Analysis of Longevity Progressiveness*](#)", a special analytical case study developed by its Longevity-focused analytical subsidiary that applied Big Data Analysis (utilizing **200 parameters** applied to **50 regions**, encompassing **10,000 data points in total**) to rank the effectiveness of nation's Longevity Progressive Medicine Policy/Governance efforts.



Previous Analytical Precedents: Big Data Analysis of 50 Countries Healthcare Progressiveness

Featured below are the **200 specific parameters** utilized in the Big Data Comparative Analysis of 50 regions' level of Longevity and healthcare progressiveness conducted in Aging Analytics Agency's Global Longevity Governance special analytical case study. The report utilized 10,000 data to conduct intelligible and fact-driven benchmarking of 50 nations in relation to their respective levels of Healthy Longevity, as measured by Health-Adjusted Life Expectancy (HALE), their current gaps between HALE and unadjusted life expectancy, their current levels of success in growing and maintaining National Healthy Longevity, and in dealing with the issue of aging.

The results of this analysis were then used to provide tangible region specific policy recommendations on how each of the 50 nations analyzed can either maintain or improve their current international standing and optimize their levels of National Healthy Longevity, and to identify social policy, healthcare, medical, financial and socioeconomic factors having the greatest effect on the gap between life expectancy at birth and Health Adjusted Life Expectancy (HALE).

6 Layers and 200 Parameters

Socio-economic Conditions			Demography			Health Care and Health Status			Health Care and Health Status			Health Care Policy			Environmental Factors					
1. Adjusted net enrollment rate female, 2016	26. Global Gender Gap Index, 2016	27. Human Development Index, 2016	46. Age Dependency Ratio, 2010	65. Life expectancy both sexes, 2009	86. Adult mortality rate, 2016	107. HALE both sexes, 2000	139. Public health care expenditure attributed to household and ambient air pollution, age-standardized (per 100,000 population), 2016	158. Public Health Care Expenditure (as % of GDP), 2010	171. Existence of a set of time-based national targets based on WHO guidance for NCDs (Yes - 1 / No - 0), 2016	185. Ambient air pollution, concentration of fine particulate matter PM2.5 (µg/m3), 2010	2. Adjusted net enrollment rate male, 2016	28. Human Development Index, 2016	47. Age Dependency Ratio, 2016	66. Life expectancy both sexes, 2010	87. Adult mortality rate female, 2016	108. HALE both sexes, 2001	140. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population), 2016	159. Public Health Care Expenditure (as % of GDP), 2016	172. Existence of an operational, multisectoral national NCD priority or action plan that integrates several NCDs and their risk factors (Yes - 1 / No - 0), 2017	186. Ambient air pollution, concentration of fine particulate matter PM2.5 (µg/m3), 2016
3. Adjusted savings net national savings (% of GNI), 2010	29. Inclusive Development Index Score, 2017	30. Income Gini coefficient - inequality in income or consumption 2016 (World Bank estimate)	48. Age over 65, % (by 2016) Size of aged demographic	67. Life expectancy both sexes, 2011	88. Adult mortality rate male, 2016	109. HALE both sexes, 2002	141. Out-of-pocket expenditure, 2010	160. Risk of catastrophic expenditure for surgical care (% of people at risk), 2016	173. Existence of any policies to reduce population salt consumption (Yes - 1 / No - 0), 2017	187. Ambient and household air pollution attributable death rate (per 100 000 population), 2010	4. Adjusted savings net national savings (% of GNI), 2016	31. Income Gini coefficient - inequality in income or consumption 2016 (World Bank estimate)	49. Age over 65, % (by 2016) Size of aged demographic	68. Life expectancy both sexes, 2012	110. HALE both sexes, 2003	142. Out-of-pocket expenditure (% of current health expenditure), 2016	161. Road traffic injury, 2016	174. Existence of operational policy/strategy/action plan for cancer (Yes - 1 / No - 0), 2017	188. Ambient and household air pollution attributable death rate (per 100 000 population), 2016	
5. Average salary (US\$), 2016	32. Income Gini coefficient - inequality in income or consumption 2016 (World Bank estimate)	33. Labor force participation rate, % of male population ages 15-64 (modeled ILO estimate), female	50. Crude birth rate (per 1 000 people), 2010	69. Life expectancy both sexes, 2013	89. Alcohol Consumption per Capita (litres of pure alcohol), 2016	111. HALE both sexes, 2004	143. Physicians (per 100,000 People) and 2014 Population of Adults with AIDS (%), 2010 and 2014	162. Smoking prevalence (% of population), 2016	175. Existence of operational policy/strategy/action plan for cardiovascular diseases (Yes - 1 / No - 0)	189. Daily maximum air temperature, 2016	6. Average salary growth rate, %	34. Labor force participation rate, % of female population ages 15-64 (modeled ILO estimate), male	51. Crude birth rate, 2016	70. Life expectancy both sexes, 2014	112. HALE both sexes, 2005	144. Prevalence of anemia among pregnant women (%)	163. Smoking prevalence female (% of female population), 2016	190. Daily mean air temperature, 2016		
7. Balance of trade (US\$), 2016	35. Labor force with advanced education female, 2016	36. Labor force with advanced education male, 2016	52. Crude death rate (per 1 000 people), 2010	71. Life expectancy both sexes, 2015	90. Alcohol Consumption per Capita (litres of pure alcohol), 2016	113. HALE both sexes, 2006	145. Prevalence of insufficient physical activity among adults aged 18+, 2016	164. Smoking prevalence male (% of male population), 2016	176. Existence of operational policy/strategy/action plan for chronic respiratory diseases (Yes - 1 / No - 0)	191. Daily minimum air temperature, 2016	8. Both sexes HALE, 2016	37. Minimum wage (US\$), 2016	53. Crude death rate, 2016	72. Life expectancy both sexes, 2016	114. HALE both sexes, 2007	146. Prevalence of anemia among women of reproductive age (% of women ages 15-49)	165. Suicide mortality rate both sexes, 2016	192. Dew point, 2016		
9. Consumer Price Index, 2016	38. Net ODA received (% of GNI) of people in employment	39. Normal retirement age Men	54. Fertility rate, 2016	73. Life expectancy female, 2010	91. Anemia pregnant, 2016	115. HALE both sexes, 2008	147. Prevalence of obesity female (% of population), 2016	166. Suicide mortality rate female, 2016	177. Existence of operational policy/strategy/action plan to decrease tobacco use (Yes - 1 / No - 0)	193. Diurnal temperature variation calculations, 2016	10. Democracy Index, 2016	40. Normal retirement age Women	55. Global Gender Gap Index 2016	74. Life expectancy female, 2016	116. HALE both sexes, 2009	148. Prevalence of obesity male (% of population), 2016	167. Total alcohol consumption both sexes, 2016	194. People using safely managed sanitation services (% of population), 2015		
11. Early retirement age Men	41. Number of WHO age friendly cities and communities	42. Primary education, 2016	56. Life expectancy both sexes, 2000	75. Life expectancy male, 2010	92. Cause of death by communicable diseases female, 2016	117. HALE both sexes, 2010	149. Prevalence of undernourishment (% of population), 2016	168. Total alcohol consumption male, 2016	178. Existence of operational policy/strategy/action plan for diabetes (Yes - 1 / No - 0) Existence of operational policy/strategy/action plan for oral health (Yes - 1 / No - 0)	195. People using safely managed sanitation services (% of population), 2015	12. Early retirement age Women	43. Number of WHO age friendly cities and communities	57. Life expectancy both sexes, 2001	76. Life expectancy male, 2016	118. HALE both sexes, 2011	150. Prevalence of overweight among adults, BMI ≥ 25 (age-standardized estimate) (%), 2010	169. Total alcohol consumption female, 2016	196. Population Using Improved Water Sources (%)		
13. Educational attainment at least Bachelor's male, 2016	44. Unemployed persons, 2016	45. Unemployment rate, %	58. Life expectancy both sexes, 2002	77. Net migration	93. Cause of death by communicable diseases male, 2016	119. Inbound mobility rate, 2016	151. Prevalence of overweight among adults, BMI ≥ 25 (age-standardized estimate) (%), 2016	170. Total alcohol consumption male, 2016	179. Existence of operational policy/strategy/action plan to reduce the harmful use of alcohol (Yes - 1 / No - 0)	197. People using at least basic sanitation services (% of population)	14. Educational attainment at least Bachelor's female, 2016	46. Unemployed persons, 2016	59. Life expectancy both sexes, 2003	78. Life expectancy female, 2016	120. HALE both sexes, 2012	152. Prevalence of overweight among adults, BMI ≥ 25 (age-standardized estimate) (%), 2016	171. Total alcohol consumption female, 2016	198. People using at least basic drinking water services (% of population)		
15. Financial institution account female, 2016	47. Urban Population (of Total)		60. Life expectancy both sexes, 2004	79. Population density, number of people/km2	94. Normal Cigarette Consumption (per Capita), 2016	121. Domestic general government health expenditure (% of GDP), 2016	153. Prevalence of underweight (% of population), 2016	172. Total alcohol consumption both sexes, 2016	180. Existence of operational policy/strategy/action plan to reduce physical inactivity (Yes - 1 / No - 0)	199. Relative humidity, 2016	16. Financial institution account male, 2016	48. Unemployed persons, 2016	61. Life expectancy both sexes, 2005	80. Life expectancy both sexes, 2006	122. HALE both sexes, 2013	154. Incidence of tuberculosis (per 100 000 people), 2016	173. Total alcohol consumption male, 2016	200. Sunshine hours, 2016		
18. GDP per Capita (current US\$), 2010			62. Life expectancy both sexes, 2007	81. Population over 65, 2016 (%)	95. Cause of death by non-communicable diseases both sexes, 2016	123. Domestic private health expenditure (% of current health expenditure), 2010	154. Incidence of underweight (% of population), 2016	174. Total alcohol consumption female, 2016	181. Existence of operational policy/strategy/action plan to reduce the harmful use of alcohol (Yes - 1 / No - 0)		17. GDP per Capita (current US\$), 2016	49. Unemployed persons, 2016	63. Life expectancy both sexes, 2008	82. Senior Poverty Ratio	124. Healthcare Access and Quality Index, 2016	155. Prevalence of underweight (% of population), 2016	175. Total alcohol consumption female, 2016			
22. GDP (current US\$), 2010			64. Life expectancy both sexes, 2008	82. Senior Poverty Ratio	96. Cause of death by non-communicable diseases both sexes, 2016	124. Domestic private health expenditure (% of current health expenditure), 2010	156. Prevalence of underweight female (% of population), 2016	176. Total alcohol consumption both sexes, 2016	182. Implementation of physical activity public awareness program (Yes - 1 / No - 0), 2017		19. GDP (current US\$), 2016	50. Unemployed persons, 2016	65. Life expectancy both sexes, 2009	83. Total age dependency ratio (per 1000 of working age population), 2007	125. DALY rates per 100 000 population, 2010	156. Prevalence of underweight male (% of population), 2016	177. Total alcohol consumption male, 2016			
23. GDP (current US\$), 2016					97. Cause of death by communicable diseases female, 2016	126. DALY rates per 100 000 population, 2016	157. Prevalence of underweight (% of population), 2016	178. Total alcohol consumption both sexes, 2016	183. Stand-alone law for mental health (Yes - 1 / No - 0)		20. GDP growth rate, %	51. Unemployed persons, 2016	66. Life expectancy both sexes, 2010	84. Total fertility rate (per woman US\$), 2010	127. Domestic general government health expenditure (% of GDP), 2016	158. Prevalence of underweight (% of population), 2016	179. Total alcohol consumption female, 2016			
24. GDP growth rate, %					98. Cause of death by communicable diseases male, 2016	128. Domestic private health expenditure (% of current health expenditure), 2010	158. Prevalence of underweight (% of population), 2016	180. Total alcohol consumption male, 2016	184. Stand-alone policy or plan for mental health (Yes - 1 / No - 0)		21. Global Competitiveness Index Score, 2016-2017	52. Unemployed persons, 2016	67. Life expectancy both sexes, 2011	85. Urban Population (of Total)	128. Domestic private health expenditure (% of current health expenditure), 2010	159. Mortality caused by road traffic injury (per 100,000 people)	181. Total alcohol consumption female, 2016			
					99. Life expectancy both sexes, 2016	129. Domestic private health expenditure (% of current health expenditure), 2016	159. Mortality caused by road traffic injury (per 100,000 people)	182. Total alcohol consumption female, 2016					68. Life expectancy both sexes, 2012	86. Adult mortality rate, 2016	129. Domestic private health expenditure (% of current health expenditure), 2016	160. Mortality from CVD, cancer, diabetes or CRO (per 100,000 people)	183. Total alcohol consumption male, 2016			
					100. Life expectancy both sexes, 2017	130. Inbound mobility rate, 2016	160. Mortality from CVD, cancer, diabetes or CRO (per 100,000 people)	184. Total alcohol consumption male, 2016					69. Life expectancy both sexes, 2013	87. Adult mortality rate female, 2016	130. Inbound mobility rate, 2016	161. Road traffic injury, 2016	184. Total alcohol consumption female, 2016			
					101. Cause of death by injury, ages 35-59, % of relevant age group female (2016)	131. Inbound mobility rate female, 2016 (%)	161. Road traffic injury, 2016	185. Total alcohol consumption female, 2016					70. Life expectancy both sexes, 2014	88. Adult mortality rate male, 2016	131. Inbound mobility rate male, 2016 (%)	162. Smoking prevalence (% of population), 2016	185. Total alcohol consumption male, 2016			
					102. Cause of death by non-communicable diseases both sexes, 2016	132. Incidence of tuberculosis (per 100 000 people), 2016	162. Smoking prevalence (% of population), 2016	186. Total alcohol consumption male, 2016					71. Life expectancy both sexes, 2015	89. Alcohol Consumption per Capita (litres of pure alcohol), 2016	132. Incidence of tuberculosis (per 100 000 people), 2016	163. Smoking prevalence female (% of female population), 2016	186. Total alcohol consumption female, 2016			
					103. Cause of death by non-communicable diseases both sexes, 2016	133. Incidence of undernourishment (% of population), 2016	163. Smoking prevalence (% of population), 2016	187. Total alcohol consumption female, 2016					72. Life expectancy both sexes, 2016	90. Alcohol Consumption per Capita (litres of pure alcohol), 2016	133. Incidence of undernourishment (% of population), 2016	164. Smoking prevalence male (% of male population), 2016	187. Total alcohol consumption male, 2016			
					104. Cause of death by non-communicable diseases both sexes, 2016	134. Incidence of underweight (% of population), 2016	164. Smoking prevalence male (% of male population), 2016	188. Total alcohol consumption female, 2016					73. Life expectancy female, 2010	91. Anemia pregnant, 2016	134. Incidence of underweight (% of population), 2016	165. Suicide mortality rate both sexes, 2016	188. Total alcohol consumption male, 2016			
					105. Current health expenditure per capita (current US\$), 2016	135. Medical Equipment (per 1,000,000), 2013	165. Suicide mortality rate female, 2016	189. Total alcohol consumption female, 2016					74. Life expectancy female, 2016	92. Cause of death by communicable diseases female, 2016	135. Medical Equipment (per 1,000,000), 2013	166. Suicide mortality rate male, 2016	189. Total alcohol consumption male, 2016			
					106. Urban Population (of Total)	136. Male HALE, 2016	166. Suicide mortality rate male, 2016	190. Total alcohol consumption female, 2016					75. Life expectancy male, 2010	93. Cause of death by communicable diseases male, 2016	136. Male HALE, 2016	167. Suicide mortality rate both sexes, 2016	190. Total alcohol consumption male, 2016			
						137. Mortality caused by road traffic injury (per 100,000 people)	167. Suicide mortality rate both sexes, 2016	191. Total alcohol consumption female, 2016					76. Life expectancy male, 2016	94. Normal Cigarette Consumption (per Capita), 2016	137. Mortality caused by road traffic injury (per 100,000 people)	168. Total alcohol consumption both sexes, 2016	191. Total alcohol consumption male, 2016			
						138. Prevalence of underweight male (% of population), 2016	168. Total alcohol consumption both sexes, 2016	192. Total alcohol consumption female, 2016					77. Net migration	95. Cause of death by non-communicable diseases both sexes, 2016	138. Prevalence of underweight male (% of population), 2016	169. Total alcohol consumption male, 2016	192. Total alcohol consumption male, 2016			
						139. Prevalence of underweight (% of population), 2016	169. Total alcohol consumption female, 2016	193. Total alcohol consumption male, 2016					78. Life expectancy female, 2016	96. Cause of death by communicable diseases female, 2016	139. Prevalence of underweight (% of population), 2016	170. Total alcohol consumption male, 2016	193. Total alcohol consumption female, 2016			
						140. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population), 2016	170. Total alcohol consumption male, 2016	194. Total alcohol consumption female, 2016					79. Population density, number of people/km2	97. Cause of death by communicable diseases female, 2016	140. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population), 2016	171. Total alcohol consumption female, 2016	194. Total alcohol consumption male, 2016			

Previous Analytical Precedents: Big Data Analysis of 50 Countries Healthcare Progressiveness

Region Ranking: Health-Adjusted Life Expectancy (HALE) and Gap Between HALE and Life Expectancy



50 regions

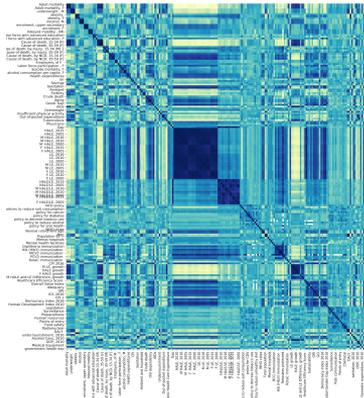


6 Layers and 200 Parameters

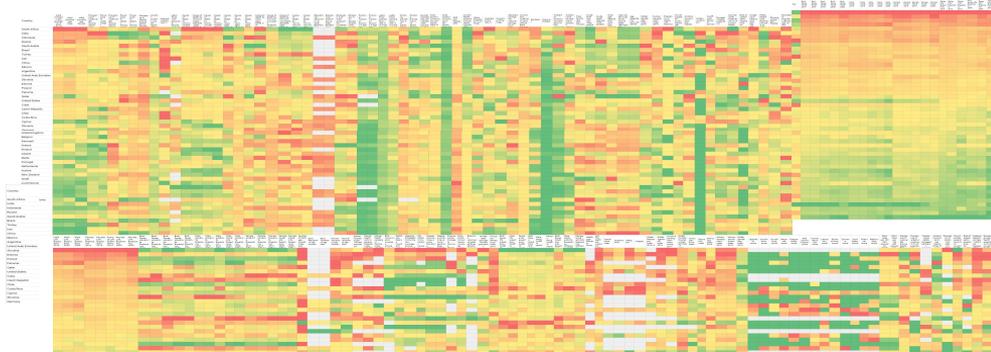
Country	Healthcare System	Healthcare Funding	Healthcare Access	Healthcare Quality	Healthcare Equity	Healthcare Sustainability	Healthcare Innovation	Healthcare Governance	Healthcare Culture	Healthcare Policy	Healthcare Practice	Healthcare Research	Healthcare Education	Healthcare Workforce	Healthcare Infrastructure	Healthcare Environment	Healthcare Lifestyle	Healthcare Demographics	Healthcare Socioeconomics	Healthcare Globalization	Healthcare Digitalization	Healthcare Internationalization	Healthcare Multiculturalization	Healthcare Transnationalization	Healthcare Globalization	Healthcare Digitalization	Healthcare Internationalization	Healthcare Multiculturalization	Healthcare Transnationalization
USA	Market-based	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High

The special case study was produced by [Aging Analytics Agency](#) as an enhanced follow-up to its previous “[National Longevity Development Plans: Global Overview 2019](#)” report, which applied a similar analysis on a smaller scale.

Correlations Between Parameters



200 Parameters + 50 regions Heat Map



As an official supporting partner and source of data for the UK All-Party Parliamentary Group (APPG) for Longevity, Aging Analytics Agency presented key findings from that report at the APPG for Longevity’s official launch event in UK Parliament, as well as in several key Advisory Board Meetings.

Main Findings (20 Regions): COVID-19 Quarantine Efficiency

Rankings for the Quarantine Efficiency component of the index were quite low for the majority of regions included in this analysis, in comparison with Deep Knowledge Group's previous Global COVID-19 Rankings. Only a few regions implemented a full lockdown, and implementing partial lockdowns was much more common.

The average length of quarantine was 14 days across most regions analyzed, whereas evidence has shown that 3 weeks is more optimal. The majority of regions also have at least one so-called "hotspot" with a very high number of confirmed cases, which makes the need for effective lockdowns pressing.

In some instances, regions faced a high degree of non-compliance with official lockdown mandates, especially regions with a high number of orthodox and ultra-orthodox religious groups. These issues were further exacerbated by the large number of anti-lockdown sentiment from the general public who are eager to return to their jobs. On average we did not detect any pressing shortages in medical equipment or protective health equipment, but regions do differ significantly in the size of their current stockpiles.

On a more positive note, we see a few factors which helped with these regions' quarantine efforts, such as the generally large size of their police forces (and the generally common use of military forces to assist police), which helped to deter quarantine non-compliance in many cases. We also detected no evidence of food shortages among the regions analyzed.

In general rules, we can see that for the most part the quarantine measures imposed among regions were insufficient in terms of both scope (partial vs. full lockdown), and duration, and that even those lockdown measures imposed were hampered by issues with public compliance.

Main Findings (20 Regions): COVID-19 Government Efficiency of Risk Management

In the “COVID-19 Government Efficiency of Risk Management” component of the index, we see a wider discrepancy in performance among the 20 regions analyzed. The 20 analyzed regions effectively deployed a Government-led Action Plan for rapid emergency mobilization of resources, although some government programs are decisively more comprehensive. Meanwhile, only few regions have either legislative capacity or political willingness to rapidly adopt new laws (such as the overnight adoption of a surveillance law in Israel which allowed it to use mobile phone data to track quarantine compliance and population movement), and those regions generally proved much more capable in efficient and rapid emergency mobilization efforts. An average of 68% of the general population of those regions analysed have access to mobile phones, which helped monitoring and detection efforts.

One positive factor among nearly all regions analyzed is that their governments managed to develop a specific mechanism for engagement with the private sector generally, and the tech sector in particular. This was done for various purposes, but predominantly for emergency medical equipment production, GovTech solutions and surveillance solutions. 14 of 20 governments enabled additional COVID-specific education and courses for nurses and doctors as well, which helped in the emergency mobilization of medical specialists and expertise.

Another interesting finding was that a region’s readiness for a state of emergency and its outputs depends heavily on governments’ practical experience and willingness in facing unexpected challenges and the predisposition of the communities to attend to those governments. Secondly, regions with a history of geopolitical tensions also seemed to be better able to address the challenges of the health and economic crisis caused by the COVID-19 since highly efficient government risk assessment and containment programs for armed conflicts seem to lead to better outputs in the management of the eventualities and consequences associated with the COVID-19 pandemic, especially when these regions turn their advanced surveillance technology into epidemiological surveillance technology.

Main Findings (20 Regions): COVID-19 Monitoring and Detection

A generally lower variance on scores for the “Monitoring and Detection” component of the index was found. Overall, the majority of regions scored well in this category. The majority of regions have a National Action Plan in place for the surveillance, monitoring and detection of infection spread, and all regions have validated laboratory testing methods available for use.

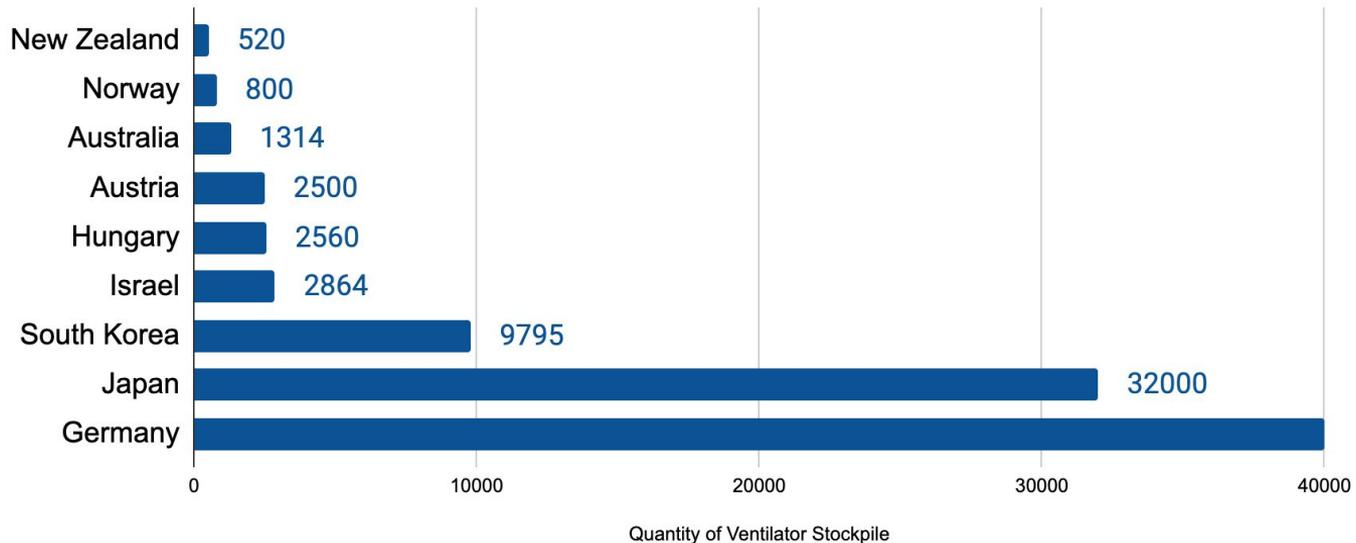
Additionally, the majority of regions utilized advanced technologies, such as face recognition, mobile phone tracking and other AI-based surveillance methods and technologies, which is one of the most critical factors impacting effective monitoring and detection efforts. However, only a few of the regions analyzed had the infrastructure and capacity for local test production in place, with testing being done at major laboratories predominating.

One specific area where regions differ the most from each other is in the specific strategy of testing, i.e., wide vs. narrow. Some regions employed very widespread testing, while others employed more narrow testing, which is perhaps the most critical factor impacting the actual effectiveness of monitoring and detection efforts in gaining a realistic, real-time understanding of the current state of infection across the region, and in mobilizing emergency response efforts according to their present realities.

While all regions utilize monitoring and detection technologies to track infection spread and coordinate emergency response efforts and mandates in response to such monitoring, the largest area where regions differed is in the extent with which they are able to collect data, which comes down to their legislative flexibility and privacy law landscape. Israel, for example, was able to pass a law rapidly (overnight) allowing them to use mobile phone data for tracking population movement as it pertains to quarantine compliance and infection spread, which assisted greatly in their efforts to obtain real-time COVID-19 infection spread data.

Main Findings (20 Regions): COVID-19 Healthcare Readiness

While there may not be vast differences among the 20 regions analyzed in terms of general healthcare readiness, we do see differences in terms of *emergency* healthcare readiness, including vast discrepancies in the size of different regions' emergency medical equipment stockpile, especially equipment which is of particular importance for a disease like COVID-19, which is transmitted and causes pathology mainly via the respiratory system.



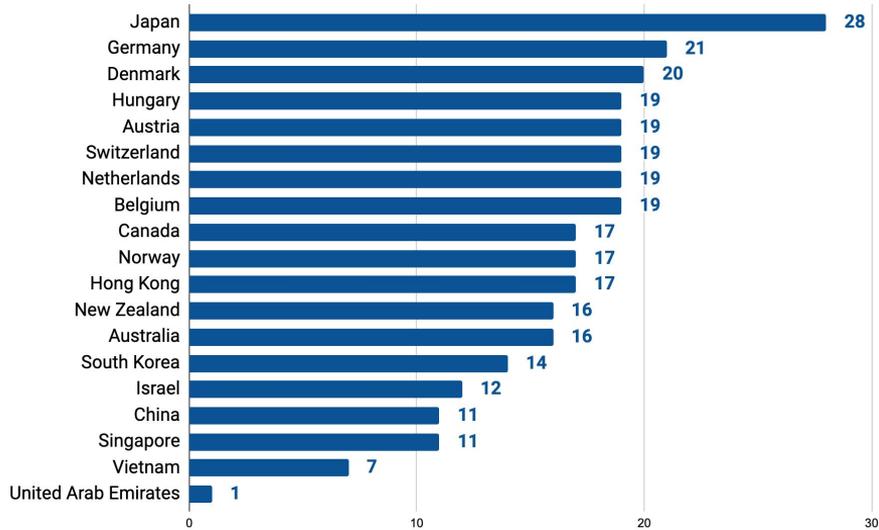
Main Findings (20 Regions): COVID-19 Regional Resilience

Among the regions analyzed, no eminent risk of medical equipment shortages or power outages was identified. Many regions are assisting their neighbors as much as possible via humanitarian aid, and selling emergency equipment to regions who are suffering shortages if they are not facing a shortage themselves. Overall, most regions score high in terms of cultural resilience and societal discipline parameters for this category. This may be due in part to the high literacy rate of the general population (close to 100% in most regions analyzed), with a high level of education helping with quarantine compliance and other government-directed behavioural mandates in the case of national emergencies. Access to basic sanitation is also close to 100% in the majority of regions, which is a necessary factor impacting people's basic ability to perform behavioural mandates like hand washing and surface sanitization. However, some degree of non-compliance from certain minority religious groups, and only in certain exceptional cases, served to hamper many regions' efforts to slow the rate of infection spread; this was a general commonality among many regions in the analysis, despite the fact that it has not had extremely significant proportions and although it did become a higher-than-average issue for Israel in particular, while the region coordinated rapid actions to mitigate this potential threat.

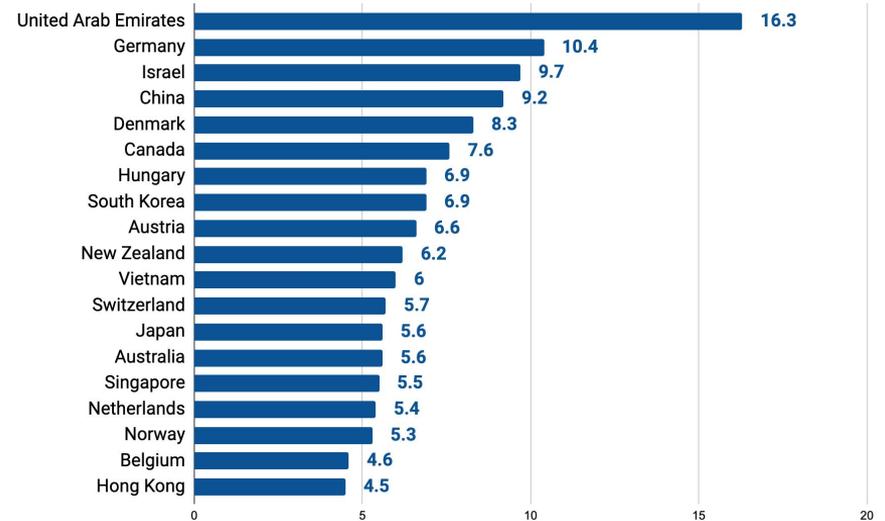
Two of the largest factors behind regions' mortality rates are a high prevalence of chronic diseases and a high proportion of elderly population. Regions with higher numbers in these two specific categories generally had a higher amount of COVID-19 related deaths. This decisive and conclusive data should be enough for decision-makers in the respective regions to address one of the central issues surrounding the COVID-19 pandemic: a serious evaluation and an effective political and health approach to this issue cannot focus solely on the epidemiology of the virus, but there are pre-existing and underlying epidemiological conditions that determine the severity of the epidemiological nature of COVID-19. Overall, despite the latter, the majority of regions did not have severe problems relating to infection spread, or at least not of the proportions seen in other territorial infectious foci, and only certain exceptions have been observed in which noncompliant minority religious groups have refused the social distancing and quarantine mandates.

Main Findings (20 Regions): COVID-19 Regional Resiliency

Size of Elderly Population/Regions



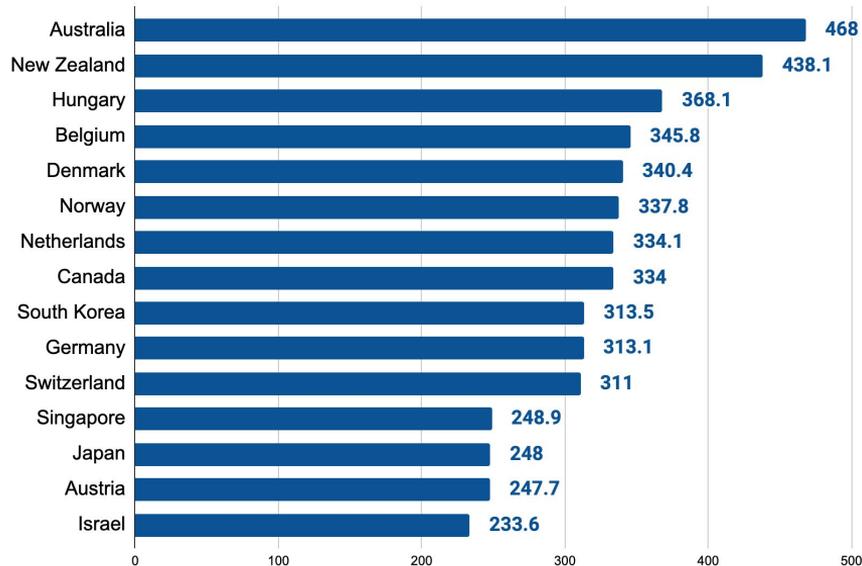
Diabetes prevalence (% of population ages 20 to 79)



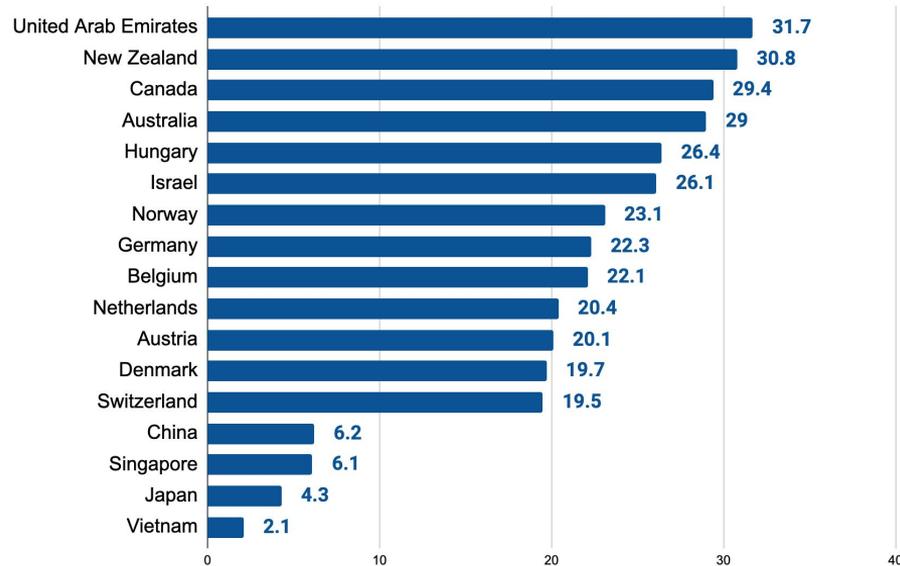
As can be seen in the above graph, there is considerable variation in the size of elderly population and prevalence of diabetes among the regions analyzed. It is notable that several regions which scored high in the final, cumulative ranking have a substantial elderly population burden (Germany) and diabetes prevalence (Germany and Israel). While they are weighed down by these factors, the high cumulative score of these regions is due to their excellence in other categories of the index.

Main Findings (20 Regions): COVID-19 Regional Resiliency

Cancer per 100,000



Obesity (%)



The prevalence of other high-risk comorbidities is lower, however, in high-scoring regions like Israel, Germany and Switzerland. Israel and Germany score moderately well in prevalence of obesity, and very well in prevalence of cancer. These factors served to offset the burden caused by their comparatively high prevalence of diabetes and aging population.

Main Findings (20 Regions): COVID-19 Emergency Preparedness

We see a generally greater degree of variability among regions in this sixth index category than the first five, which may be a result of the high level of specificity of the category's component indicators (Societal Emergency Resilience, Emergency Military Mobilization Experience, Surveillance Capabilities [Scale, Scope and Technological Sophistication], and Previous National Emergency Experience). Generally, the regions that score well within this sixth category are those who have a long and recent history, and tangible, practical experience with regional and national emergencies, which is not the case for many developed regions without existing geopolitical tensions or a risk of situations involving Weapons of Mass Destruction (WMDs), including biological or chemical weapons.

Such experience, while not directly related to pandemics per-se, create an existing level of preparedness (and an existing set of policies and action plans) for dealing with emergency situations, and in particular with the rapid mobilization of resources and coordination of activities relating to real-time crisis management and mitigation. Additionally, such regions usually also have other enabling systems in place, such as the capacity to rapidly adopt new nation-wide mandates in short periods of time, the capacity for robust surveillance, monitoring and detection measures (from both a legislative as well as technological standpoint), and a high degree of coordination between law enforcement and military personnel.

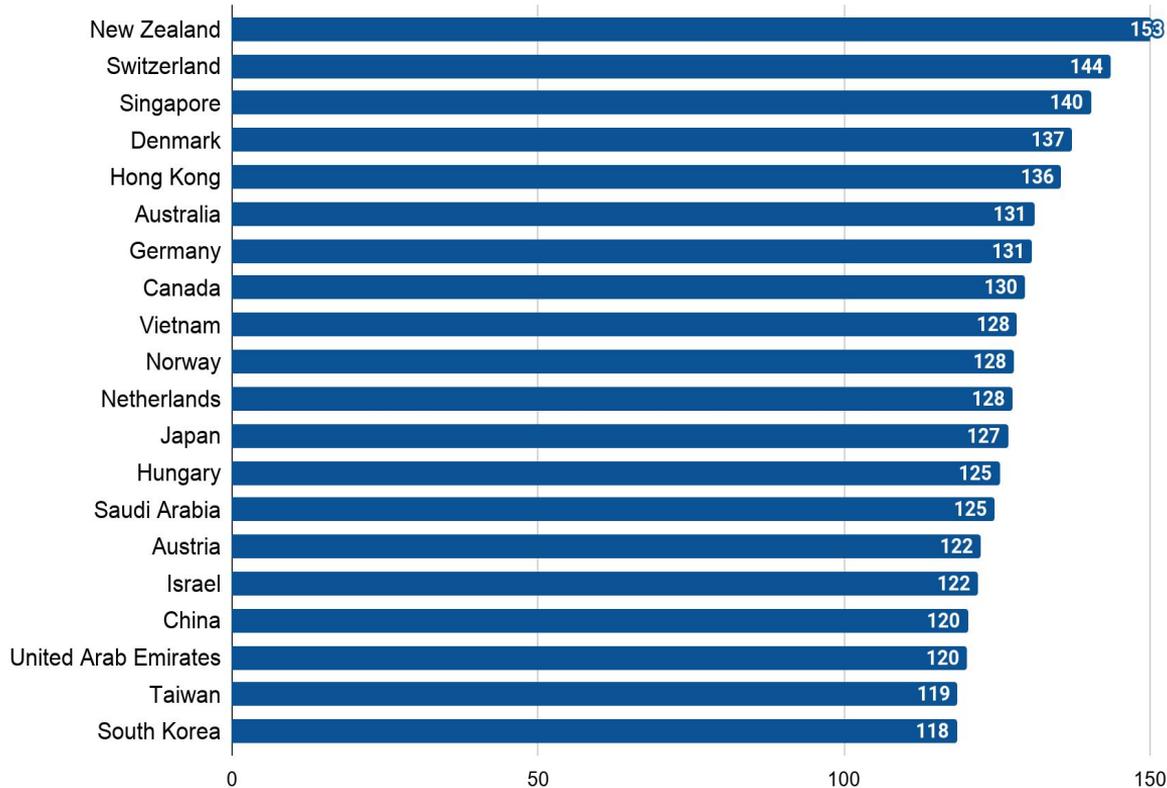
Israel achieves the highest score in this category, largely as a result of the fact that it is a region with a very long practical history of dealing with emergency crises (such as geopolitical conflicts), and thus has developed a very extensive policy infrastructure for emergency coordination, tangible experience with rapid mobilization of resources and national efforts in response to crises. It is a region that maintains a continual state of readiness against threats to its national security and stability, and for this reason it was excelled beyond other regions in terms of very rapidly mobilizing and coordination efforts to reduce infection spread and to ensure economic and geopolitical stabilization in the post-pandemic era.

COVID-19 Quarantine Efficiency



2.2

Weight



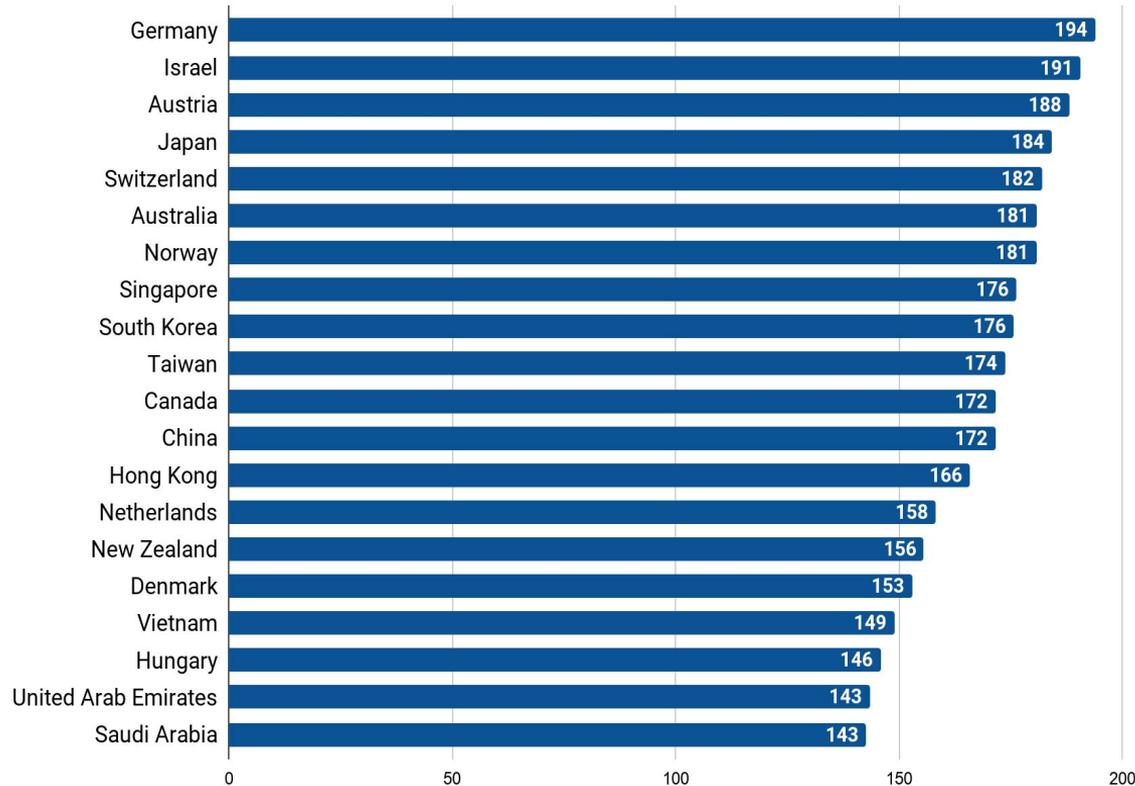
The present graph shows the the distribution of 20 regions according to the sum of their weighted Quarantine Efficiency scores. The distribution reflects the effectiveness of the 20 regions' quarantine and social distancing measures and government's economic support activity; due to these characteristics New Zealand holds the top position.

COVID-19 Government Efficiency of Risk Management



2.2

Category Weight



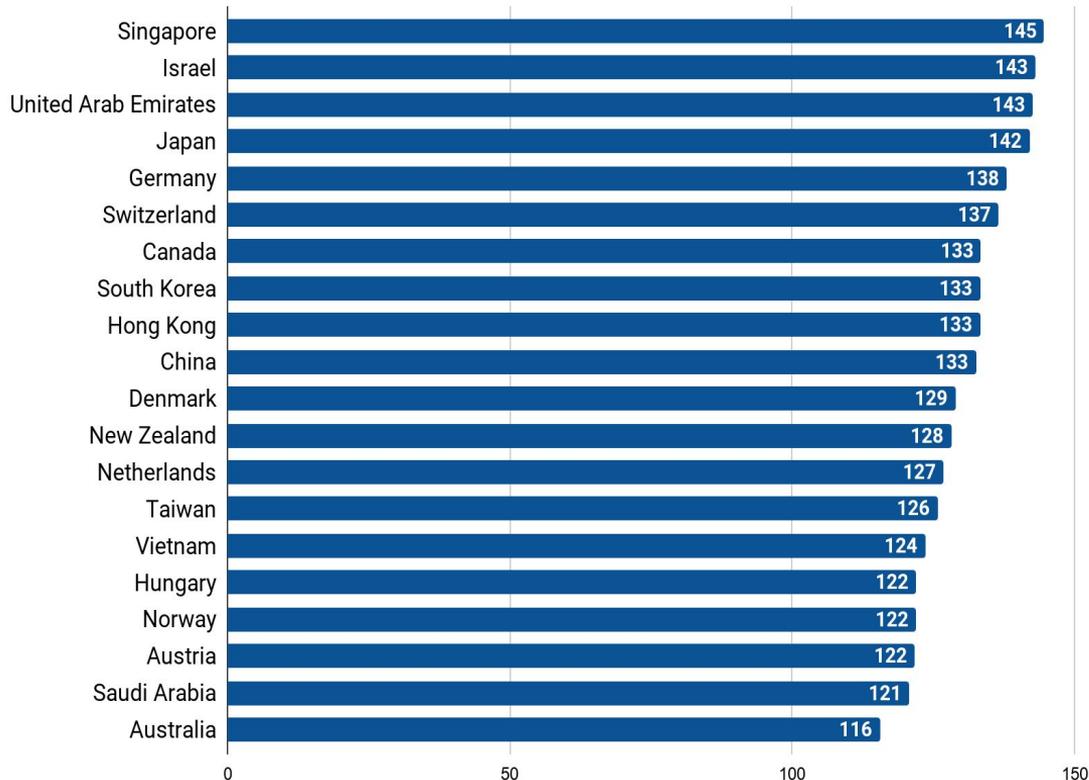
The present graph shows the the distribution of 20 regions according to the sum of their weighted Government Efficiency of Risk Management scores. The distribution shows that Israel is a leader among other regions in terms of economic stability and sustainability, military security and defense capabilities and general level of pandemic preparedness.

COVID-19 Monitoring and Detection



1.5

Category Weight



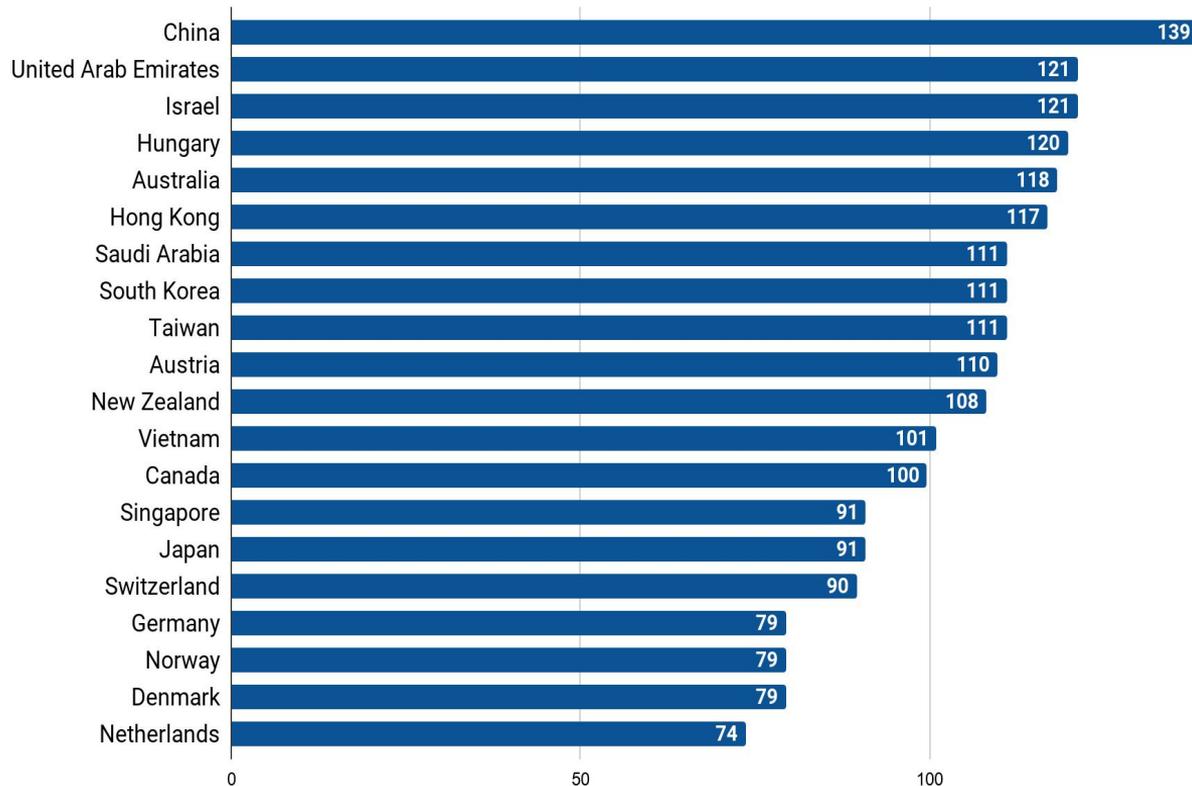
The present graph shows the the distribution of 20 regions according to the sum of their weighted Monitoring and Detection scores. This parameter allows us to compare all regions with respect to the scope, technological sophistication and diversity of their surveillance and monitoring technologies, as well as whether the utilize AI for diagnostic analysis.

COVID-19 Emergency Preparedness



1.5

Category Weight



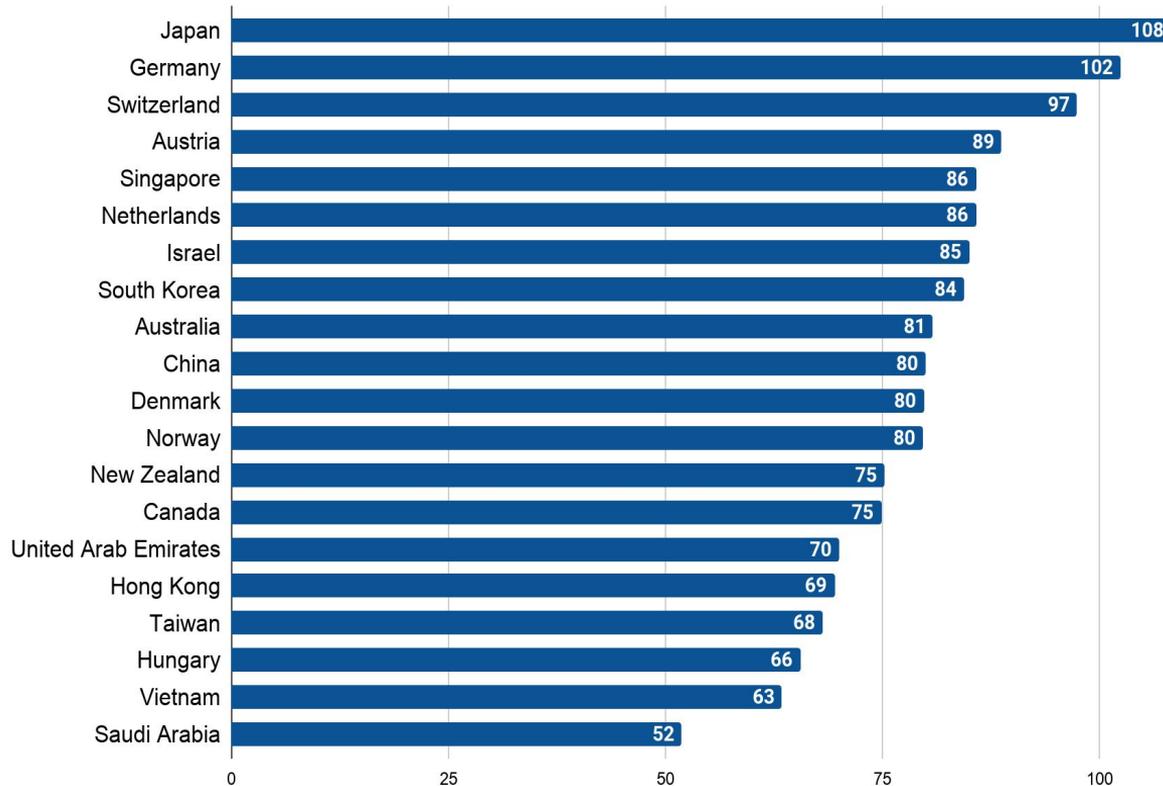
The present graph shows the the distribution of 20 regions according to the sum of their weighted Emergency Preparedness scores. China is shown to be the region with the greatest capacity to respond to emergency situations, particularly health emergencies, and to address outbreaks.

COVID-19 Healthcare Readiness



1.3

Category Weight



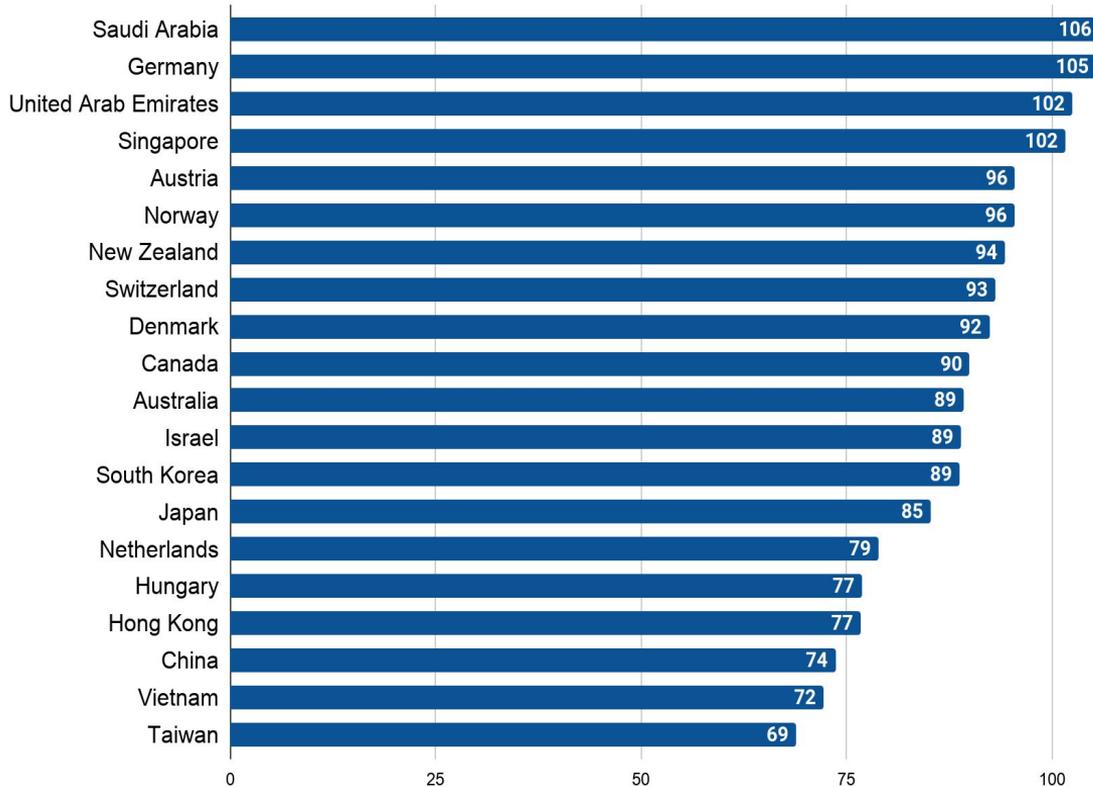
The present graph shows the the distribution of 20 regions according to the sum of their weighted Healthcare Readiness score. The highest score is obtained by Japan, indicating that the region is the most advanced in terms of efficiency, equity and quality of Healthcare System and its strength to response COVID-19 pandemic.

COVID-19 Regional Resiliency



1.3

Category Weight



Represented here is the distribution of 20 regions according to the sum of their weighted Regional Resiliency scores. The distribution shows that Germany and United Arab Emirates are the least vulnerable to infection and have the lowest overall risk of COVID-19 infection.

COVID-19 20 Regions General Findings

For the multiparametric analytical evaluation of the 20 selected regions, six (6) central variables have been chosen that show highly positive correlation with the degree of efficiency, defense and resilience of each region against the COVID-19 crisis. These six variables, which we formally call Categories, can be imagined as large data sets or data matrices, made up of sub-variables which at the same time contain other minor sub-variables inside; the former have been called Indicators, while the latter, Parameters. The six Categories evaluated for each region are, in order, those that follow.

- **Quarantine Efficiency**, the capacity evidenced by a region to establish timely social norms that allow the containment, reversal or neutralization of viral spread to be achieved and avoid saturation of the health system, particularly of Intensive Care Units (ICUs).
- **Government Efficiency of Risk Management**, the executing capacity of political institutions and their leaders to establish adequate national emergency plans, attending to the particular deficits and risks of each region.
- **Monitoring and Detection**, a measure of the technological and procedural resources made available in a region for epidemiological surveillance, emphasizing the use of digital tech and AI for risk analysis, population monitoring, or diagnosis.
- **Healthcare Readiness**, understood as the region's health system capacity to withstand critical emergencies related to COVID-19.
- **Regional Resiliency**, which should be understood not only as the capacity of the region to resist, respond and fight against the multiple economic, health and humanitarian impacts of the emergency, but also as its post-pandemic recovery capacity.
- **Emergency Preparedness**, a comprehensive measure of the specific resilience of the community and also of the mobilization capacities of regions' security and defense forces, taking into account both their previous exposure to various comparable emergency experiences, as well as whether or not they already have plans of containment in place to apply in similar scenarios.

From the extensive data sets analyzed using multidimensional statistical techniques such as PCA, the present analysis derives a ranking of 20 regions in terms of how well-equipped and positioned they are against regional and global crisis situations resulting from the current global COVID-19 pandemic.

COVID-19 20 Regions General Findings

One of the most remarkable characteristics of the comparative analysis carried out was the finding of nearly-universal features among the various regions. These include: the good general availability of medical equipment, the use of AI to detect and monitor the spread and outbreaks of the infection, and the very low risk of ineffectiveness or failure of quarantine and social distancing measures.

Among those near-universal traits identified by our analysis, one specific area for improvement contrasts sharply above the others. Namely, even though the COVID-19 pandemic is far from over and just beginning, and despite the fact that it has now become a potentially more dangerous economic and health risk than at the beginning of the outbreak (even for nations that have been successful in flattening the curve, reducing it and, in some cases, avoiding extremely high rates of infection, pathology and mortality), **most governments nonetheless appear to be prioritizing economic concerns over healthcare priorities, easing partial lockdowns and reviving economies without giving sufficient signs of caution.**

We must point out in this section, as many times as necessary given that it constitutes the greatest existing risk identified by the present analysis, that it is in no way advisable for governments to reverse or relax their existing quarantine and economic freezing measures unless they have a well-established strategy in place to ensure containment of future outbreaks (including either a continuation or an increase in testing, monitoring and detection efforts, and a readiness to reimpose quarantines in the case of infection resurgences), and that gradual reopening plans must be supported by the most rigorous epidemiological surveillance.

On a related note, any efforts to relax quarantine mandates and re-open economies should bear the approval of the majority of citizens. The social restrictions associated with the COVID-19 crisis are on average widely supported by citizens of the 20 regions analysed as a general rule, and eventual uncontrolled outbreaks would not only jeopardize the totality of what was achieved but will also cause a loss of trust in government institutions.

COVID-19 20 Regions General Findings

Based on the preceding consideration, we can identify several universal recommendations that apply to the majority of regions included in the present analysis:

- Governments should be very careful about economic unfreezing and easing lockdown measures in an effort to promote economic rehabilitation and stabilization. While this is an important factor to account for, it should not come at the risk of dramatic increases in infection spread and death. And, indeed, if economic rehabilitation does come at the cost of increasing the scope of the pandemic, this will lead to worse economic outcomes in the longer run. Governments should, as much as possible, take a long-term view of both pandemic neutralization and economic recovery.
- The majority of regions identified have the infrastructure and capacity to mobilize local ventilator production, and should either develop or continue maintaining specific mechanisms to facilitate this, such as by providing economic incentives for local businesses to switch over to production of needed emergency equipment. The differences in ventilator stockpiles among regions was dramatic, and maintaining a sufficiently large ventilator stockpile will be critical for being prepared for future resurgences of COVID-19, especially in the wake of easing lockdown measures.
- If there is a phenomenon that powerfully calls attention in our study, it is the reorientation of global capital, and governmental efforts and wills, which previously deposited in the military defense and arms industries, now they branch towards scientific and technological discovery and development for the healthcare industry. As the challenges for defense and national security are rapidly changing in this new geopolitical panorama, we can expect to see the military industry being proactively developed into a new, more scientific-military oriented industry where national defense issues will gradually redirect to scientific and technological challenges requiring international coordination. Those governments that fork their greater military development towards this new category or format of defense will have more efficient outcomes in this and future global crises.

COVID-19 Safety Assessment: Israel

Israel's overall scores stand out above those of the remaining geographic regions of the selected pool included in the analysis. Israel ranks just 2 points above Germany in our classification framework, practically sharing the first position, and 9 points above Switzerland, positioned in third place.

Israel excels fundamentally in 3 of 6 index categories, obtaining very high scores in those categories and achieving comparatively good scores in the remaining three areas. One category in which it scores extremely well is in epidemiological monitoring and detection capabilities (95.38 points out of 100), which exemplifies the strong quality of resources that the region has made available for health surveillance and screening.

State-of-the-art military and security technologies have been used very intensively in Israel to monitor the COVID-19 outbreak, including face detection video surveillance of citizens to trace the pathways of the pathogen and its contagion, mobile tracking technologies and drones. Israel is teaching the world how military and defense industry's cutting-edge technologies and resources can be efficiently invested in achieving health and medical solutions.

High values corresponding to the degree of emergency preparedness are also highlighted in the assessment of Israel. Those high scores reflect, in large part, its practical experience and preparedness in rapidly mobilizing resources for national and regional emergencies, and the conditioning of the region's infrastructure and procedural frameworks to resist and overcome extreme-stress geopolitical junctures involving threats from military offensives whose characteristics and consequences are similar to those represented by COVID-19.

According to our analysis, Israel is positioned in the ranking not only as a local European leader in the fight against COVID-19, but as a global leader more generally, and its specific strengths in key areas should be used as a model for other regions, both as it pertains to COVID-19 and as it related to setting a new standard of practice for national and global security and overall capabilities to manage the scientific, health and environmental challenges of the future.

COVID-19 Safety Assessment: Germany

Germany's performance in the COVID-19 "Monitoring and Detection" category is remarkably above average, presenting well-established vigilance and disaster management systems. In terms of optimized emergency management in individual cases and mass healthcare during disaster management, the German proactive medicine scheme (with healthcare workers approaching the patient directly and early) has been a quality standard of medical care and a determinant of the high survival of patients in the region.

Germany has stood out from most regions for its efforts and investments in tracing early community transmission of COVID-19, and this methodical search for contagion chains has so far resulted in some of the lowest death rates in Europe. The German monitoring model is a global example of how epidemiological chains of infection must be carefully tracked in order to interrupt them. On the other hand, and despite the above, Germany presents certain vulnerabilities regarding the infection spread risk and potential future outbreaks, and the apparent cause is a multiplicity of diverse factors, including a greater possibility of negative impacts of the emerging COVID-19 on the community and the healthcare system due to the marked aging of the population and the possibility of a resurgence of cases as they continue to ease their lockdown efforts. In addition, there is a relatively high risk of COVID-19 spreading in Germany mainly due to the magnitudes of the port container traffic, tourism and travel, and breadth of the road network in the region.

The cooperation of civilians with partial confinement rules has been high in Germany, showing a good tolerance to crises in the medium term. Also, the confirmation of a short-time work scheme, which results in millions of secured jobs and protects the region from the costly effects of unemployment, cause Germany to perform very positively in terms of government efficiency at the time to counteract the economic effects of COVID-19.

However, since relaxing their lockdown measures in early May, the number of new daily cases of coronavirus infection have nearly tripled in just 24 hours, which is a major sign that efforts to ease lockdowns and re-initiate economic activity cannot come at the cost of relaxed monitoring and detection efforts, and should be scaled back in response to a resurgence of new cases.

COVID-19 Safety Assessment: Switzerland

The Swiss federal government shows fairly optimal relative performance according to our analysis. Since mid-March, it has enacted a series of measures to mitigate the effects of COVID-19 on the Swiss economy, one of the most important being financial assistance in the form of cash flow to Small to Mid-Size Enterprises (SMEs) to help them survive the short-term economic impact of the pandemic - a measure that includes loans with limited bureaucracy and without or very low interest rates.

On the other hand, the assessment of the monitoring and detection systems efficiency, the advanced disaster management systems and its epidemiological surveillance scheme yields overall values for Switzerland that, despite being comparatively high, have at least some room for improvement. While the Swiss scheme is at the forefront of the European countries analyzed in this study, only behind Germany and separated from it by only one point of difference in the corresponding category, the main weakness of the Swiss program has been its decision to test only citizens with mild symptoms, when the most dangerous vectors are those who are asymptomatic. This element can disrupt the entire efforts of the Swiss institutions at the time of making partial confinement more flexible.

The Achilles heel of Switzerland has been exactly the same as that of most European countries: population aging is the greatest vulnerability of developed regions in the global scenario of COVID-19. This factor, along with shortages of intensive care units, is capable of extensively stretching morbidity and mortality rates from 3 - 4 percentage points to more than 7 - 8 percentage points. This should serve as a warning not only for Switzerland, but for the entire community of European states and the developed world. The silver tsunami these regions have experienced is one of their main risk factors, requiring strengthened efforts in digital epidemiology and surveillance of age-related diseases. Despite being home to many technologically advanced private health clinics focused on preventive and personalized medicine, Switzerland's government spending on preventive health is still comparatively low. The Swiss government could consider adopting such preventive medicine and digital health technologies for use in their public hospitals and clinics, and provide specific incentives and mechanisms for that purpose; in this way, an improvement of aging epidemiology could be achieved.

COVID-19 Safety Assessment: Singapore

Singapore achieves a high overall score in Deep Knowledge group's COVID-19 Regional Safety Assessment for a number of reasons. From a very high level, its meritocratic, city-state government structure gives it heightened capacity to coordinate and deploy very broad and comprehensive social policy mandates and mobilization of emergency resources quite rapidly and efficiently, and to coordinate the activities of different government departments in a very integrated manner. This unique aspect of the region gives it strengths that apply to almost every individual category included in our Regional Safety Assessment Index.

In terms of Monitoring and Detection, the region is utilizing a diverse array of sophisticated technologies for COVID-19 infection spread monitoring and detection, including location data, video camera footage and credit card information. The Singaporean government also launched a specific app, *TraceTogether*, that uses encrypted Bluetooth signals between cellphones to see if potential carriers of the coronavirus have been in close contact with other people. These efforts have helped the region maintain a very up-to-date understanding of their current situation, and to rapidly deploy COVID-19 neutralization measures in response.

The region also has a fairly robust level of Healthcare Readiness. The region has been increasing their per capita number of doctors and healthcare professionals for a number of years, which has put them at a comparative advantage to other regions now that healthcare professionals and resources are in dire need.

While their general level of Emergency preparedness is lower than other regions (due to an overall lower level of practical experience with geopolitical tensions and military conflict), this potential detriment is offset by the efficiency of their government structure, which allows them to rapidly mobilize emergency resources in a coordinated manner, even when specific policies and mobilization infrastructures are not already in place.

Two of the most pressing risks of the region include the large size of their elderly population, and their high degree of economic dependence on foreign workers and supply chains. These are two factors that should be monitored and optimized moving forward.

COVID-19 Safety Assessment: Japan

Japan achieves a high overall score due to its generally good performance across the majority of categories included in the Safety Assessment Index, and due to its specific excellence in a number of particular categories.

The region has a comparatively low number of infections and deaths in comparison to its population size, despite its lower testing rates, and despite the fact that its quarantine and lockdown mandates are much more relaxed than other countries. Many experts attribute this fact to its comparatively unique approach to monitoring and detection, which consists of a “cluster based approach” that assumed that the majority of infections stem from a select number of individuals with much higher-than-average levels of transmissibility. Thus, rather than focusing efforts and resources on very wide-scale testing, or wide-scope testing (e.g., testing asymptomatic individuals), the Japanese government concentrates on very aggressive contact tracing (i.e., tracing a large number of infections to a shared source), and quarantining that individual.

However, the region’s large aging population is a clear risk that should be monitored. While the region has a large proportion of its elderly population voluntarily isolate to avoid contracting COVID-19, preventive steps should be taken nonetheless to avoid burdening their healthcare system as a result of the possibility that the region might see steep rises in infection rates due to outbreaks among the elderly.

Additionally, Japan has seen a recent decline in public support and acceptance rates for how the rate the effectiveness of the Japanese government’s efforts at neutralizing the pandemic, with growing concerns that efforts aimed at economic stabilization are being prioritized over public health. This is a clear risk that should be counter-acted as much as possible, such as through a more directed and transparent government communications strategy. The Japanese economy is also at risk for decline as a result of the pandemic, and this is a factor that should continue to be closely monitored as the long-term dynamics of COVID-19 continue to take shape.

General COVID-19 Recommendations for Future Pandemic Readiness and Prevention

- Government leaders should seek to improve cross-department coordination, especially as it pertains to links between public health authorities and security forces including military and law enforcement officers.
- Regional governments and international policy organizations should proactively develop the capacity and infrastructure for addressing fast-moving pandemic threats.
- A dedicated normative international organization should be created to promote early identification of global pandemic threats and reduction in health-risks imposed by advances in modern technology, such as international travels, which are one of the root causes of the current pandemic's global reach.
- Regions should be more proactive in stress-testing their health security capacities and in conducting and publishing the results of after-action reviews. By holding periodic health security simulations, such regions can simultaneously demonstrate their commitment to maintaining a well-functioning health security system and transparently identify weak points in their health security infrastructure in order to improve them for future scenarios of epidemiological relevance.
- The majority of regions should increase the level of domestic financing for health security maintenance, development and improvement, and should be tied to specific benchmarks within national action plans.
- Governments should develop specific mechanisms for facilitating private sector coordination for rapid mobilization of emergency pandemic responses (e.g. equipment production, test and treatment development, etc.)
- Overall utilization of AI-enabled GovTech platforms must be increased to create better cross-department coordination efforts.
- Medical and safety equipments storages must be addressed proactively.
- Regions should seek to establish intra-border cooperation and emergency response efforts jointly to prevent disease spread.
- Above all else, regions should not put economic recovery above public health and safety. Efforts to ease economic freezing and lockdowns should be coupled by vigilant and widespread testing, monitoring and detection.

General COVID-19 Conclusions

Based on the results of our analysis, we can conclude that the 20 selected regions show considerably high overall scores in terms of availability of medical, economic and technological resources to monitor, detect and neutralize the pathogenic agent causing COVID-19 within their own borders, as well as to establish programs that attempt to maintain economic and social security, and stability.

The analysis finds that the regions' main challenge lies perhaps more in attending to their capacities to efficiently manage these resources, fundamentally with regard to changing the pre-existing dynamics of conflict resolution. One of the central measures used to combat previous economic and humanitarian crises, such as the financial crisis of 2008, has been the government policy of money issuance and financial rescue. The current global crisis is not just an economic crisis; it is a combined health and economic crisis with major systematic impacts on all areas of resource management. The majority of regions included in the present analysis are well conditioned, in terms of availability of material and human resources, to establish new, more comprehensive emergency preparation measures, and to create the heightened levels of international coordination necessary to account for and attend to the different facets and demands of this conflict in such a way that regional safety and stability can be achieved.

It should be highlighted that one of the greatest risks that the analysis identifies is the possibility that governments make their respective states of emergency and quarantine measures more flexible too soon, in an effort to re-initiate economic activity. The risk of successive COVID-19 outbreaks is a constant that remains immovable, and the scientific and health community has only just begun to understand the nature of this infectious agent and its population dynamics.

It is a key security issue that the reopening process of national economies is carried out with caution, assessing the potential and intensity of future outbreaks, and continuing widespread and aggressive testing, monitoring and detection efforts, otherwise all the sacrifice and joint work of citizens, governments and organizations will have been meaningless. **Despite this fact, many governments appear to be prioritizing economic concerns over healthcare priorities, easing partial lockdowns and reviving economies without giving sufficient signs of caution and without corresponding increases in testing. This is the most critical risk identified by the analysis.**

DISCLAIMER



Deep Knowledge Group is using its best efforts to continuously update its COVID-19 analytics based on dynamic, publicly available metrics deemed reliable, such as World Health Organization, Worldometers, CDC, Johns Hopkins University, and other publicly available sources.

Certain metrics used for advanced and qualitative assessment were formulated by Deep Knowledge Group analysts in coordination with specific experts and consultants using proprietary sources and techniques. Therefore, such rankings may be adjusted over time depending on the corresponding underlying information and in coordination with ongoing enhancements to our underlying analytical methodologies.

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