

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

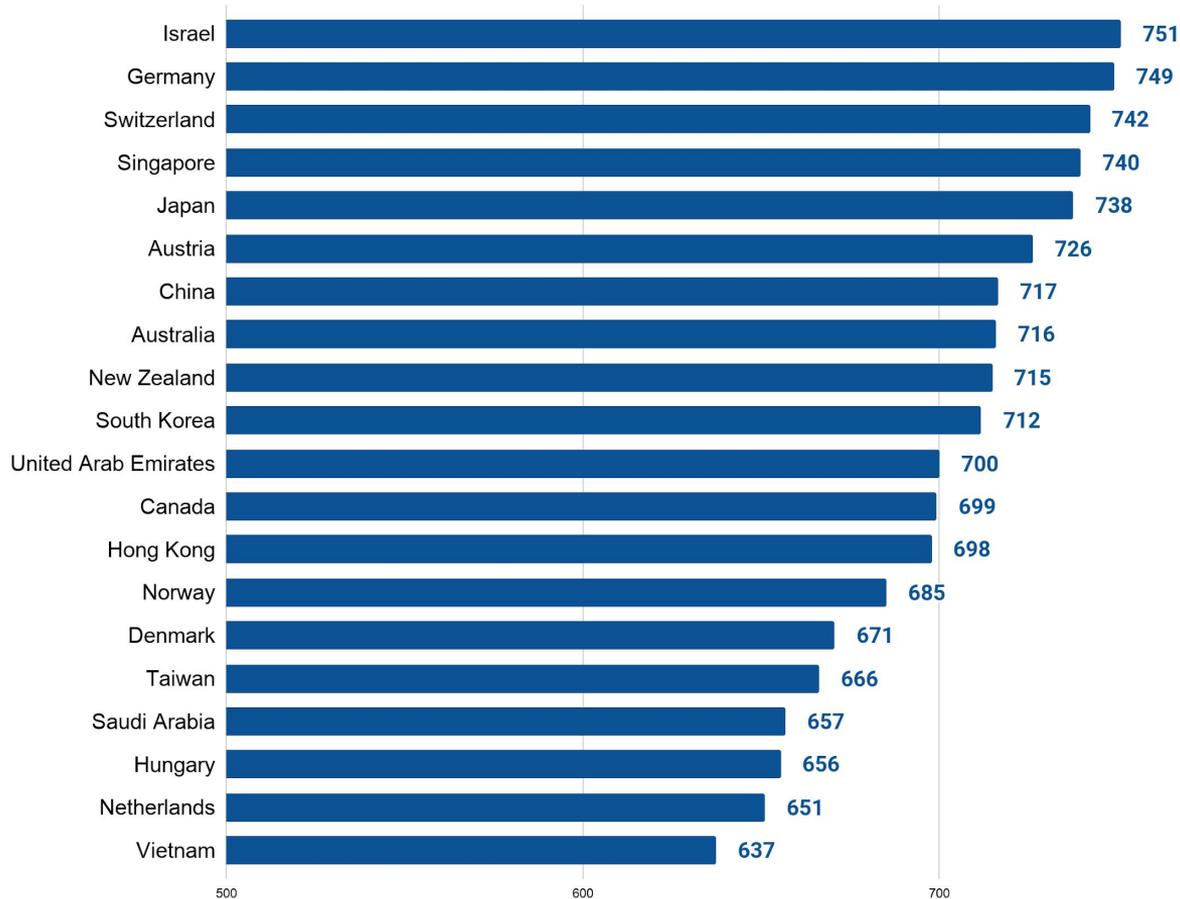


COVID-19
Brief Comparative Analysis
20 Regions

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, and also in terms of improving the current and 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 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 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 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 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 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 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 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 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 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 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

740
CUMULATIVE
SCORE

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.

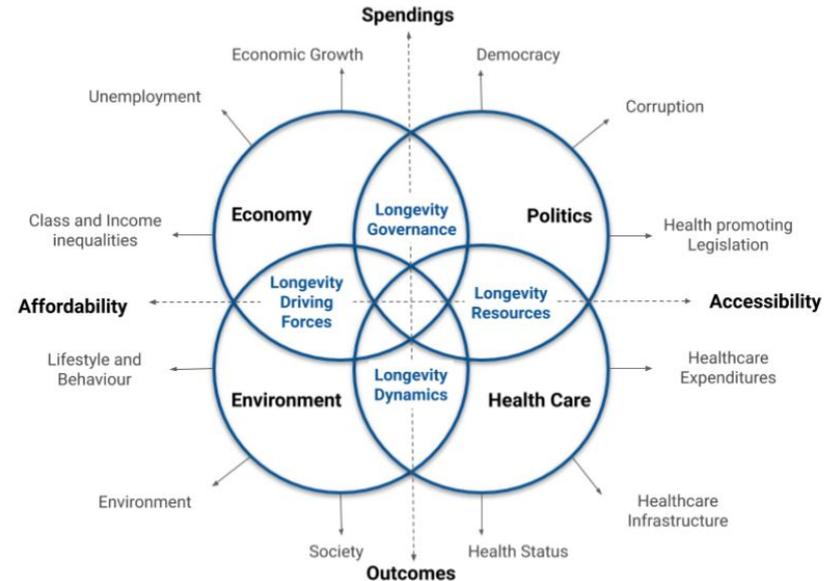
Certain metrics used for advanced and qualitative assessment were formulated by Deep Knowledge Group analysts in coordination with specific experts and consultants using proprietary sources and techniques. Therefore, such rankings may be adjusted over time depending on the corresponding underlying information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

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.



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.

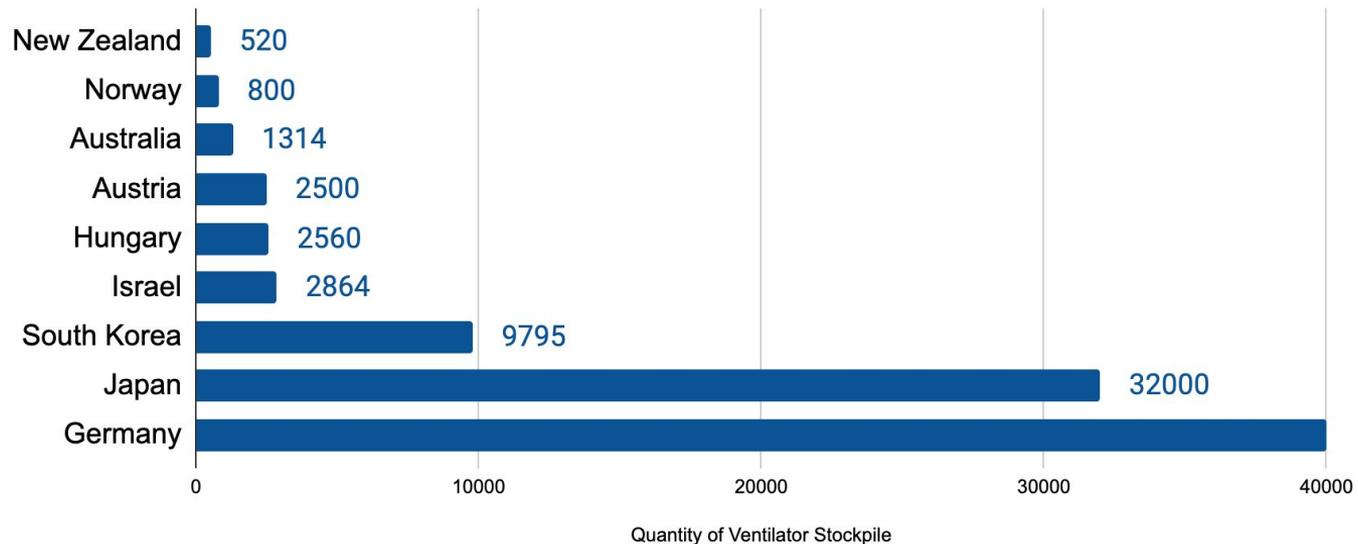
Additionally, the majority of regions utilized advanced technologies, such as face recognition, mobile phone tracking and other AI-based surveillance methods and technologies, which is one of the most critical factors impacting effective monitoring and detection efforts. However, only a few of the regions 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.



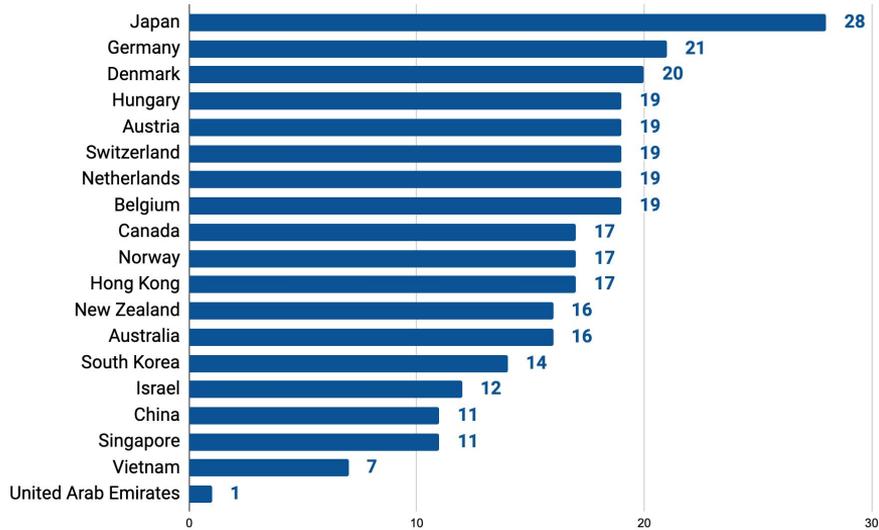
Main Findings (20 Regions): COVID-19 Regional Resilience

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.

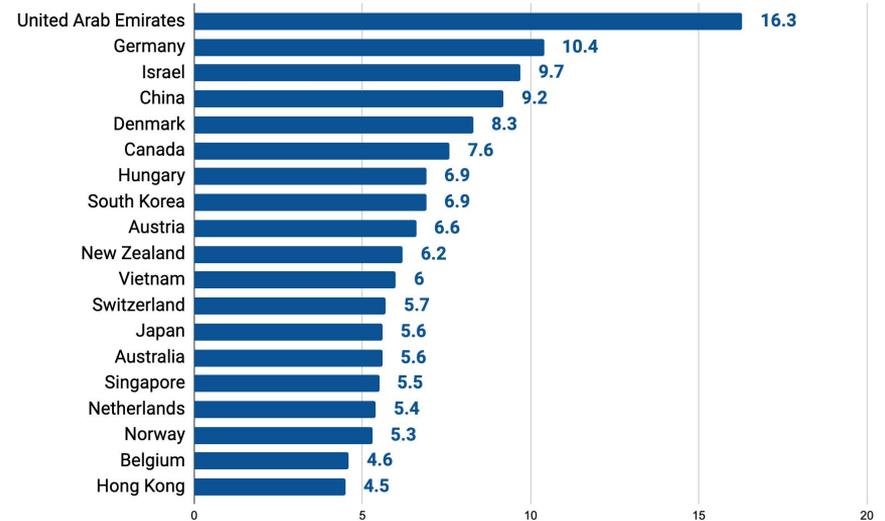
Two of the largest factors behind regions' mortality rates are a high prevalence of chronic diseases and a high proportion of elderly population. Regions with higher numbers in these two specific categories generally had a higher amount of COVID-19 related deaths. This decisive and conclusive data should 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



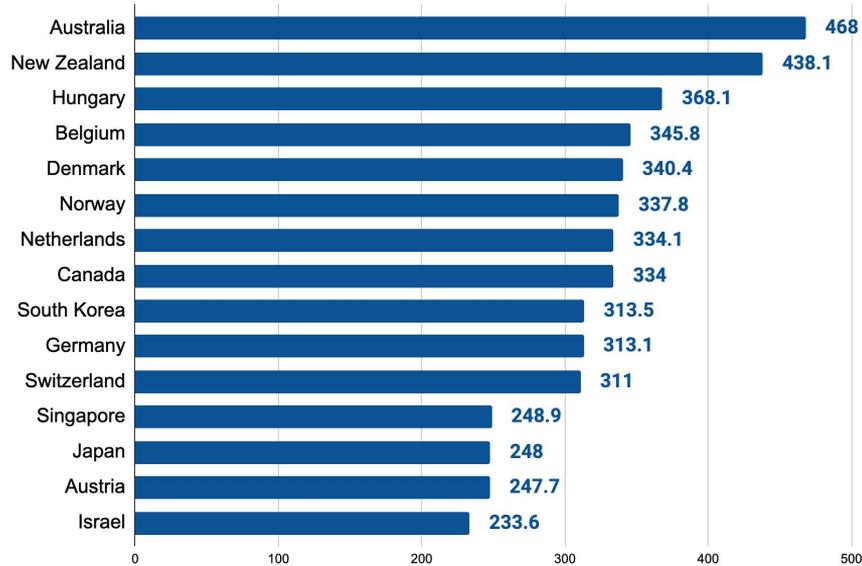
Diabetes prevalence (% of population ages 20 to 79)



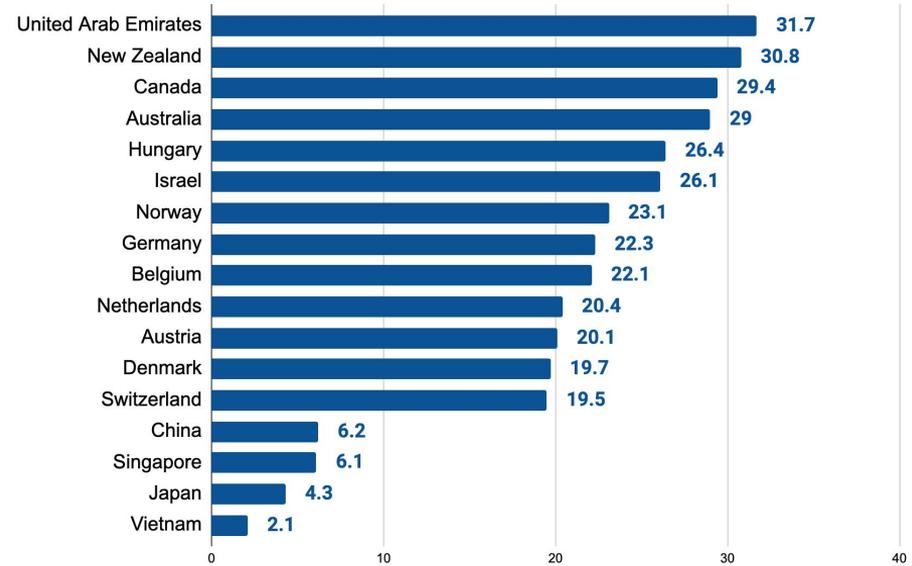
As can be seen in the above graph, there is considerable variation in the size of elderly population and prevalence of diabetes among the regions analyzed. It is notable that several regions which scored high in the final, cumulative ranking have a substantial elderly population burden (Germany) and 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.

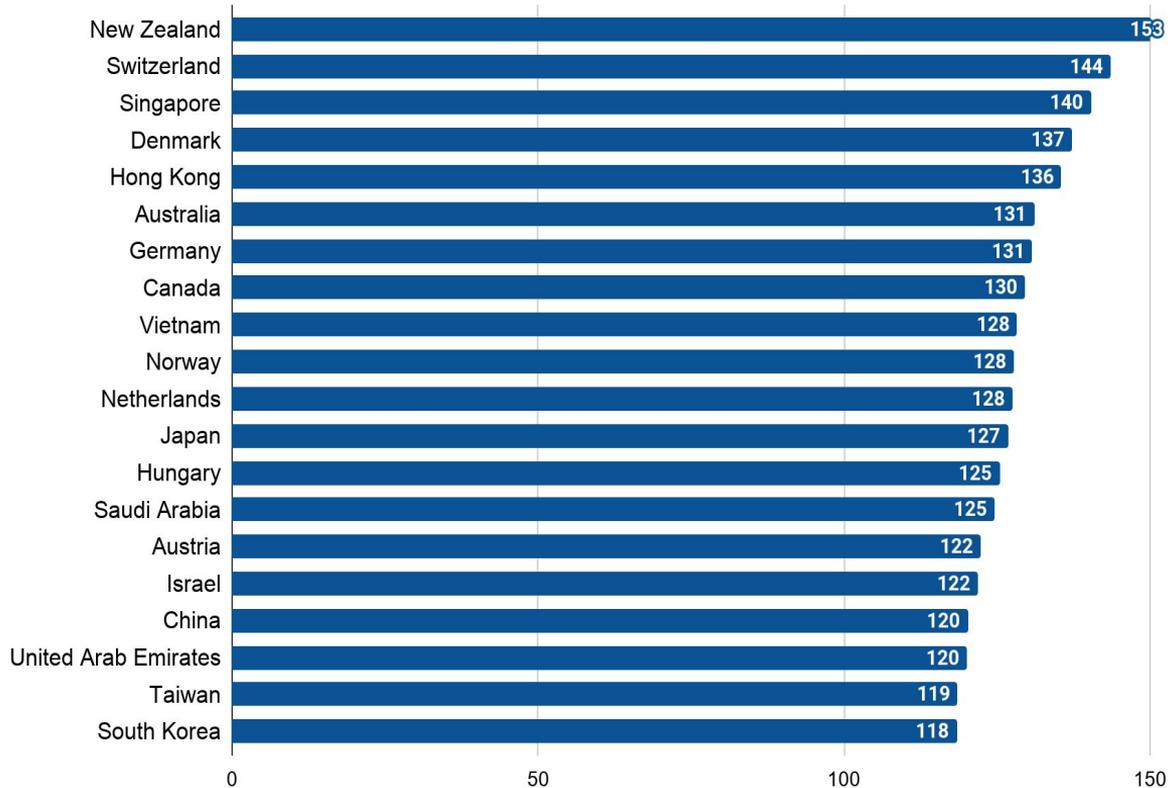
Israel achieves the highest score in this category, largely as a result of the fact that it is a region with a very long practical history of dealing with emergency crises (such as geopolitical conflicts), and thus has developed a very extensive policy infrastructure for emergency coordination, tangible 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



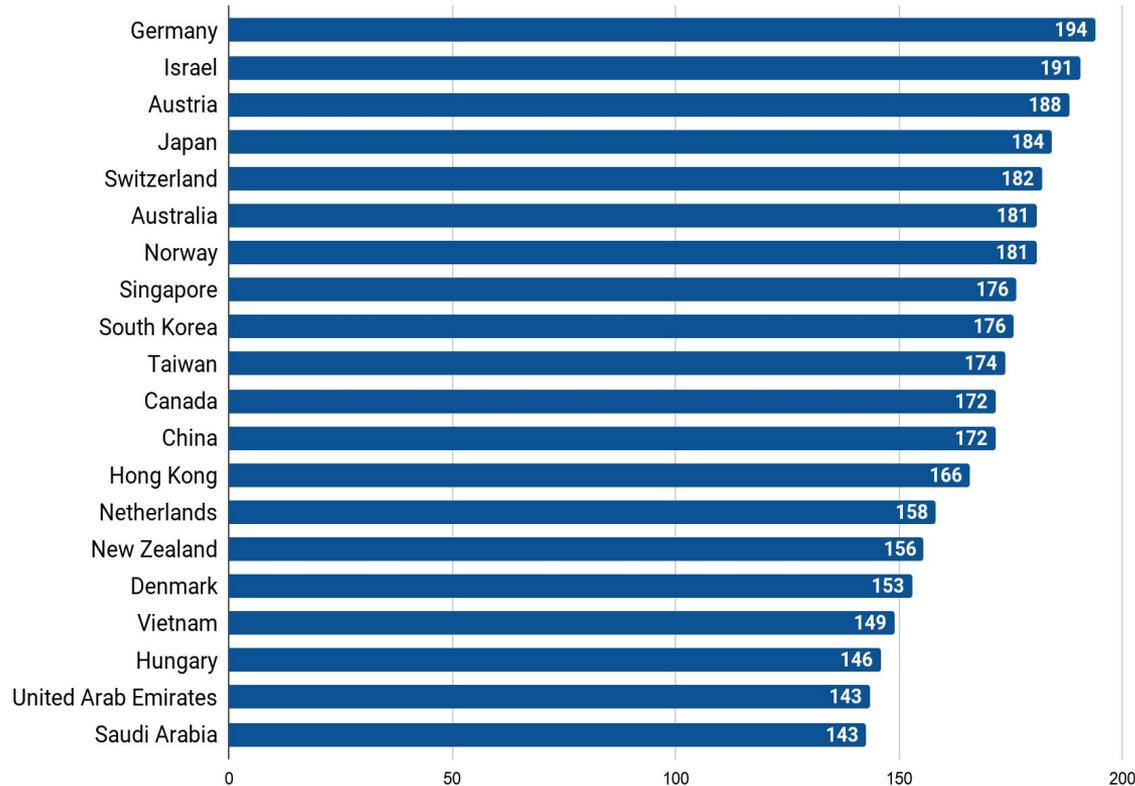
The present graph shows the the distribution of 20 regions according to the sum of their weighted Quarantine Efficiency scores. The distribution reflects the effectiveness of the 20 regions' quarantine and social distancing measures and government's economic support activity; due to these characteristics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

COVID-19 Government Efficiency of Risk Management



2.2

Category Weight



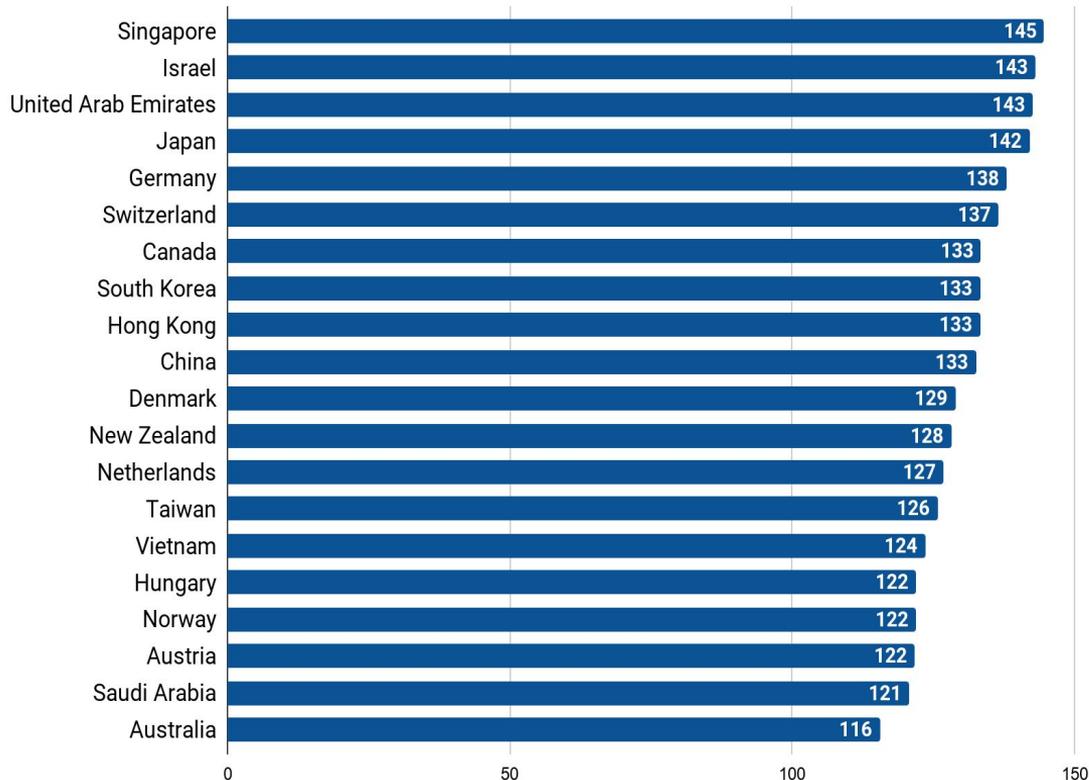
The present graph shows the the distribution of 20 regions according to the sum of their weighted Government Efficiency of Risk Management scores. The distribution shows that Israel is a leader among other regions in terms of economic stability and sustainability, military security and defense capabilities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

COVID-19 Monitoring and Detection



1.5

Category Weight



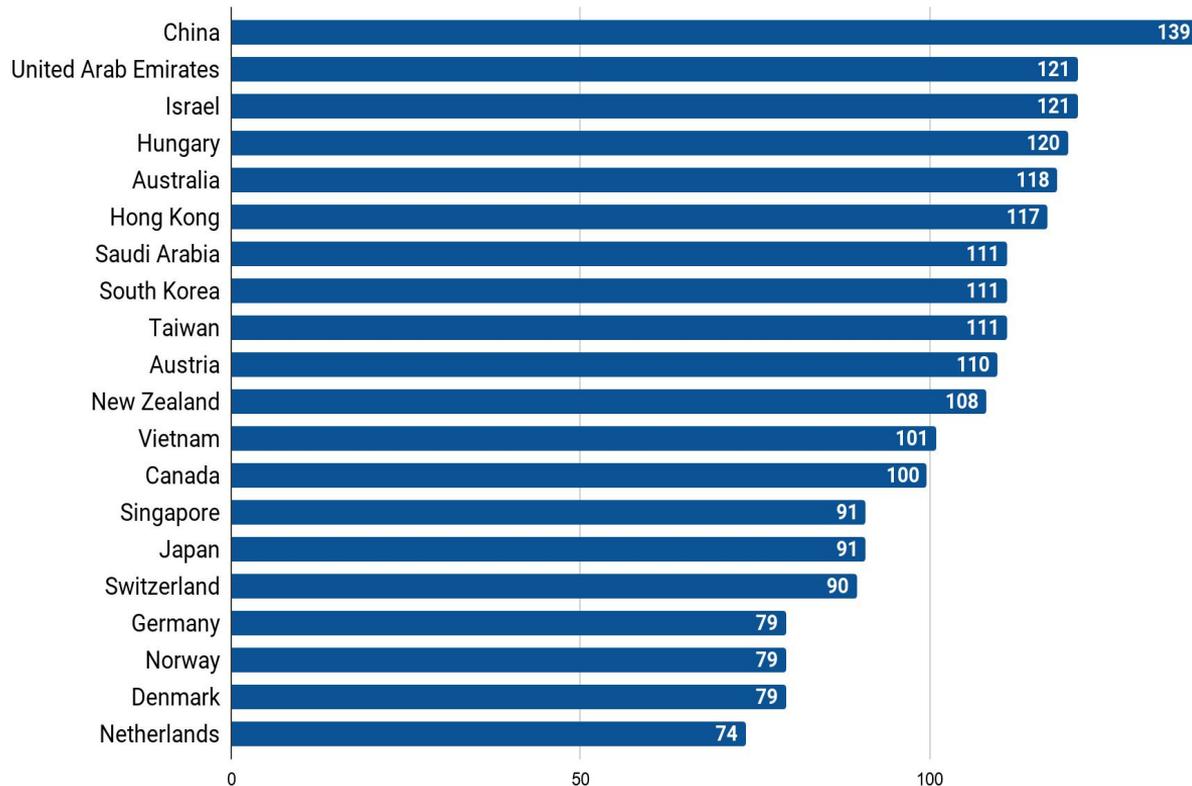
The present graph shows the the distribution of 20 regions according to the sum of their weighted Monitoring and Detection scores. This parameter allows us to compare all regions with respect to the scope, technological sophistication and diversity of their surveillance and monitoring technologies, as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

COVID-19 Emergency Preparedness



1.5

Category Weight



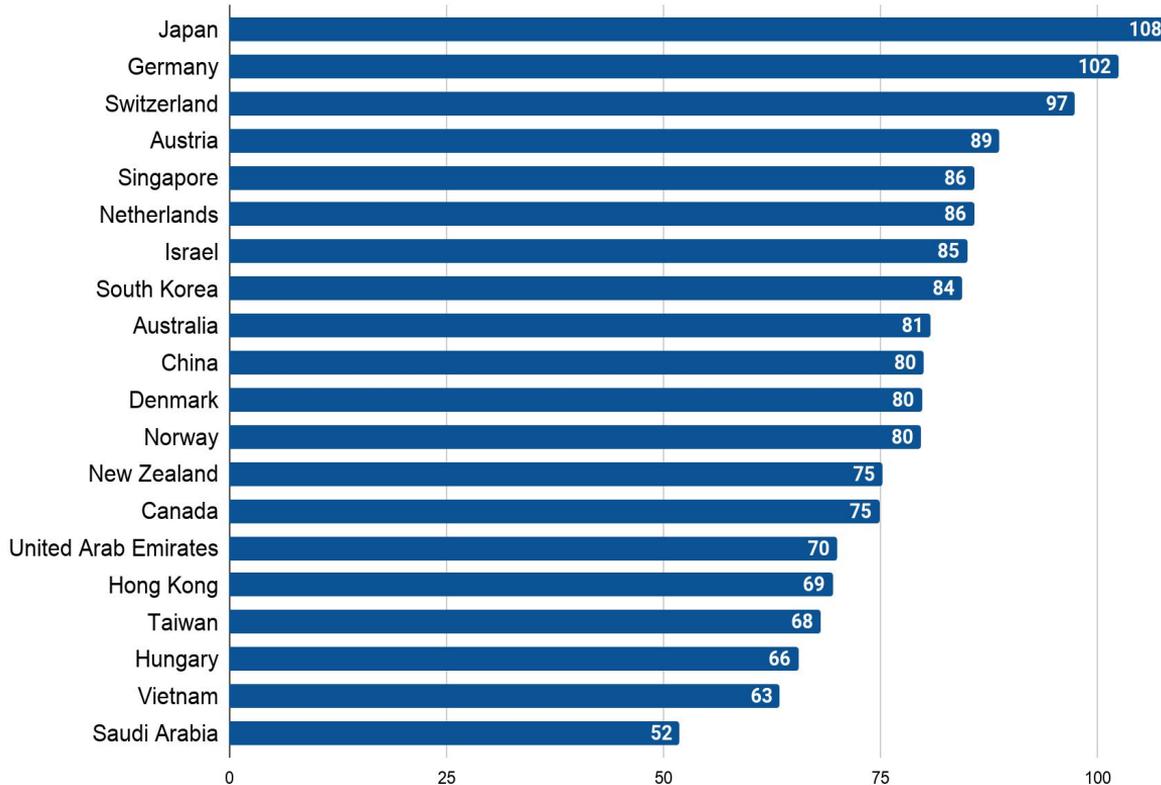
The present graph shows the the distribution of 20 regions according to the sum of their weighted Emergency Preparedness scores. China is shown to be the region with the greatest capacity to respond to emergency situations, particularly health emergencies, and to address outbreaks.

COVID-19 Healthcare Readiness



1.3

Category Weight



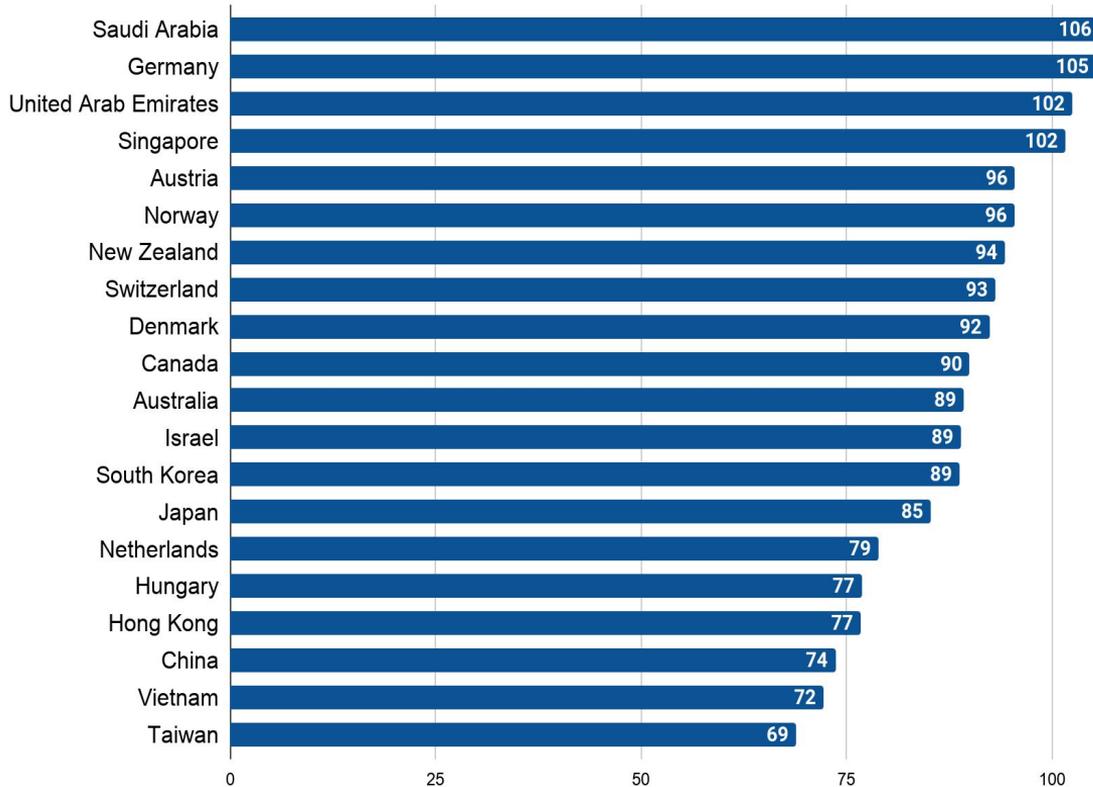
The present graph shows the the distribution of 20 regions according to the sum of their weighted Healthcare Readiness score. The highest score is obtained by Japan, indicating that the region is the most advanced in terms of efficiency, equity and quality of Healthcare System and its strength to response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



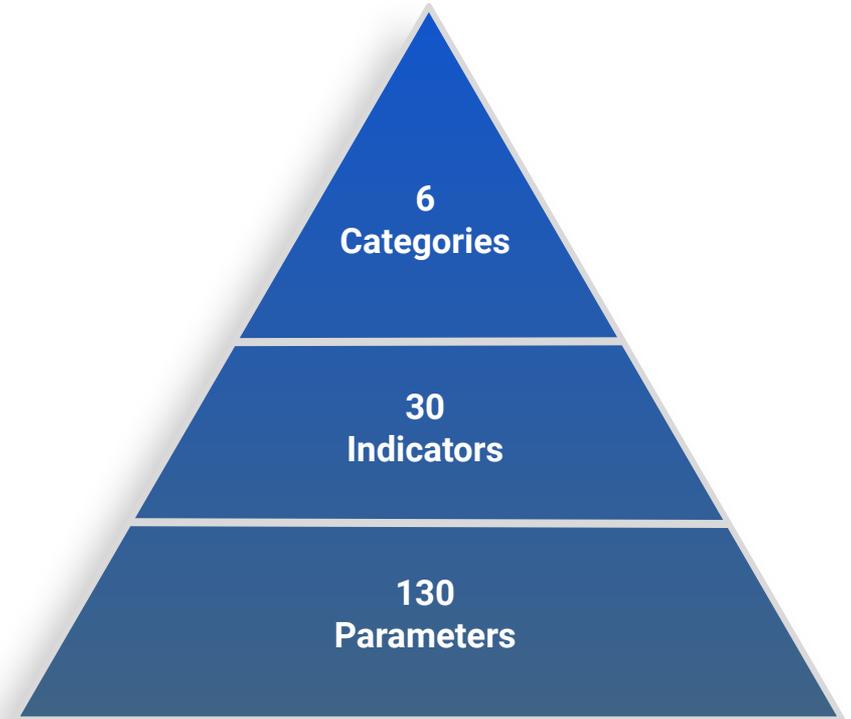
Analytical Framework and Methodology

COVID-19 Regional Safety Index: Introduction

The framework comprises 6 top-level categories (Quarantine Efficiency, Government Efficiency of Risk Management, Monitoring and Detection, Health Readiness, Regional Resilience and Emergency Preparedness).

Each category consists of a matrix of sub-parameters (referred to here as Indicators), which relate to specific factors of importance impacting the stability of current regional circumstances, of the effectiveness of various regions' emergency response efforts, and these variables will also address post-pandemic planning measures in future studies.

Finally, each indicator itself consists of a matrix of 2-10 quantitative or qualitative sub-parameters, relating to the specific topic, analytical focus and end-point of their parent indicator. Quantitative parameters are numeric, and are obtained from a variety of reputable, publicly available sources of data. Qualitative parameters are binary, and regions are assigned either a 1 or a 0, which represent an answer to a specific yes/no question.



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

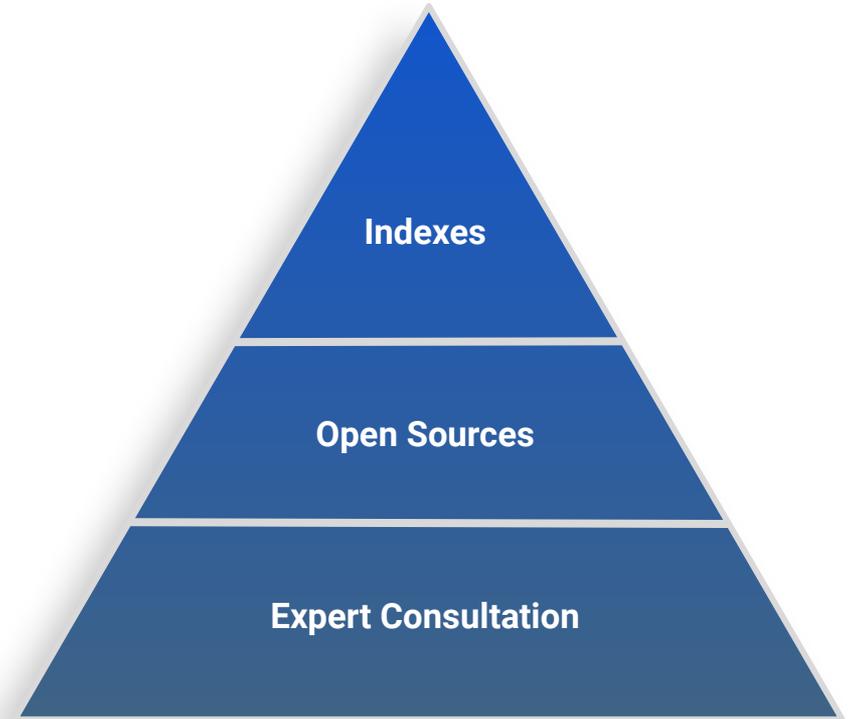
ProCon.org

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.



COVID-19 Regional Safety Index: Data Modeling and Calculations

Each parameter in all three layers of the framework (categories, indicators and parameters) is assigned a specific weight, or importance factor, designed to approximate the relative importance of each parameter or parameter-matrix on the effectiveness of a region's current situation, emergency response efforts or post-pandemic preventive measures as it relates to the specific analytical focus and endpoint of its parent group (indicator or category).

While the index takes into account both positive and negative factors impacting a given region's current or future (post-pandemic) stability, each binary question is constructed in such a way that a higher value is associated with more favorable conditions. Thus, for example, a higher score in an indicator or parameter within top-level categories focused on risk (such as region vulnerability) indicates less vulnerability, rather than higher vulnerability, than a lower score within the same category, indicator or parameter.

Deep Knowledge Group analysts first worked to formulate the specific list of parameters (categories, indicators and parameters), and to assign relevant parameter weights (importance factors) and then gathered data from government and academic publications; and websites of government authorities, international organizations, non-governmental organizations, and local and international news and media reports in order to compute the score for each parameter.

The research process proved challenging, both because of the difficulty in sourcing data and official information related each quantitative and qualitative parameter and, in some cases, because of a lack of publicly available information.

COVID-19 Regional Safety Index: Data Modeling and Calculations

Modeling the parameters, indicators, and categories in the COVID-19 Regional Safety Index results in overall scores of 0–100 for each region, in which 100 represents the most favorable conditions possible and 0 the least favorable (with respect to the topical focus of each parameter).

A score of 100 in the Index does not indicate that a region has perfect regional stability conditions, and a score of 0 does not mean that a region has no regional stability at all. Instead, scores of 100 and 0 represent the highest or lowest possible scores, respectively, as measured by the Index criteria.

1. The values of each parameter are averaged to determine the value of their parent indicator: **indicator score = average of weighted individual parameters**
2. Then, the indicator score is multiplied by the weight of the indicator, and is normalized (multiplied by 100) in order to allow for a final category value to be made by summing the individual values of all normalized indicators in each category.
3. Finally, the aggregate value of each category (consisting of the sum of indicators) is multiplied by the weight of the category. The final cumulative index score for each region is the obtained by summing the individual category weights. Thus, the category values consist of a weighted total of the indicator values within each category: **category score = \sum weighted individual indicators**

The category values have been normalized on the basis of the following equation: $x = (x - \text{Min}(x)) / (\text{Max}(x) - \text{Min}(x))$, where $\text{Min}(x)$ and $\text{Max}(x)$ are the lowest and highest values, respectively, in the COVID-19 Regional Safety Index (of the 20 regions) for any given indicator. The normalized value (i.e., a score of 0–100) makes it directly comparable with other normalized indicator scores.

COVID-19 Regional Safety Index: Principal Component Analysis

Principal components analysis (PCA) is a data science technique used to quantitatively define the way that indicator weights are assigned in order to create a “composite index” (a ranking based on a weighted sum of specific indicators). PCA allows us to remove redundant information that are shared among two or more indicators by creating a weighting that accounts for the greatest amount of variance in the data.

The PCA weights that have been used to create Deep Knowledge Group’s COVID-19 Regional Stability Ranking are provided in order to provide further depth into the model’s construction. However, they should be considered as complementary tools, and not as supplemental weights to override the default weights assigned to indicators, parameters and categories, or as a direct means of understanding the regional index scores themselves, because they do not take into account the “impact factor” or significance-based weights used in the model.

PCA gives a weight to each component in an the index which takes into account covariance between indicators, and the degree with which a particular component (parameter, indicator or category) maximizes the variation among scores in the index. In essence, it is a method used to minimize redundancy between variables and maximize variation as it pertains to the actual final index scores.

In simplified terms, it minimizes the importance or impact of redundant factors shared among variables and maximizes the importance of impact of non-redundant factors that contribute significantly to the final output of the index (the regional scores).

Principal Component Analysis

Each PCA weight is calculated by taking the principal component (known as the eigenvector) associated with the highest explained variance (known as the eigenvalue), which constitutes a method of decomposing data into independent components ordered by informational content. Valid PCA makes several important assumptions. These include (1) the assumption that variance is meaningful and not the result of significant measurement errors in the data itself, and (2) that the assumption that that the dynamic in question are along the direction with the largest variance.

Single-stage PCA analysis solves for the weights maximize variance across all variables, irrespective of which top-level category they belong to. The following steps are followed:

- Perform PCA analysis on all indicators, ignoring the category they belong to.
- Use the principal component associated with the highest eigenvalue.
- Set negative components to zero.
- Normalize indicator weights (such that the sum of weights is equal to 1).
- Normalize the category weights (such that the sum of categories is equal to 1).
- Use the sum of the non-normalized parameter weights and assign this as the indicator weight for that category.
- Renormalize top-level indicator weights across indicators so that those also sum to 1.

Variation within indicator weights is a sign that redundancy is occurring in the elements or that some elements are not as relevant in explaining the variation in the overall index once all the other variables are considered. Finding equal weights across indicators is a sign of very little redundancy across subgroups and similar relevance in explaining variation in the COVID-19 Regional Safety Index, which suggests that the Index has been divided into subgroups appropriately.

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

COVID-19 Quarantine Efficiency

Scale of Quarantine

This indicator quantifies the current scale of a region's quarantine measures, including both the total size and the geographical distribution of quarantine efforts. Different weightings are given for full-scale quarantine vs. mandatory social distancing measures.

Criminal Penalties for Violating Quarantine

This indicator quantifies and qualifies the presence and severity of a region's criminal penalties for violating imposed quarantine and social distancing measures. Regions that police such violations are generally better equipped to limit infection spread.

Economic Supply Chain Freezing

This indicator quantifies the extent of governments' efforts to "freeze" economic and supply-chain activity, which allows for nationwide lockdowns to occur in practice, and in a way that is believed to minimize eventual negative economic repercussions of the pandemic.

Quarantine Timeline

This indicator qualifies how early (with respect to the overall timeline of infection spread) that a region implements quarantine and social distancing measures, with respect to the total number of cases present and the geographical distribution of infection at the time of implementing quarantine and social distancing measures.

Economic Support for Quarantined Citizens

This indicator qualifies and quantifies the level of economic support provided by governments to citizens under stay-at-home or lockdown orders. Economic support provides citizens with the capacity to stay at home in practice.

Travel Restrictions

This indicator quantifies the scale of regions' travel restrictions on both citizens and tourists in order to minimize infection spread. Different weightings are given for domestic and international travel restrictions.

COVID-19 Government Efficiency of Risk Management

Level of Security and Defense Advancement

This indicator quantifies the current scale of a region's military security and defense capabilities (taking into account both national security and reserve capacities for neutralizing potential external geopolitical threats).

Rapid Emergency Mobilization

This indicator serves to qualify the robustness of a region's capacity to mobilize emergency response measures in the face of national emergencies, including pandemics.

Efficiency of Government Structure

This indicator measures various nations' capacity for rapid and effective governance to provide insight on which regions have the greatest risk of dealing with the COVID-19 pandemic (and its potential economic, societal and geopolitical consequences) in a non-optimal manner.

Economic Sustainability

This indicator qualifies and quantifies the overall level of the region's economic stability and sustainability (taking into account not just the current state of economy, but also the growth rate of its debt and its capacity to remain economically sustainable in a post-pandemic era).

Pandemic Readiness

This indicator quantifies a region's level of preparedness in rapidly mobilizing nation-wide emergency response measures in response to pandemics across legal, economic and social efforts to minimize a pandemic's negative effects on their citizens' health and their economy.

Legislative Efficiency

This indicator quantifies the flexibility and comprehensiveness of the region's legislative infrastructure and resources for rapidly deploying emergency response legislation on a nation-wide scale.

COVID-19 Monitoring and Detection

Monitoring Systems and Disaster Management

This indicator quantifies how advanced and sophisticated a region's surveillance and monitoring technologies are, including both the depth and breadth of technologies (the diversity of surveillance and monitoring technologies, and their general level of sophistication).

Testing Efficiency

The indicator quantifies regions' average testing efficiency, considering both the average time to get results from an administered test, and the average test backlog based on available lab analysis personnel.

Government Surveillance Technology for Monitoring

This indicator quantifies how advanced and widespread a region's surveillance and monitoring activities are. Widespread monitoring gives governments greater capacity to track infection rates and compliance with quarantine and social distancing measures.

Scope of Diagnostic Methods

This indicator qualifies the scope, breadth and diversity of the specific diagnostic techniques in standard use in a region, assuming a relationship between the diversity and effectiveness of diagnostic techniques.

AI for Diagnostics and Prognostics

The indicator qualifies whether the use of AI and data-driven techniques for diagnostic analysis are in widespread use in a region. Such techniques lower the burden on resources and personnel dedicated to analyzing the results of COVID tests and patient prognosis.

Reliability and Transparency of Data

This indicator qualifies the reliability and transparency of a region's reported infection, hospitalization and mortality statistics. Many regions appear to be manipulating their data to obscure the true level of infection, hospitalization and mortality.

COVID-19 Healthcare Readiness

COVID-19 Equipment Availability

This indicator quantifies the size (total and per capita) of emergency equipment stockpiles (i.e., medical supplies and emergency treatment supplies used to treat COVID-19 patients in hospital).

Quantity and Quality of Medical Staff

This indicator takes into account the quantity of medical staff and healthcare workers (doctors, nurses, administrative staff, etc.) in the region and the average level of medical doctors' education and expertise.

Level of Technological Advancement

This indicator ranks regions according to their healthcare system's level of technological sophistication, modernization and effectiveness in comparison to other regions.

Mobilization of New Healthcare Resources

This indicator takes into account a region's preparedness for mobilizing additional healthcare resources (supplies, equipment, treatments and personnel) beyond their current capacity, taking into account existing guidelines and policies for emergency healthcare mobilization.

Level of Healthcare Progressiveness

This indicator provides a measure of the general level of a technological advancement and progressiveness of a region's medical science and healthcare infrastructure, and serves as an approximation of the overall quality of medical treatment in that region.

Epidemiology System Level of Development

This indicator ranks the epidemiology system of a region (including both epidemiologists and epidemiological resources, companies, etc), in terms both of quantity and regional distribution, as well as in terms of technological sophistication.

COVID-19 Regional Resiliency

Infection Spread Risk

This indicator quantifies nations' overall spread infection risk, and is used in order to provide information on which citizens of which regions have the highest and lowest overall risk of getting infected with COVID-19.

Level of Modern Sanitation Methods

This indicator ranks regions according to the presence (or absence) and degree of modernization of their sanitization systems. regions with poor sanitation systems, or those who lack them entirely, are at a much higher risk of infection spread.

Chronic Diseases

This indicator quantifies regions' level of geographic risk in terms of several variables including proximity to regions with a high level of infection, number of border crossings with neighboring regions, number of infection hot-spots, and number and distribution of population-dense areas.

Culture Specifics and Societal Discipline

This indicator qualifies regions according to their culture-specific practices and traditions, as it relates to health, wellness and sanitization, as well as general societal discipline. Populations which give less care and attention to health and sanitization are at greater risk of infection.

Demography

This indicator quantifies the population size and demographics (age, sex, and proportion of populations with specific diseases) of a given region with respect to demographics most vulnerable to infection and negative patient outcomes.

Geopolitical Vulnerability

This indicator qualifies the current state of the region's geopolitical stability, taking into account the economic and military strength of the region's allies and rivals, assuming an association between high geopolitical stability and lower risk of attack by military rivals and resulting socioeconomic instability.

COVID-19 Emergency Preparedness

Societal Emergency Resilience

This indicator approximates the overall level of societal resilience, preparedness and experience with national emergencies, incorporating practical historical experience, psychological, cultural and religious practices and attitudes, etc.

Emergency Military Mobilization Experience

This indicator approximates the region's practical historical experience with mobilizing their military in order to help deal with national emergencies (both geopolitical and non-geopolitical emergencies), as well as the overall domestic military resources available.

Surveillance Capabilities (Scale, Scope and Technological Sophistication)

This indicator approximates the scale, scope and technological sophistication of the region's government surveillance capabilities.

Previous National Emergency Experience

This indicator approximates the region's practical historical experience with national emergencies, accounting for both geopolitical and non-geopolitical emergencies, with a focus on preparation policies and government-led emergency relief efforts.

COVID-19 Regional Safety Index: Parameters

1	COVID-19 Quarantine Efficiency	
1.1	Scale of Quarantine	
1.1.1	Population Density	People per km²
1.1.2	Does the region have dedicated military chemical and biological warfare divisions and forces?	yes=0, no=1
1.1.3	Does the region have “hotspots” (high density of cases in one specific area)?	yes=0, no=1
1.1.4	Number of cases.	per million individuals
1.1.5	Scale and scope of region-wide lockdown	full = 1, partial = 0.5 non-existing = 0
1.1.6	Does the region’s federal government have legislative authority over the entire territory?	yes=0, no=1
1.1.7	Does the region possess culture and religion-specific behaviours that preclude enforcement of mandatory quarantine measures?	yes=0, no=1
1.2	Quarantine Timeline	
1.2.1	What is the length of quarantine?	14 days = 0.5, more than 14 = 1, no quarantine length = 0
1.2.2	Did the region impose quarantine measures early in the timeline of viral spread?	yes=0, no=1
1.2.3	Was quarantine easing officially declared?	yes=0, no=1
1.2.4	Did the population exert public pressure to ease quarantine measures?	yes=0, no=1
1.3	Criminal Penalties for Violating Quarantine	
1.3.1	Quantity of law enforcement officers.	number per capita

COVID-19 Regional Safety Index: Parameters

1.3.2	Did the region use volunteers to monitor quarantine compliance?	yes=1, no=0
1.3.3	Criminal penalties for violating quarantine.	Number of months in incarceration.
1.3.4	Fines	In USD
1.3.5	Did the region use military personnel to assist law-enforcement officers?	yes=1, no=0
1.4	Economic Support for Quarantined Citizens	
1.4.1	Economic support to citizens	in USD
1.4.2	Economic support to SMEs	in USD
1.4.3	Tax reliefs	in USD
1.4.4	Economic rescue package	% of GDP
1.5	Economic and Supply Chain Freezing	
1.5.1	Export-oriented region?	yes=0, no=1
1.5.2	Does the region have an absence of large supply shortages?	yes=0, no=1
1.5.3	Are the region's border-crossing routes open?	yes=0, no=1
1.5.4	Does the region have a high availability of food?	yes=0, no=1
1.5.5	Are there any shortages in protective equipment?	yes=0, no=1
1.6	Travel Restrictions	
1.6.1	Quantity of automotive vehicles.	number per 1000 people
1.6.2	Did the region allow for direct flights to Italy or China in February - March 2020?	yes=0, no=1
1.6.3	Average level of touristic flow.	number of tourists per year

COVID-19 Regional Safety Index: Parameters

2	COVID-19 Government Efficiency of Risk Management	
2.1	Level of Security and Defense Advancement	
2.1.1	Does the region's military have dedicated laboratories for protection against chemical and biological warfare?	yes=0, no=1
2.1.2	Does the region's military have pre-existing plans and policies in place in the event of a biological or chemical attack?	yes=0, no=1
2.2	Level of GovTech Development	
2.2.1	Does the region have COVID-specific training courses for doctors and nurses?	yes=0, no=1
2.2.2	Rural population	% of total population
2.2.3	Local vaccine development (attempts).	yes=0, no=1
2.3	The Efficiency of Government Structure	
2.3.1	Did the region's government develop a specific emergency response mechanism for engagement with the private sector?	yes=0, no=1
2.3.2	Are there government-startups cooperation?	yes=0, no=1
2.3.3	Government effectiveness (EIU score).	EIU Score
2.3.4	EGDI.	EGDI score
2.3.5	Number of internet users per 1000 individuals.	number per 1000 people
2.3.6	Smartphone penetration.	% of population
2.3.7	Does the region utilize Electronic Health Records?	yes=0, no=1

COVID-19 Regional Safety Index: Parameters

2.3.8	Regional Corruption Index Score.	Index
2.4	Economic Sustainability	
2.4.1	Regional economic debt (number).	% of GDP
2.4.3	GDP index.	GDP index score
2.4.4	GNI index.	GNI index score
2.4.5	Minimum wages.	in USD
2.4.6	Unemployment rate due to COVID19.	% of population
2.4.7	Exit strategy plan.	yes=0, no=1
2.5	Legislative Efficiency	
2.5.1	Does the region's government have a pre-existing Action Plan for rapid resource mobilization in the event of a national emergency?	yes=0, no=1
2.5.2	Legislations and regulations for the cross-border screening of pathogens, toxic, pandemic potential pathogens.	yes=0, no=1
2.5.3	Legislative availability for disaster mobilization.	yes=0, no=1
2.5.4	State capability to adopt new surveillance laws.	yes=0, no=1
2.6	Political Stability	
2.6.1	Does the region's government have a pre-existing Action Plan for rapid resource mobilization in the event of a national emergency?	yes=0, no=1
2.6.2	Legislations and regulations for the cross-border screening of pathogens, toxic, pandemic potential pathogens.	yes=0, no=1
2.6.3	Legislative availability for disaster mobilization.	yes=0, no=1

COVID-19 Regional Safety Index: Parameters

3	COVID-19 Monitoring and Detection	
3.1	Monitoring Systems & Disaster Management	
3.1.1	Does the region's government use event-based surveillance for infection disease?	yes=0, no=1
3.1.2	Does the region's government share its surveillance data with the neighboring regions?	yes=0, no=1
3.1.3	Does the region's government have an existing Action Plan in place for the surveillance and detection of viral outbreaks and disease?	yes=0, no=1
3.2	Scope of Diagnostic Methods	
3.2.1	Does the region have validated laboratory testing methods available?	yes=0, no=1
3.2.2	Does the region have laboratories with molecular diagnostic capacity available?	yes=0, no=1
3.2.3	Does the region use online diagnostic tools?	yes=0, no=1
3.3	Testing Efficiency	
3.3.1	Number of COVID-19 tests conducted per day.	Numeric
3.3.2	Are mobile diagnostic stations available for use in the region?	yes=0, no=1
3.3.3	Does the region have a significant shortage of COVID-19 tests?	yes=0, no=1
3.3.4	Does the region use local production of COVID-19 tests?	yes=0, no=1
3.3.5	Does the region have national laboratories available for COVID-19 testing?	yes=0, no=1
3.4	AI for Diagnostics and Prognostics	
3.4.1	Are there AI/ML healthcare initiatives related to COVID-19?	yes=1, no=0

COVID-19 Regional Safety Index: Parameters

3.4.2	Are there AI startups that create solutions to fight Covid-19?	yes=1, no=0
3.4.3	Does the region employ AI technologies and techniques in hospitals?	yes=1, no=0
3.5	Government Surveillance Technology for Monitoring	
3.5.1	Per capita quantity of surveillance cameras.	per 1000 people / approximate
3.5.2	Does the region's government routinely use face-recognition technology for surveillance?	yes=0, no=1
3.5.3	Does the region's government use mobile tracking (tracking of population's mobile phones) in its surveillance practices?	yes=0, no=1
3.5.4	Does the region's government utilize other AI-based surveillance methods?	yes=0, no=1
3.6	Reliability and Transparency of Data	
3.6.1	Does the region have a publically-available National Plan for COVID-19?	yes=0, no=1
3.6.2	Does the region's governments conduct daily briefings on the current status of the pandemic?	yes=0, no=1
3.6.3	Does the region have an established agency or Action Group responsible for COVID-19 prevention and treatment?	yes=0, no=1
3.6.4	Does the region conduct centralized collection of COVID-19 data?	yes=0, no=1
3.6.5	Does the Ministry of Health provide data on confirmed COVID-19 cases among healthcare workers?	yes=0, no=1
3.6.6	Does the Ministry of Health provide data on confirmed COVID-19 cases, critical cases and deaths on a daily basis?	yes=0, no=1

COVID-19 Regional Safety Index: Parameters

4	COVID-19 Healthcare Readiness	
4.1	COVID 19 Equipment Availability	
4.1.1	Quantity of Ventilator Stockpile.	Numeric
4.1.2	Number of hospital beds	per 1000 people
4.1.3	Does the region have sufficient availability of PPE (masks and gloves)?	yes=0, no=1
4.1.4	Does the region have sufficient availability of face shields?	yes=0, no=1
4.2	Mobilization of New Healthcare Resources	
4.2.1	Did the government request that medical students assist in COVID-19 patient treatment?	yes=0, no=1
4.2.2	Does the region have the necessity and ability to build additional hospitals for COVID-19 treatment?	yes=0, no=1
4.2.3	Did the region use military mobile stations for chemical and bacteriological cleaning?	yes=0, no=1
4.2.4	Does the region have the necessary infrastructure for surplus ventilator production?	yes=0, no=1
4.2.5	Does the region have the necessary infrastructure for surplus mask production?	yes=0, no=1
4.2.6	Does the region have the necessary infrastructure for the production of other surplus PPE?	yes=0, no=1
4.3	Quantity and Quality of Medical Staff	
4.3.1	Number of doctors.	per 1000 people

COVID-19 Regional Safety Index: Parameters

4.3.2	Number of nurses.	per 1000 people
4.3.3	Does the region have epidemiology faculty at the majority of their medical universities?	yes=0, no=1
4.3.4	Are epidemiology classes available for medical students not specializing in epidemiology?	yes=0, no=1
4.4	Level of Healthcare Progressiveness	
4.4.1	Does the region have evidence of recent healthcare advancements and optimizations?	yes=0, no=1
4.4.2	Healthcare Development Index score.	Index
4.4.3	Current health expenditure per capita.	in USD
4.4.4	Current health expenditure.	as % of GDP
4.4.5	HAQ (The Healthcare Access and Quality Index) - 2016.	Index
4.4.6	Pharmaceuticals spending per capita.	in USD
4.5	Level of Technological Advancement	
4.5.1	MRI number.	per million people
4.5.2	Quantity of ICU-CCB beds.	per 100,000 people
4.6	Epidemiology System Level of Development	
4.6.1	Global Health Security Index	GHS index score

COVID-19 Regional Safety Index: Parameters

5	COVID-19 Region Vulnerability	
5.1	Infection Spread Risk	
5.1.1	Container port traffic.	TEU: 20 foot equivalent units
5.1.2	Average number of international arrivals (incoming tourists) per year.	Number per year
5.1.3	Total transportation network size.	km
5.1.4	Does the region have a significant risk of power shortages?	yes=0, no=1
5.1.5	Does the region have a significant risk of medication shortages?	yes=0, no=1
5.2	Culture Specifics and Societal Discipline	
5.2.1	Literacy rate.	%
5.2.2	Proportion of population with tertiary education.	number per capita
5.2.3	Poverty rate.	Population living below national poverty line (%)
5.2.4	Does the region have religious or cultural practices that increase chances of infection risk or quarantine non-compliance?	yes=0, no=1
5.2.5	Human Development Index 2016.	Index
5.3	Level of Modern Sanitization Methods	
5.3.1	Does the region have access to basic sanitation facilities?	yes=1, no=0
5.4	Diseases	
5.4.1	Prevalence of diabetes.	% of population ages 20 to 79

COVID-19 Regional Safety Index: Parameters

5.4.2	Death rate due to endocrine disorder.	per 100,000 people
5.4.3	Prevalence of mental health and substance use disorders as a share of total disease burden, 2017.	Percent of total disease burden, 2017.
5.4.4	Incidence of tuberculosis.	per 100,000 people
5.4.5	Incidence of cancer.	per 100,000 people
5.5	Demography	
5.5.1	Size of Elderly Population.	% of total population
5.6	Societal Risks	
5.6.1	Is the region currently experiencing a political or election-based crisis?	yes=0, no=1
5.6.2	Is there a majoritively positive public sentiment regarding government COVID-19 strategy?	yes=0, no=1
5.6.3	Does the majority of the region's population support the current government?	yes=0, no=1
5.6.4	Does the region's government take into account diaspora as a factor in formulating its COVID-19 strategy?	yes=0, no=1
5.6.5	Does the region's government experience significant foreign pressure affecting its COVID-19 strategic decision making?	yes=0, no=1

COVID-19 Regional Safety Index: Proprietary Parameters

6	COVID-19 Emergency Preparedness	
6.1	Societal Emergency Resilience	
6.1.1	Proprietary metric #1	Not publicly disclosed.
6.1.2	Proprietary metric #2	Not publicly disclosed.
6.1.3	Proprietary metric #3	Not publicly disclosed.
6.1.4	Proprietary metric #4	Not publicly disclosed.
6.2	Emergency Military Mobilization Experience	
6.2.1	Proprietary metric #1	Not publicly disclosed.
6.2.2	Proprietary metric #2	Not publicly disclosed.
6.2.3	Proprietary metric #3	Not publicly disclosed.
6.3	Surveillance Capabilities (Scale, Scope and Technological Sophistication)	
6.3.1	Proprietary metric #1	Not publicly disclosed.
6.3.2	Proprietary metric #2	Not publicly disclosed.
6.3.3	Proprietary metric #3	Not publicly disclosed.
6.4	Previous National Emergency Experience	
6.4.1	Proprietary metric #1	Not publicly disclosed.
6.4.1	Proprietary metric #2	Not publicly disclosed.
6.4.1	Proprietary metric #3	Not publicly disclosed.

COVID-19 Regional Safety Index: Indicator Weighting Rationale

Each index category is assigned a weighting, representative of an “importance factor”, which is applied to each aggregate category score when the final, cumulative regional score is computed. Generally speaking, greater weights are given to indicators that have a greater effect on overall regional safety and stability as it is defined in the present assessment. Similarly, the composite indicators within each index categories are also given individual weights, in accordance with their perceived importance and effect on the specific topic being measured by the indicator’ parent category. While indicator weights are represented as a percentage, category weights are represented by integers for the purpose of obtaining round numbers that are more easily understandable.

The index's first two categories (COVID-19 Quarantine Efficiency and COVID-19 Government Efficiency of Risk Management) are given the highest weightings, of 2.2, respectively, because they measure the effectiveness of government responses made early in the overall timeline of COVID spread, which has a much greater (and, indeed, multiplative) effect on COVID-19 risk and safety than reactionary responses and management later on on the course of the pandemic. Meanwhile, COVID-19 Monitoring and Detection and COVID-19 Emergency Preparedness are given a weighting of 1.5, respectively, because they most closely measure the efficiency of ongoing responses, emergency relief efforts and real-time pandemic neutralization tactics, as well as the innate preventive infrastructure in place for rapid mobilization and coordination of crisis management efforts. Finally, COVID-19 Healthcare Readiness and COVID-19 Regional Resilience are given a weighting of 1.3, respectively, because while they are important to consider in the assessment of regional safety, they have comparatively less impact than the other categories. The high death rates in the USA and UK, for example, indicate that the tangible risk of infection and mortality in regions with a high degree of healthcare-related technological sophistication can still be high, despite the high level of medical modernization.

In future iterations of Deep Knowledge Group’s COVID-19 Regional Safety Assessment, the relative weightings of categories that reflect the efficiency of early crisis neutralization and mitigation efforts will be decreased in accordance with the growing timeline of the pandemic, and the weighting assigned to categories that reflect the efficiency of ongoing crisis management efforts will be increased proportionately.

COVID-19 Index Indicator Weight

1. COVID-19 Quarantine Efficiency		Weighting of Index Indicator
1.1	Scale of Quarantine	18%
1.2	Quarantine Timeline	17%
1.3	Criminal Penalties for Violating Quarantine	14%
1.4	Economic Support for Quarantined Citizens	18%
1.5	Economic and Supply Chain Freezing	15.50%
1.6	Travel Restrictions	17.50%

2. COVID-19 Government Efficiency of Risk Management		Weighting of Index Indicator
2.1	Level of Security and Defense Advancement	17%
2.2	Rapid Emergency Mobilization	16%
2.3	Efficiency of Government Structure	18%
2.4	Economic Sustainability	17%
2.5	Legislative Efficiency	16%
2.6	Political Stability	16%

COVID-19 Index Indicator Weight

3.	COVID-19 Monitoring and Detection	Weighting of Index Indicator
3.1	Monitoring Systems and Disaster Management	18%
3.2	Scope of Diagnostic Methods	15%
3.3	Testing Efficiency	18%
3.4	AI for Diagnostics and Prognostics	15%
3.5	Government Surveillance Technology for Monitoring	17%
3.6	Reliability and Transparency of Data	17%

4.	COVID-19 Healthcare Readiness	Weighting of Index Indicator
4.1	COVID-19 Equipment Availability	18%
4.2	Mobilization of New Healthcare Resources	17.50%
4.3	Quantity and Quality of Medical Staff	16%
4.4	Level of Healthcare Progressiveness	15%
4.5	Level of Technological Advancement	17%
4.6	Epidemiology System Level of Development	16.50%

COVID-19 Index Indicator Weight

5.	COVID-19 Regional Resiliency	Weighting of Index Indicator
5.1	Infection Spread Risk	16.50%
5.2	Culture Specifics and Societal Discipline	18%
5.3	Level of Modern Sanitization Methods	15%
5.4	Demography	15.50%
5.5	Chronic Diseases	18%
5.6	Societal Risks	17%

6.	COVID-19 Emergency Preparedness	Weighting of Index Indicator
6.1	Societal Emergency Resilience	27%
6.2	Emergency Military Mobilization Experience	23%
6.3	Surveillance Capabilities (Scale, Scope and Technological Sophistication)	27%
6.4	Previous National Emergency Experience	23%

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: Proprietary Data Overview

Five of the six top-level categories that comprise the index have been made publicly available in an open-source manner, all the way from the top level categories, down through their component indicators and parameters. However, Deep Knowledge group has only disclosed the component indicators of the sixth top-level index category (Emergency Preparedness), and not its bottom-level parameters, because they employ proprietary techniques that are the group's intellectual property and are intended only for internal use.

The Emergency Preparedness index category consists of four component indicators: Societal Emergency Resilience (whose parameters measure the regions' overall level of societal resilience, preparedness and experience with national emergencies), Emergency Military Mobilization Experience (whose parameters measure region's practical historical experience with mobilizing their military in order to help deal with national emergencies), Surveillance Capabilities (which measure regions' the scale, scope and technological sophistication of the region's government surveillance capabilities), and Previous National Emergency Experience (which measures region's practical historical experience with national emergencies).

It has always been Deep Knowledge Group's long-term mission to pursue its strategic agenda in a dual non-profit and for-profit manner, aiming to achieve positive impact in the support of progressive technologies for the benefit of humanity. It is for this reason that the decision was made to conduct the majority of the group's COVID-19 analytics in an open-source manner, free of charge, to provide the public in general and authorized organizations in particular with fact-based and unbiased information. However, the group also remains open to disclosing its proprietary metrics and analytical techniques to relevant organizations, and to conducting region-specific and topic-specific analytics and forecasting for responsible governmental bodies and departments.

COVID-19 Regional Safety Index: Conclusion and Future Methodology Development

Deep Knowledge Group's COVID-19 analytics generally, as well as the methodological underpinning of the present special case study, are in a continuous state of refinement, expansion and enhancement, and future COVID-19 rankings and special case studies will strive to incorporate a larger number of regions in its analysis, a broader scope of specific parameters, a wider array of topics and categories of analysis, and a greater scope of data-science techniques.

Continuously-Updated Sources of Data	New Analytical Frameworks
Deep Knowledge Group is constantly incorporating the latest findings from existing and new, reputable sources of public data as they become available, and regularly consulting with specific experts on the matter of advanced and qualitative aspects of the current COVID-19 pandemic, to remain on the forefront of shifting trends.	Deep Knowledge Group is developing and releasing entirely new ranking frameworks on additional topics relating to COVID-19 on a continual basis. In the coming weeks the group will reveal frameworks relating to such topics as regions' prospects for economic vulnerability and geopolitical instability as a result of the pandemic.
Enhancing of Analytical Techniques	Customized Consultancy
Deep Knowledge Group is continually refining and expanding both the breadth and depth the analytical techniques applied to its ranking frameworks, and periodically enhancing their capacity to handle and quantitatively assess highly complex and multidimensional data, as the complexity of the pandemic increases.	Deep Knowledge Group is open to disclosing its proprietary metrics and analytical techniques to select counterparties, and to conducting customized region-specific and topic-specific analytics and forecasting for interested governmental bodies and departments in order to derive as much humanitarian benefit from its activities as possible.

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Israel
Special Case Study
Covid-19 Safety Assessment

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

751
CUMULATIVE
SCORE

COVID-19: SWOT Analysis of Israel

STRENGTHS

- State readiness due to permanent attention to the possibility of armed conflicts. Advanced surveillance technology converted into epidemiological surveillance and monitoring technology.
- Anti-COVID-19 measures were introduced quite early in the overall pandemic timeline. Israel banned all air communications with Asia.
- Primary care is closely connected with preventive medicine.

WEAKNESSES

- Healthcare expenditure in Israel is lower than the OECD average. It was 7.6% of GDP in 2019. Also, there is a relatively high dependency on imports of medical goods.
- Quarantine efficiency does not have a remarkable performance due to implementation of partial rather than full lockdown.
- Presence of religious groups that refuse to obey mandatory quarantine measures present issues with quarantine compliance.

OPPORTUNITIES

- Uses of advanced healthcare technologies in Israel can consolidate the healthcare format of the future.
- Integration of digital health to the healthcare system would make it easier for people to achieve equal health and welfare.
- Adoption of P4 Medicine will increase healthcare system efficiency. P4 Medicine will use systems medicine to bring all 90-years-olds to a state of full mental and physical function.

THREATS

- Population aging arises the growing demand on the healthcare services, and there are also high rates of chronic diseases related to old age in non-aging populations, a key risk factor.
- The government acceptance rate has decreased a few points due to the 2019-20 electoral crisis.
- Easing the quarantine will cause more cases, as in Germany.

Israel: COVID-19 Quarantine Efficiency

Israel has a relatively high population density (416 people per square kilometer), which is exceeded only by Singapore for all regions included in the present analysis. This fact naturally and immediately hampers any quarantine efforts that the region puts into place.

However, in terms of actual quarantine measures implemented, Israel fares quite well. It imposed a partial quarantine (similar to Germany) quite early in the overall pandemic timeline, which is one of the most important factors impacting the overall effectiveness of quarantines in neutralizing infection spread. For example, Israel banned all air communications with Asia very early in the timeline of the pandemic. Israel also has a comparatively small state debt (26% of GDP), with further served to increase its score in this specific category.

These positive factors, however, are somewhat offset by a number of parameters where the region scores less favourably than other regions. Among these factors are the modest maximum fine in place for violating quarantine, the fact that Israel's government does not have total control over the entire region (a situation further hampered by the presence of religious groups that did not wish to obey mandatory quarantine measures), and due to the fact that Israel is a relatively export-oriented region (which in practice means that we can expect economic recovery and stabilization efforts to be more difficult than other regions that are less export-oriented).

Indicators	Points
Scale of Quarantine	10.10
Quarantine Timeline	10.63
Criminal Penalties for Violating Quarantine	7.67
Economic Support for Quarantined Citizens	6.30
Economic and Supply Chain Freezing	12.40
Travel Restrictions	8.30
Final Score	55.41
Weight	2.2
Final Points	122

Israel: COVID-19 Government Risk Management Efficiency

Israel has achieved a comparatively high score in this category specifically because it is in a constant state of readiness and preparedness for emergency situations due to regional geopolitical tensions and the region's nearly constant readiness for potential war and attack. This includes a high degree of emergency situation readiness both on the part of the military, and on the part of the general population.

In terms of the specifics of the current COVID-19 pandemic, Israel's history of prior attacks in particular has caused its government to have very practical, pragmatic and up-to-date policies and emergency action plans in place for chemical and biological warfare situations. Thus, what is presented in the previous paragraph is particularly suited to the case of Israel and in very few other regions of the world.

Israel has the legislative power to coordinate rapid nation-wide disaster mobilization efforts, in part due to previous military conflicts, which has helped in executing very swift and comprehensive emergency responses to the current COVID-19 pandemic. The region is a great model of what governmental action plans should be for rapid resources mobilization, and also about legislations and regulations for the cross-border screening of potentially pandemic pathogens, as well as biological and chemical weapons in general.

Indicators	Points
Level of Security and Defense Advancement	17.00
Rapid Emergency Mobilization	16.00
Efficiency of Government Structure	13.69
Economic Sustainability	11.31
Legislative Efficiency	16.00
Political Stability	12.66
Final Score	86.66
Weight	2.2
Final Points	191

Israel: COVID-19 Monitoring and Detection

Israel is suffering a shortage of tests, which is the case for many other regions. However, the region does score better than others in this specific category due to its abundance and diversity of tools for monitoring, including: face recognition tech, use of mobile surveillance, military assistance in conducting monitoring and detection, and its use of drones. Israel shows the best values for the category in question, with Singapore just behind and Germany in third place.

One of the aspects in which Israel stands out the best from the rest of the regions, in terms of monitoring and detection, is the high value that testing efficiency sub-indicators take due to the battery of methods previously mentioned. On the other hand, Israel is one step behind China, Canada, Hong Kong and Netherlands regarding government surveillance technologies for monitoring, but this may be due to the difficulty in finding records about the number of cameras per capita, which affects the indicator value.

Epidemiological surveillance is one of the most determining factors in the efficiency of the government response to health outbreaks, and in Israel we find an optimal management model that should be imitated by the rest of the regions in the fight against this emerging pathology. Lacking a vaccine or efficient treatments for emerging infectious diseases, the only cure that exists is epidemiological prevention.

Indicators	Points
Monitoring Systems & Disaster Management	18.00
Scope of Diagnostic Methods	15.00
Testing Efficiency	14.40
AI for Diagnostics and Prognostics	15.00
Government Surveillance Technology for Monitoring	15.98
Reliability and Transparency of Data	17.00
Final Score	95.38
Weight	1.5
Final Points	143

Israel: COVID-19 Healthcare Readiness

Israel scores are fairly low in this specific category, compared to the other regions included in the analysis. This is, in part, due to the fact that the region has a lower Global Health Security Index than others (metric that tries to represent the health security status of a region against epidemic scenarios), and because the size of Israel's ventilator stockpile is comparatively low. An increase in the per capita budget linked to health care and aimed at increasing the availability of health resources and equipment could be an opportunity for Israel to be in a more optimal position to face future potential resurgences of COVID-19 infection, which will almost certainly occur, although the specific size and intensity of such resurgences remain to be seen.

Similarly, an increase in the expenses allocated for importing medical professionals could be, although not yet a requirement or necessity, a proactive measure that would allow the region to optimize its response to future outbreaks of COVID-19. Israel presents a good supply of doctors in relation to the number of inhabitants, but it is the region with the lowest number of nursing personnel in the pool evaluated, being only ahead of Vietnam. The same is true of the HAQ (Healthcare Access and Quality Index), which is based on death rates from multiple causes that could be avoided by timely and effective medical care. A greater number of nursing personnel and a moderate increase in the percentage expenditure of GDP in health could improve the early response to health emergencies and thus significantly strengthen the region's position to resist eventualities.

Indicators	Points
COVID 19 Equipment Availability	11.12
Mobilization of New Healthcare Resources	17.50
Quantity and Quality of Medical Staff	11.38
Level of Healthcare Progressiveness	9.67
Level of Technological Advancement	7.90
Epidemiology System Level of Development	7.80
Final Score	65.38
Weight	1.3
Final Points	85

Israel: COVID-19 Region Resiliency

Israel scores comparatively well in the “Regional Resiliency” category for a number of reasons. Firstly, its overall level of touristic flow is low, which puts the region in a more optimal position in terms of the number of cases present at the start of the pandemic. Secondly, a high proportion of its population has attained tertiary education, which predisposes its population to understand and follow imposed guidelines. However, the latter is in part hampered by the prevalence of religious groups, which creates a factor of opposition to guidelines in cases where those mandates conflict with these groups’ religious and cultural practices and beliefs.

The region’s elderly population is quite small (12% of the general population), which puts it at a lower risk of massive deaths due to increased elderly vulnerability to COVID-19. However, the region also has a mid-level prevalence of diabetes and mortality due to endocrine disorders, which slightly lowered its score in this category.

However, Israel’s ultimate score was somewhat lowered by the current political and election crisis occurring in the region, as well as the generally low government acceptance/approval rate of the public, which is in part due to the recent resignation of Israel’s Minister of Health. In this study we observe that Israel requires greater government consolidation, and greater social legitimization of its current political program, which is a direct consequence of the successive pressures that the region has been experiencing in recent years.

Indicators	Points
Infection Spread Risk	13.21
Culture Specifics and Societal Discipline	13.50
Level of Modern Sanitization Methods	15.00
Demography	11.19
Chronic Diseases	7.93
Societal Risks	7.80
Final Score	68.63
Weight	1.3
Final Points	89

Israel: COVID-19 Emergency Preparedness

Our assessment of Israel's readiness to tolerate the impact of health emergencies analogous to that caused by COVID-19 yields highly positive values, and its score is among the most remarkable of the 20 regions.

The societal emergency resilience is at the maximum point reached by the set of regions. We consider this to be a consequence of an optimal combination related to: psychological preparation of the community in cases of humanitarian adversities that involve a broad mobilization of the national security forces; a good adaptability of the citizens to cope with the consequences of changing and dangerous situations, as well as to cooperate with government provisions related to national security; a systemic resilience to protracted or medium-term crises.

Israel demonstrates substantial experience in relation to military mobilization for emergencies, and pre-existing plans, policies and experience against chemical and biological attacks due to the constant geopolitical tensions to which they are subjected, as well as exposure to circumstances that have compromised its military forces in the past.

These are all scenarios that put the region in a state of constant preparedness that is very favorable and definitely an opportunity to respond more efficiently to the consequences of COVID-19 and achieve a prompt recovery.

Indicators	Points
Societal Emergency Resilience	27.00
Surveillance Capabilities (Scale, Scope and Technological Sophistication)	15.33
Emergency Military Mobilization Experience	27.00
Previous National Emergency Experience	11.50
Final Score	80.83
Weight	1.5
Final Points	121

Israel: COVID-19 Recommendations

- A phenomenon that powerfully calls attention regarding the global economic and health crisis generated by COVID-19 is the reorientation of governmental and private capital efforts towards technological and scientific R&D for the health industry, particularly of those interests that were previously focused on the military defense industry.
- Israel is a clear example in this regard, although we consider that this strategic positioning should not be only conjunctural and temporary, but a process that must be deepened in the months to come.
- The gradual loss of funds from its single health care payer insurance program, smaller number of nurses and doctors per capita than most developed regions, and shortages of hospital beds (in which 100 percent were occupied in most hospitals at the beginning of the quarantine), are problems that can be addressed in the short term.
- One of Israel's central weaknesses is the fact that, despite not having a heavily aging population, there is a serious underlying epidemiology of chronic pathologies associated with aging, such as diabetes or endocrine disorders, which predisposes to higher morbidity and mortality rates product of COVID-19.
- As previously stated, the strategies for defense and national security are rapidly changing in this new geopolitical panorama, and the boundaries between the military and health industries are beginning to blur. Those governments that fork their military development towards this new category of safety-related challenges will have more efficient outcomes.

Index Categories: All Scores	Points
Quarantine Efficiency	122
Government Efficiency of Risk Management	191
Monitoring and Detection	143
Healthcare Readiness	85
Regional Resiliency	89
Emergency Preparedness	121
Cumulative Score	751

Israel: COVID-19 Conclusions

- One of the most positive factors that we have observed in the pool of regions analyzed, but that takes even greater dimensions in Israel, has been the political will and government capacity to develop specific mechanisms for engagement between the public and private sectors in general terms, and with the tech sector in particular. Although the primary reason has been the production of emergency medical equipment, GovTech solutions and surveillance solutions to contain the infection spread, as already mentioned, we believe that this modality may progressively extend to other challenges, such as global coordination for development of a vaccine; a central element that has not yet been achieved.
- A peculiarity that strongly draws attention with respect to Israel is the strong redirection of governmental and private capital efforts that has occurred during the last months, from the military and security industry to the scientific and technological discovery and development for the healthcare industry. This trend may be signaling a new format for building national security and defense strategies, which will gradually deepen into the future.
- Israel's high ranking reflects, in large part, its practical experience and preparedness in rapidly mobilizing resources for national and regional emergencies, and the preparatory infrastructure (in terms of both policy and planning, as well as tangible resources). Israel denotes a very well established experience in managing this type of resources and in terms of military mobilization for emergencies. Its pre-existing plans, policies and experience against chemical and biological warfare due to constant geopolitical tension put the region in a state of readiness that is highly favorable to respond more efficiently to the unexpected consequences of COVID-19.
- It is important to mention that Israel is relatively isolated from the outside world with Ben Gurion being its sole major international airport: with a single airport destined for international flights, much greater efficiency and capacity to monitor incoming flights can be achieved. Israel can take advantage of this when it considers easing restrictions in the future.

Israel: COVID-19 Conclusions

- While Israel's universal health system is among the most prestigious in the world, and the quality of its medical staff is enviable, there has been a gradual loss of funds from the single health care payer insurance program in Israel, a lower number of nurses and doctors per capita than most developed regions included in our study, as well as a comparatively low size of ventilator stockpile, and Israel experienced a shortage of hospital beds in which 100 percent were occupied in most hospitals at the beginning of the quarantine. An increase in the percentage expenditure of Israel's GDP on health could markedly improve the region's early response to health emergencies and associated economic emergencies. These issues could be addressed in the short term.
- Primary care is closely connected with preventive medicine in Israel, and the easy access to patient data as well as the prevalence of highly qualified and educated doctors results in better monitoring and detection, and better health outcomes.
- Although Israel does not have a marked level of population aging, which is an advantage over many other European countries, its relatively high prevalence of certain chronic pathologies generally present in old age draws attention. This is a risk factor that compromises the younger sectors of the population, which would not be classified within the age group at risk.
- The efficiency of the quarantine in Israel has allowed for a recovery of two thirds in the number of cases per day, and this led the government to relax its restriction measures on May 5th, 2020. Theoretically, return flights to Israel would be allowed for citizens and residents; despite that, most of those flights are canceled. At the same time, easing of restrictions would again allow social gatherings of up to 20 people in public spaces, and the reopening of libraries, gyms, malls, zoos, hotels, guest houses, kindergartens, and national parks. The easing of restrictions taken in early May could be Israel's biggest risk, and will cause more cases as in all the regions where social conglomerations have occurred.



Germany
Special Case Study
Covid-19 Safety Assessment

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



COVID-19: SWOT Analysis of Germany

STRENGTHS

- The community is politically participatory and very willing to heed the recommendations and regulations imposed by the government in national emergency scenarios.
- Economic strength allows the implementation of financial aid to the industry and the community, establishing a short-time work and basic income scheme that alleviates the crisis.
- Very well established ventilators industry.

WEAKNESSES

- Self-employed people with low income and migrants have low accessibility to social insurance in comparison with other citizens.
- EU integration and dependence.
- Germany shows an average comparative performance in relation to the efficiency of its quarantine; the score is not low but can be improved.

OPPORTUNITIES

- Considerable financial, human and organizational resources for enhancing the healthcare system in Germany.
- Large number of hospitals, physician and well trained nurses to provide quality services to the population.
- Large investments in R&D linked to personalized medicine and disruptive technologies, to integrate into the public health system.

THREATS

- Very marked population aging, which also occurs in the medical workforce. The medium-term extensive implementation of P4 Medicine and digital health is a solution.
- Immigration can be challenging to control the pathogen's re-entry into the region. The health system must be up to the task.
- Easing the quarantine will bring more cases, as was stated in late April and early May after meetings of protesters in Germany.

Germany: COVID-19 Quarantine Efficiency

It is important to consider that the population density of Germany is slightly more than half of that in Israel; that is, approximately 233 inhabitants per square kilometer. This yields considerably higher values for the parameter in question, and has an overall favorable impact on the performance of the "Scale of Quarantine" parental indicator compared to that of Israel; 16.51 points the first against 10.10 in Israel, as already analyzed.

Germany is one of the regions that shows average comparative performances in this category, just one point ahead of Vietnam and Norway. Despite having established a partial quarantine relatively early in the race against the pandemic, what has already been mentioned is one of the most decisive real factors in the fight against the spread of viral infections, poorer values for other sub-indicators cause Germany to be somewhat behind multiple regions in this category.

Regardless of those sub-indicators, Germany's performance is overall good: the region has established considerably more severe sanctions against citizens violating the legal norms of preventive isolation, presents a greater number of security force personnel per capita, and a decisive factor that has been favorable for quarantine efficiency is that compliance with social distancing laws has been promoted through a reduction in working hours, economic support to citizens and flexibility of tax rates, achievements by which Germany stands out from the other regions in our ranking.

Indicators	Points
Scale of Quarantine	16.51
Quarantine Timeline	4.25
Criminal Penalties for Violating Quarantine	10.24
Economic Support for Quarantined Citizens	13.02
Economic and Supply Chain Freezing	9.30
Travel Restrictions	6.12
Final Score	59.45
Weight	2.2
Final Points	131

Germany: COVID-19 Government Risk Management Efficiency

In this category, Germany performs very favorably just 3 points ahead of Israel; it comparatively presents one of the highest scores, most likely due to measures taken by state agencies in the course of the crisis.

For example, the expansion of the "Emergency Information and News App" (NINA for short) and its supplementation with information on the COVID-19, carried out by the Federal Office for Civil Protection and Disaster Assistance (BBK), and thus responding to the growing need for comprehensive and up-to-date information in connection with the pandemic. Also the confirmation of a short-time work scheme, known as Kurzarbeit, which results in millions of secured jobs and protects the region from the costly effects of unemployment. Germany has a strong welfare state, very solidly established, with highly legitimate, functional institutions, and the same applies to its economy, which is why they are in a position to perform very favorably in terms of government efficiency for decision-making at the time to counteract the effects of COVID-19.

Some of the factors that slightly worsen Germany's performance with respect to Israel are in particular the lower capacity of the state to adopt new surveillance laws (consequence of being immersed in a very different geopolitical context), as well as a much higher percentage of economic debt over total GDP.

Indicators	Points
Level of Security and Defense Advancement	17.00
Rapid Emergency Mobilization	14.57
Efficiency of Government Structure	14.26
Economic Sustainability	11.38
Legislative Efficiency	16.00
Political Stability	14.92
Final Score	88.13
Weight	2.2
Final Points	194

Germany: COVID-19 Monitoring and Detection

Germany's performance for the COVID-19 outbreak monitoring and detection category is on par with the case of Israel, presenting well-established vigilance and disaster management systems; both in terms of optimized emergency management in individual cases and mass healthcare during disaster management, the German proactive medicine scheme with health agents approaching the patient directly and early, even within the same foci incidence of pathologies, has been a quality standard of medical care and a determinant of the high survival of patients for a long time 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.

Despite the above, one of the factors that Germany has an opportunity to resolve at the moment is linked with the efficiency of testing. We can see that while in Israel approximately 55K tests per million individuals are being performed, in Germany this value falls to just over 3K tests per million; a very strong detection program, but there is still a need for a more massive implementation.

Indicators	Points
Monitoring Systems & Disaster Management	18.00
Scope of Diagnostic Methods	15.00
Testing Efficiency	13.37
AI for Diagnostics and Prognostics	15.00
Government Surveillance Technology for Monitoring	13.60
Reliability and Transparency of Data	17.00
Final Score	91.97
Weight	1.5
Final Points	138

Germany: COVID-19 Healthcare Readiness

The values for Germany in the evaluation of this category serve to highlight the deficiencies of the other regions, since Germany is one of the best positioned in terms of healthcare readiness but, still presenting higher values than the rest, those are probably lower than expected.

The approach of this study highlight that health systems of the regions in our pool would not be sufficiently prepared to face the emerging issue of epidemiological crises, or that they would be to a lesser extent than is assumed a priori. This exposes a substantial weakness that emerges from our analysis, perhaps associated with some central recommendations of this report: that health care systems, scientific and technological development linked to human health, and associated costs that must be addressed by states and governments, have been found far from its optimal state for a long time and these regions are still in time to take measures to reverse this serious vulnerability. A vulnerability that has the capacity to unbalance regional economies but also global geopolitics.

Germany shows almost no weaknesses with respect to the rest of the regions, positioning itself a single point below Switzerland in terms of the qualitative and quantitative dimensions of its medical staff, and two below Norway, and being less than a point ahead of Switzerland in terms of the overall level of healthcare progressiveness. Despite this, it should be noted that none of these regions have the highest level of development relative to the epidemiological system according to our indicators and parameters.

Indicators	Points
COVID 19 Equipment Availability	17.10
Mobilization of New Healthcare Resources	17.50
Quantity and Quality of Medical Staff	14.08
Level of Healthcare Progressiveness	12.59
Level of Technological Advancement	11.15
Epidemiology System Level of Development	10.89
Final Score	83.31
Weight	1.3
Final Points	102

Germany: COVID-19 Region Resiliency

Germany turns out to be a region with average resilience compared to the rest of the pool as indicated by the measurements of the present study, and the apparent cause is a multiplicity of diverse factors, some of which will be briefly summarized below.

Firstly, there is a probability in Germany of a greater negative impact of the emerging COVID-19 on the community and on the health system, in terms of the mortality rate, due to the marked aging of the population. Although it is not the only region that presents this characteristic, since other regions such as Denmark or Hungary show similar levels for this trait, and even the region of Japan is worse positioned, this is one of the variables that determine more decisively on the value thrown by the category. Many will think that nothing immediate can be done to amortize the risks associated with this demographic situation. In this report, we point out that yes, it can be done, and we outline the way.

In addition to the above, there is a relatively high risk of COVID-19 spreading in Germany compared to most European countries, with some exceptions, mainly due to the easing of restrictions on social distancing for economic reasons, although in Germany there are no considerable power shortages or medical equipment shortages risks according to the evaluated data, and this places it in a better position than Hungary, Denmark, the Netherlands and Norway.

Indicators	Points
Infection Spread Risk	11.09
Culture Specifics and Societal Discipline	15.16
Level of Modern Sanitization Methods	14.29
Demography	5.02
Chronic Diseases	9.1
Societal Risks	17.00
Final Score	71.66
Weight	1.3
Final Points	105

Germany: COVID-19 Emergency Preparedness

Germany's degree of emergency preparedness expressed by our indicators and parameters is not optimal, but far from bad. Although Chancellor Angela Merkel has urged Germans on some occasions to show endurance and discipline to get through the pandemic, mainly due to concerns that they are decreasing their efforts at social distancing after the federal government agreed to reopen stores during the third week of April, the cooperation of civilians with partial confinement rules has been high, showing a good tolerance to crises in the medium term.

As part of the support that the German military can offer to civil society, the military's procurement office, which is responsible for the purchase of military weapons and equipment, arranged € 241 million to find medical protective gear on the global market at the end of March, which the Health Ministry is to distribute among clinics and doctors' offices across Germany, and the Bundeswehr has also started food and camp beds provisioning, mobile doctors' facilities, and is storing medical goods in its barracks. The German armed forces have been showing active participation in the defense of the national security, but our qualitative parameters warn of their lack of previous experience in cases of national emergency equivalent to the COVID-19 outbreak. There have been no recent previous events relating to internal border epidemic crises in Germany, and this casts uncertainties about the efficiency of national defense systems to optimally respond to challenges and to ensure a rapid return to normality in the post-pandemic era.

Indicators	Points
Societal Emergency Resilience	20.25
Surveillance Capabilities (Scale, Scope and Technological Sophistication)	7.67
Emergency Military Mobilization Experience	13.50
Previous National Emergency Experience	11.50
Final Score	52.92
Weight	1.5
Final Points	79

Germany: COVID-19 Recommendations

- Prioritize R&D for preventive and treatment measures aimed specifically at the elderly to minimize the impact of Germany's large aging population.
- Germany is conducting nationwide testing for COVID-19 antibodies since April, becoming the first European country to do so. The serological tests are helping officials in monitoring the infection spread. Germany has tested for COVID-19 on a larger scale than most regions in an attempt to slow the spread of the virus and this has resulted in very positive outputs. Despite this, there is a need to further expand the scope of testing specifically for senior citizens.
- It is important to focus efforts on limiting spread from neighboring European countries by restricting access to tourists, domestic travel and port container traffic.
- Germany's Healthcare Readiness score is generally good, but it lags behind other regions specifically in terms of epidemiological control. The region should prioritize funding and resources to optimize its epidemiological surveillance procedures.
- While Germany has been recognized for its efforts at very early testing within the overall quarantine timeline, there is room for improvement in the scale and breadth of testing. The region should try and ramp up the number of tests per million people as it continues easing lockdowns and coordinating economic unfreezing, with a prioritized focus on segments of the population returning to work.

Index Categories: All Scores	Points
Quarantine Efficiency	131
Government Efficiency of Risk Management	194
Monitoring and Detection	138
Healthcare Readiness	102
Regional Resiliency	105
Emergency Preparedness	79
Cumulative Score	749

Germany: COVID-19 Conclusions

- As in Israel, one of the most positive factors that we have observed in Germany has been the political will and the capacity of the government to implement mechanisms for joint participation of the public and private sectors. The number of initiatives to find immediate solutions to the consequences of the COVID-19 health and economic crisis have multiplied strongly in the previous months. In Germany, scientific research and development of solutions have been prioritized, both aimed at taking preventive measures and treating affected citizens, mainly those who are part of risk groups, to minimize the impact of COVID-19 on aged populations.
- Germany's armed forces have been actively participating in containing the epidemiological outbreak, although they lack experience in equivalent national emergency cases. The region does not present pre-existing government plans or policies sufficiently conditioned to face emergencies equivalent to the COVID-19 pandemic, such as threats of chemical and biological warfare, and this casts uncertainties about the efficiency of national defense systems to optimally respond to challenges and to ensure a rapid return to normality in the post-pandemic era. Despite the above, they efficiently take part in the matter and the military's procurement office is allocating funds valued at millions in medical supplies.
- Germany imposed a relatively early partial quarantine in the race against the pandemic, one of the most decisive real factors in the fight against the spread of viral infections. In addition, it has established severe sanctions against civilians who violate the legal norms of preventive isolation, and is one of the regions with the highest number of security forces per capita. These factors determine Germany's good score in terms of the efficiency of its quarantine.
- The community is highly participatory and responds positively to government determinations. There is good cultural resilience to emergency scenarios. Nonetheless, some expressions of social opposition to the quarantine occurred at the end of April have caused increases in the infection rate. In addition, after the easing of its lock-down efforts in early May 2020, Germany saw its number of new daily cases triple in a single day. These risks should be mitigated.

Germany: COVID-19 Conclusions

- In response to the abrupt drop in employment caused by COVID-19, the German government implemented a short-time work scheme, known as Kurzarbeit, to appease the consequences on family economies, and ensure that social distancing measures are economically sustainable. This temporal reduction of the regular working time allowed companies to reduce personnel costs, while at the same time maintaining their workforce. The workers were partially compensated for their wage losses by a Federal Employment Agency plan that assigns financial aid proportional to the amount of lost salary. The government is efficiently protecting the region from the high costs of unemployment.
- Until 2018, remote health consultations were not allowed in Germany. Much has changed since then due to the relaxation of these restrictions, and the current crisis accelerates the process of digitization of health services. Telemedicine platforms, bots and IT-systems are being widely used in the region to guarantee medical care remotely, trace contagion routes, identify points of major risk, and allow efficient crisis management. Germany shows a remarkable epidemiological control of the health crisis as a result of its promotion of digital ecosystems for the resolution of conflicts derived from COVID-19. Even without the best-ranked epidemiological system of the selected set of regions, the epidemiological monitoring of Germany has been above average due to this digitization process.
- Germany ranks among the top of the regions included in the analysis in terms of the total number of cases, but a closer look shows that its mortality rate is considerably lower than in the rest of the regions, especially when compared to sites that reported a similar number of cases. The region's continuous efforts and investments in the early monitoring of COVID-19 transmission and its adaptability to integrate new technologies to track infection chains result in its very remarkable degree of regional safety.
- The main threats to safety in the region are two: the pronounced population aging (a very common risk factor among European countries), and the reversal of restrictions on social distancing.



Switzerland
Special Case Study
Covid-19 Safety Assessment

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 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 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 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 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 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

COVID-19: SWOT Analysis of Switzerland

STRENGTHS

- There is guaranteed accessibility to high standard healthcare services for the entire community.
- Large capacities to mobilize new health resources.
- The government shows optimal relative performance of risk management. It has enacted financial assistance to mitigate the effects of COVID-19 on the Swiss economy.

WEAKNESSES

- Decentralized nature of the Swiss health system makes data collection difficult.
- High rates of chronic diseases increases the risks of the region.
- Government spending on preventive health is low. Switzerland should consider adopt P4 Medicine in their public hospitals and clinics.
- Geographical interconnection with Italy and France.

OPPORTUNITIES

- Digital health offer many opportunities to improve healthcare.
- Home to many advanced private clinics. It already presents the resources to implement P4 Medicine in the public sector.
- Capacity to gradually deepen basic income policies and thus revive the economy, stimulating the digital consumption of goods and services.

THREATS

- Early quarantine easing. The economic reopening process requires establishing a robust epidemiological surveillance plan. Otherwise, infection rates will rise as in Germany.
- Marked population aging.

Switzerland: COVID-19 Quarantine Efficiency

Our analytical evaluation shows that Switzerland presents one of the most favorable values for the category in question, just behind New Zealand and surpassing Denmark by only a magnitude of less than 3 points; this is so even while it is stated that Switzerland has been containing one of the greatest magnitudes in number of cases per million individuals.

The success of Switzerland's national preventive scheme has enabled the government on April 16 to announce the easing of restrictions in a gradual three-step plan. The first stage of that plan began on April 27, allowing the reopening of activities for those who work in contact with other individuals, but not in large numbers; the second stage will begin on May 11, assuming that the first step has been successful, and the third is dated June 8 with the relaxation of restrictions on schools, universities and others.

This has been achieved with fewer police officers per capita than in most of the European countries evaluated, without the exposure of civilian volunteers and with contrasting social support for the measures, making it unnecessary to define legal penalties for the violation of social isolation. Switzerland has proven to be a fundamental actor in the fight against COVID-19 and its management scheme a model to keep in view, but it is important that the reopening process of the Swiss economy is carried out with caution, assessing the dynamics of the virus, otherwise all the sacrifice and joint work of citizens, government and organizations will have been meaningless.

Indicators	Points
Scale of Quarantine	15.36
Quarantine Timeline	10.63
Criminal Penalties for Violating Quarantine	6.42
Economic Support for Quarantined Citizens	10.44
Economic and Supply Chain Freezing	12.40
Travel Restrictions	10.01
Final Score	65.26
Weight	2.2
Final Points	144

Switzerland: COVID-19 Government Risk Management Efficiency

The Swiss federal government shows optimal relative performance according to our multivariable indicator. 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 to help them survive the short-term impact of the pandemic, a measure that includes loans with limited bureaucracy and without or very low interest rates. As in the rest of the world, the impact of the health crisis on employment has been harsh in Switzerland - although its magnitude has been much minor in this region and in our pool of European countries in general compared to Eastern and American ones due to governmental action plans to conserve jobs and financially assist citizens.

The Swiss economic program consists of a rescue package of 42 billion CHF, which includes money to replace lost wages for employed and self-employed people, short-term loans to businesses, delay for payments to the government and support for organizations. Clearly, the performance of the Swiss government could improve, and we find two weak points that can be addressed with diverse approaches. The first is related to economic sustainability, the second to legislative efficiency. Emphasizing these two highlighted areas, the absolute performance returns of the government could markedly improve in fighting crises equivalent to that of COVID-19.

Indicators	Points
Level of Security and Defense Advancement	17.00
Rapid Emergency Mobilization	14.29
Efficiency of Government Structure	14.65
Economic Sustainability	9.64
Legislative Efficiency	12.00
Political Stability	15.15
Final Score	82.73
Weight	2.2
Final Points	182

Switzerland: COVID-19 Monitoring and Detection

The assessment of the efficiency of monitoring and detection systems implemented by the Swiss government, the advanced disaster management systems, epidemiological surveillance schemes and others, yields values for Switzerland that, despite being comparatively high, have scope for improvement. The Swiss scheme is at the forefront of the European countries analyzed in this study, only behind Germany and separated from it by just one point of difference in the corresponding category.

Nevertheless, the main weakness of the Swiss program has been the determination 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, and it is necessary for Switzerland to establish coherent programs for the monitoring, detection and neutralization of new cases as potential outbreaks occur in the months ahead.

Thus, without a well-consolidated strategy, it is not advisable to ease or reverse the quarantine state, widely supported by citizens, since eventual outbreaks would jeopardize the totality of what was achieved and the institutions would lose social legitimacy. It would be better to proceed very gradually in the revival of the economy due to the risks of reversing any stage or sub-stage of social restrictions, and strengthen a strategy for the epidemiological survey of the asymptomatic population along the way.

Indicators	Points
Monitoring Systems & Disaster Management	18.00
Scope of Diagnostic Methods	15.00
Testing Efficiency	13.45
AI for Diagnostics and Prognostics	15.00
Government Surveillance Technology for Monitoring	12.58
Reliability and Transparency of Data	17.00
Final Score	91.03
Weight	1.5
Final Points	137

Switzerland: COVID-19 Healthcare Readiness

Some of the best-defined strengths of the Swiss health system, with regard exclusively to its readiness for combating epidemiological outbreaks of COVID-19, are its capacities to mobilize new health resources such as new infection hospitals, mobile military stations for microbiological treatment and cleaning, and good infrastructure provision for mass production of masks and other protective sanitary equipments.

Even standing out more than the above, its high level of healthcare progressiveness is a trait to highlight in our ranking, being at the forefront of the advanced pool of regions addressed in the present study. Although Switzerland has not led recent optimizations of its health system, which would be a point in favor of great relevance in this framework, it has one of the most favorable Healthcare Development Index, an good balance between budgetary spending allocated to health as GDP percentage and quality of medical care, and is on par with Canada and Norway in terms of its HAQ Index (Healthcare Access and Quality Index). In addition, it also presents high values regarding the quality and quantity of the medical staff, as evidenced by our parameters.

To go beyond its constraints, Switzerland could improve its level of technological advancement for health, which regarding certain particularities scores slightly below those for other regions of our select pool. Further, there is a need to promote the transfer of state-of-the-art healthcare technology from private P4 Medicine clinics to public hospitals.

Indicators	Points
COVID 19 Equipment Availability	14.40
Mobilization of New Healthcare Resources	17.50
Quantity and Quality of Medical Staff	14.99
Level of Healthcare Progressiveness	12.19
Level of Technological Advancement	8.68
Epidemiology System Level of Development	11.06
Final Score	78.82
Weight	1.3
Final Points	97

Switzerland: COVID-19 Region Resiliency

Regarding the intrinsic resiliency of Switzerland, as evidenced by the indicators and parameters with which we have subjected the data sets to analysis, only the regions of Singapore, Saudi Arabia and United Arab Emirates exceed the favorable magnitudes obtained by the central european region.

Comparatively, 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.

In that way, this should serve as a warning not for Switzerland only, but for the entire community of the European states and the developed world; the silver tsunami these regions have experienced is a main risk factor, and the necessary means must be implemented for a digital epidemiology and surveillance of ageing diseases in addition to a digital epidemiology and surveillance of the Coronavirus Disease. Disruptive technologies associated with digital health, AI and cutting-edge biotechnology advances are within the reach of these regions to establish, at very low cost, better defined risk groups among the elderly, optimize clinical interventions, and point out the way to the rest of the world.

Indicators	Points
Infection Spread Risk	12.78
Culture Specifics and Societal Discipline	16.46
Level of Modern Sanitization Methods	14.94
Demography	5.17
Chronic Diseases	11.87
Societal Risks	17.00
Final Score	78.21
Weight	1.3
Final Points	93

Switzerland: COVID-19 Emergency Preparedness

As in the case of Germany, Switzerland's degree of emergency preparedness is far from being among the lowest, but there is still a long way for improvements.

Although the indicator of societal resilience to emergencies is above of the expressed by the European countries considered in the studied set, for example when considering the value shown by Germany, the region lacks experience regarding the mobilization of armed troops in national territory due to emergencies analogous to COVID-19.

The military apparatus has not faced equivalent events neither abroad nor borders within, such as assaults or military operations that require planning or policies around chemical or biological warfare, nor has it recorded experience in situations in which the military forces are compromised or diminished.

This is evidently another argument for which our central recommendation is decisively valuable: it is essential to carry out an exhaustive monitoring of possible outbreaks of the viral agent, dedicate all efforts to its early detection and eradication, mainly during periods of quarantine-related restrictions easing, as well as to prevent the contagion and leakage channels linked to asymptomatic individuals, and amortize the effects on senior citizens over the next few years - that is, establishing a very solid digital sanitary program for the diagnosis, prognosis, treatment and epidemiological monitoring and vigilance of pathologies associated with the elderly.

Indicators	Points
Societal Emergency Resilience	20.75
Surveillance Capabilities (Scale, Scope and Technological Sophistication)	7.67
Emergency Military Mobilization Experience	20.25
Previous National Emergency Experience	11.50
Final Score	59.67
Weight	1.5
Final Points	90

Switzerland: COVID-19 Recommendations

- As Switzerland continues easing lockdown efforts, the region should continue its widespread monitoring and testing. A large proportion of citizens are attentive to the government's provisions in this regard, since they are not willing to sacrifice what has been achieved during the more than two months of quarantine.
- The region should also dedicate significant efforts to the early detection and eradication of COVID-19, mainly during those periods of quarantine-related restrictions easing, as well as to prevent the contagion and leakage channels linked to asymptomatic individuals.
- Importantly, Switzerland should consider amortizing the effects on senior citizens over the next few years - that is, establishing a solid digital health program and public P4 Medicine services for the diagnosis, prognosis, treatment and epidemiological monitoring of age-related diseases.
- The Swiss government could improve its performance in epidemiological surveillance by implementing, to a greater extent, the appropriate technologies for monitoring; face recognition technologies have been very controversial, but their implementation in the risk areas may be urgent, always safeguarding security and privacy.
- Despite being home to many technologically advanced private health clinics focused on preventive medicine, Switzerland's government spending on preventive health is still comparatively low. Switzerland should consider developing a specific incentive mechanism to leverage and adopt the preventive medicine technologies in use throughout their public hospitals and clinics.

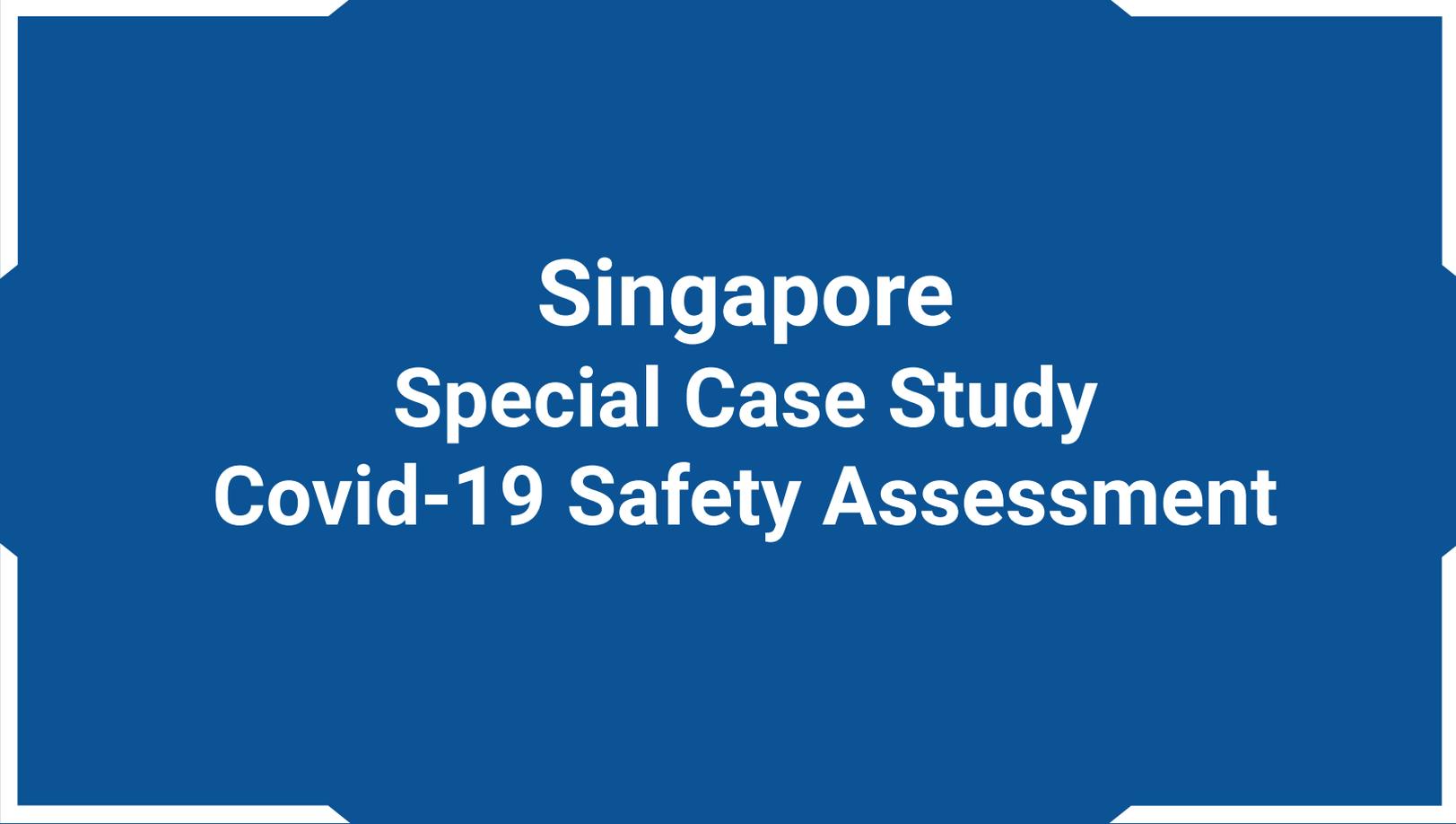
Index Categories: All Scores	Points
Quarantine Efficiency	144
Government Efficiency of Risk Management	182
Monitoring and Detection	137
Healthcare Readiness	97
Regional Resiliency	93
Emergency Preparedness	90
Cumulative Score	742

Switzerland: COVID-19 Conclusions

- While Israel and Germany show high levels of government will and capacity to implement mechanisms for cooperation between the public and private sectors, Switzerland is comparatively lacking in this regard. More specifically, the region is not equipped with robust mechanisms to establish incentives that allow the transfer of high-level P4 Medicine resources from private clinics to the public hospital sector. The government's health budget could increase, in order to achieve feasibility in strengthening the public primary health care system and its epidemiological monitoring system. These incentives would allow the private sector of the health industry to take economic advantage of its technological offer, while increasing citizens' access to advanced technologies from state-of-the-art biosciences, thereby reducing the risks associated with any category of pathology.
- The government's efficiency in managing economic risks, on the other hand, is considerably high. The region has financially assisted companies and citizens with greater vulnerabilities to cushion the effects of the economic crisis, and as a consequence, the unemployment crisis has been controlled more efficiently in this region than in most of those considered in this report.
- Switzerland has made the determination to test only citizens with mild symptoms, when the most dangerous vectors are those who are asymptomatic, particularly infants and children, and although it has a high standard epidemiological surveillance system. Switzerland can implement a massive and robust detection program similar to that of Germany to map out transmission routes and contain outbreaks in real time. Epidemiological safety is reduced in Switzerland due to this comparative lack. Furthermore, the decentralized nature of the Swiss health system is a challenge for collecting health data in an easily accessible, interpretable and transparent way, as Israel does for example.
- Similarly to Germany, a major threat to safety in Switzerland is its pronounced population aging, as in the rest of the European countries evaluated, and the reversal of restrictions on social contact. In addition, less rigorous epidemiological surveillance increases the risks, and therefore this is an area that should be prioritized in the region.

Switzerland: COVID-19 Conclusions

- The Swiss government has decided not to make the use of protective face masks compulsory, and instead only recommends their use when it is not feasible to maintain social distance. Furthermore, the Swiss Federal Railways and the Postal Bus service only recommends avoiding the use of public transport and traveling when necessary, rather than imposing mandatory restrictions. The public health authorities in the region recommend remote work from home, only when it is possible, and to follow hygiene and social distancing measures while commerce revives with the opening of different types of shops and businesses.
- The pandemic added strong pressure on the Swiss health system, although the system would not have reached a saturation point and even some hospitals would have admitted COVID-19 patients from the neighboring region of France. Swiss hospitals have 82 Intensive Care Units and a total of up to 1,000 hospital beds, 850 of which are equipped with respirators. The Swiss army has around 100 additional respirators. The health system is equipped to contain outbreaks of the characteristics already experienced, but higher levels of infection spread would cause a severe sanitary collapse like those that occurred in other regions.
- The Swiss government orchestrated a historic mobilization of the armed forces that revealed a good preparedness and responses to emergencies. The army deployed a battalion of hospitals for the first time to support the public health system, with a capacity for 200 patients, and provided the cantons with additional ambulances. This is the largest Swiss military mobilization since the WWII, and many cantons mobilized volunteer civilians along with the armed forces.
- Switzerland has shown efficient control of land border crossings, limiting crossings from Italy, carrying out border controls on trips from Germany, Austria and France, and only allowing Swiss citizens, residents and travelers with justified business reasons to enter its borders. Nevertheless, its geographical location and proximity to its European neighbors constitutes a significant risk that should continue to be monitored.



**Singapore
Special Case Study
Covid-19 Safety Assessment**

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 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 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 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 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 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

740
CUMULATIVE
SCORE

COVID-19: SWOT Analysis of Singapore

STRENGTHS

- High degree of healthcare modernization and technological sophistication.
- Meritocratic, city-state government capable of rapidly implementing very wide-spread social policy mandates and emergency mobilization of resources.
- Strong monitoring and detection efforts, both in terms of testing as well as in real-time monitoring of infection spread.

WEAKNESSES

- Singapore's economy highly depends on foreign workforce and supply chains.
- The region has a large aging population, which is the most at-risk demographic for infection, mortality and negative long-term health outcomes as a result of COVID-19.
- Singapore currently has the highest number of confirmed COVID-19 cases in Southeast Asia.

OPPORTUNITIES

- Singapore has in recent years been investing heavily into AI, digitalization and technological innovation, both generally and as it applies to healthcare. The region is in a position to optimize their testing and treatment capacities by creating specific mechanisms and incentives for technology transfer to utilize these innovations for COVID-19 treatment.
- Singapore's strengths in AI can also be utilized to further strengthen their monitoring and detection capacities.

THREATS

- Economy highly depends on foreign workforce and supply chains. As a result of lockdowns and border-closings, Singapore is at risk for economic decline as a result of the pandemic.
- Singapore's large aging population puts the region at risk for large infection resurgences and future healthcare resource incapacitation due to the rapid rate of transmission in elderly care facilities and nursing homes.

Singapore: COVID-19 Quarantine Efficiency

Singapore implemented a nation-wide mandatory lockdown in early April, which requires home isolation except for accessing essential goods and services, social distancing when in public, and mandatory wearing of masks. These measures were recently extended to June 1, 2020.

Singapore is also enforcing some of the most strongest criminal penalties for violating lockdown and social distancing mandates, ranging from monetary fines to incarceration. For now, preliminary results indicate that Singapore's quarantine efforts appear to be working, with the quantity of new cases steadily declining (from an average of 30 new daily cases in mid-April to roughly 8 daily new cases in early May).

Additionally, these efforts appear to be helping to stabilize one of their greatest previous risk factors as well, i.e., the high number of cases among migrant workers (due in part to the close living conditions of migrant worker dormitories). Since imposing their quarantine efforts, new cases among such workers has declined from an average of 1000 per day in mid-April to 700 per day in early May).

The situation in the migrant worker dormitories is also stabilising, from a high point of an average of more than 1,000 new cases per day in late April, to an average of about 700 cases per day in the last week.

Indicators	Points
Scale of Quarantine	13.65
Quarantine Timeline	10.63
Criminal Penalties for Violating Quarantine	9.20
Economic Support for Quarantined Citizens	9.04
Economic and Supply Chain Freezing	15.50
Travel Restrictions	5.78
Final Score	63.79
Weight	2.2
Final Points	140

Singapore: COVID-19 Government Risk Management Efficiency

Singapore will spend 12% of GDP to ensure the impact on the economy is softened and to help the economy recover back to the original state. The region's high dependency on foreign workers puts it particularly at risk for economic shortfalls as a result of closing its borders. Data released by the Ministry of Manpower found that the region lost 22,200 foreign workers from December 2019 - March 2020.

Singapore's Legislative Efficiency is also very high, and the region is capable of rapidly implementing very comprehensive, coordinated and widespread social policy measures in an efficient way, which in large part stems from its meritocratic governmental structure. As a city-state, Singapore is much more adept at efficiently and effectively implementing sweeping industry development and progressive social policy initiatives and reforms.

Furthermore, the Singapore Armed Forces are arguably among the most technologically advanced in Southeast Asia, which comes into play during the present pandemic in its capacity to utilize its armed forces to help with testing, monitoring and detection, and to enforce government-mandated lockdown and social distancing measures (and, indeed, the region utilized the combined resources of its Police Force, Armed Forces and Ministry of Health to conduct aggressive contact tracing).

Indicators	Points
Level of Security and Defense Advancement	8.50
Rapid Emergency Mobilization	16.00
Efficiency of Government Structure	15.33
Economic Sustainability	11.02
Legislative Efficiency	16.00
Political Stability	13.29
Final Score	80.14
Weight	2.2
Final Points	176

Singapore: COVID-19 Monitoring and Detection

Singapore scores well in the Monitoring and Detection category of the index. This in part is a result of its meritocratic government structure; as a city-state, the region is able to rapidly mobilize resources and impose widespread social policy mandates.

Similar to the cases of Israel and China, Singapore is using a diverse range of 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.

The scope and breadth of the region's testing facilities is also highly optimal. In order to increase the number of available testing sites, the SARS-CoV-2 Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) laboratory test was expanded from the National Public Health Laboratory (NPHL) to all public hospitals in Singapore, which enabled an average of 2200 tests to be performed daily. The region also conducts detailed interviews with confirmed COVID-19 cases to conduct activity mapping and guide contact tracing and cluster investigations. Identified close contacts are placed in quarantine, and casual contacts are placed on phone surveillance.

Indicators	Points
Monitoring Systems & Disaster Management	18.00
Scope of Diagnostic Methods	15.00
Testing Efficiency	16.45
AI for Diagnostics and Prognostics	15.00
Government Surveillance Technology for Monitoring	14.96
Reliability and Transparency of Data	17.00
Final Score	96.41
Weight	1.5
Final Points	145

Singapore: COVID-19 Healthcare Readiness

The Singaporean government has made great strides in ensuring the sustainability of its healthcare resources during the current pandemic. As of January 2020, the region was requiring twice-daily temperature monitoring for all front-line healthcare workers, and encourages all such workers to report any symptoms of respiratory infection to their superiors.

In late April 2019, Singaporean healthcare authorities indicated that, while the region's healthcare resources were being stretched, they were not over-capacity. The region's government made rapid preventative and preparatory measures to scale up their available healthcare resources in the event of significant surges of new infection.

In early April Singapore's health ministry requested that retired nurses, doctors and other health care professionals to rejoin the workforce during the pandemic, and 1,100 signed up in a single day. The government has also enabled free transportation for front-line healthcare workers.

However, limiting outbreaks in elderly care and nursing homes must remain a vigilant priority, as this represents one of the main risks of future surges large enough to strain the region's healthcare capacity due to the high rates of infection

Indicators	Points
COVID 19 Equipment Availability	14.40
Mobilization of New Healthcare Resources	17.50
Quantity and Quality of Medical Staff	10.99
Level of Healthcare Progressiveness	6.91
Level of Technological Advancement	6.52
Epidemiology System Level of Development	9.69
Final Score	66.00
Weight	1.3
Final Points	86

Singapore: COVID-19 Region Resiliency

Singapore scores moderately well in the “Region Resiliency” category. The region has a high level of political stability, and the region has extended its support to several of its neighbors.

Political acceptance rates and stability is high within the region, although elections are approaching.

In terms of demography, a clear threat is the large size of Singapore’s elderly population. This puts the region at risk for sudden jumps in the rates of infection, especially in the context of elderly care facilities.

The prevalence of chronic disease is also on the rise among the region’s aging population, with the number of older adults with three or more chronic diseases having doubled between 2009 and 2017, and 25% of Singaporeans over the age of 40 have at least one chronic disease (diabetes, high blood pressure, high blood cholesterol or stroke). This puts the region at greater risk of growing mortality rates as the number of infected continue to rise.

Furthermore, the region has a fairly optimal score in terms of cultural specifics and societal discipline, and this, in combination with the very strict penalties put in place for violating quarantine and social distancing mandates, has helped to reduce overall infection spread risk.

Indicators	Points
Infection Spread Risk	11.13
Culture Specifics and Societal Discipline	16.23
Level of Modern Sanitization Methods	15.00
Demography	9.76
Chronic Diseases	13.49
Societal Risks	12.60
Final Score	78.21
Weight	1.3
Final Points	102

Singapore: COVID-19 Emergency Preparedness

- The region does not have a high degree of existing geopolitical tensions or military threats, which puts the region in an excellent position for positive geopolitical prospects in the post-pandemic era.
- However, this situation also means that their baseline preparedness for emergency situations is less than some of the regions included in the present analysis where national emergencies are expected and prepared for from a policy, infrastructure and technological point of view.
- Nonetheless, the region has one of the most technologically sophisticated militaries in Southeast Asia.
- Singapore also has strong surveillance capabilities in terms of both scale, scope, as well as technological sophistication and diversity, due in part to the emphasis on investments and developments in AI, digitization and technological innovation made in recent years. The region has utilized location data, video camera footage and credit card information for COVID-19 infection monitoring and detection.
- Furthermore, while their practical experience in emergency military mobilization (and the rapid mobilization of emergencies to manage nationwide crises in general) is comparatively lower than other regions, many of these factors are offset by their overall government efficiency and capacity to coordinate and integrate the activities of multiple governmental departments in a rapid manner.

Indicators	Points
Societal Emergency Resilience	20.25
Surveillance Capabilities (Scale, Scope and Technological Sophistication)	15.33
Emergency Military Mobilization Experience	13.50
Previous National Emergency Experience	11.50
Final Score	60.58
Weight	1.5
Final Points	91

Singapore: COVID-19 Recommendations

- Singapore has a marked ageing population, and the elderly are the most at-risk group for COVID-19 infection and mortality. Thus, moving forward Singapore should heavily prioritize investing into elderly-specific treatment regimes to improve patient outcomes in its elderly population, and consider broader testing (e.g. of asymptomatic elderly individuals).
- Singapore is currently employing a fairly broad scope of testing, but currently the region only tests individuals who present with pneumonia or influenza-like symptoms. The region should consider expanding it to include testing of asymptomatic individuals.
- The Singaporean economy is heavily dependent on foreign workers, and moving forward, in order to reduce economic risks resulting from future pandemics, the region should decrease its reliance on foreign workers and seek to reorient economic growth and sustainability toward innovation, digitalisation, and continuous investment in the skillsets of its domestic population.
- In recent years Singapore has been investing heavily in AI, digitization and technological innovation. The region should consider implementing specific mechanisms and incentives allowing for technology transfer and the repurposing of AI and digital technologies to improve testing, monitoring and detection and COVID-19 treatment.

Index Categories: All Scores	Points
Quarantine Efficiency	140
Government Efficiency of Risk Management	176
Monitoring and Detection	145
Healthcare Readiness	86
Regional Resiliency	102
Emergency Preparedness	91
Cumulative Score	740

Singapore: COVID-19 Conclusions

- A unique characteristic of Singapore that helps to boost its scores on almost all of the six component categories within Deep Knowledge group's Regional Safety Assessment Index is the region's overall government efficiency, which in large part is a result of its meritocratic, city-state nature.
- Singapore is also a fairly small country, and is fairly geographically isolated. This, in combination with fairly early shutdowns of international flights and non-essential border crossings, helps to neutralize community-based viral transmission, and serves as a strong advantage over other regions.
- Singapore is utilizing state of the art technologies for monitoring and detection, owing in part to the investments that the country has made in AI, digitalization and general technological innovation and international competitiveness in recent years.
- The government has also imposed some of the strictest monetary and criminal penalties (including fines and incarceration) for violating mandatory quarantine, self-isolation and social distancing mandates, which helps to significantly reduce the risk of infection spread.
- The country also has a generally optimal state of healthcare readiness, which in part owed to the fact that the country has been steadily increasing its per capita quantity of doctors and healthcare professionals. The Singapore Healthcare 2020 Master Plan (released in 2012) details its ongoing efforts in this regard, including the addition of 500 new doctors on average per year, as well as measures to attract medically trained Singaporeans overseas to return.
- As a result, despite having the highest number of confirmed COVID-19 cases in all Southeast Asia, the country has not witnessed critical medical equipment shortages, and its healthcare system is not in immediate risk of being over-capacitated.

Singapore: COVID-19 Conclusions

- In terms of emergency preparedness, despite having less practical experience with armed conflict, geopolitical tensions, or nation-wide emergencies requiring the rapid coordination of crisis-mitigation resources than other regions included in the analysis, Singapore has shown a great deal of government efficiency in terms of the rapid mobilization of resources across government departments in order to flatten the curve, and particular efficiency in coordinating its armed forces and police forces to assist its ministry of health with testing, monitoring and detection.
- One of Singapore's most critical threats is its aging population. Outbreaks among elderly populations, especially in elderly care facilities, can serve to increase rates of infection and mortality significantly in very short periods of time. Furthermore, the high transmissibility among the elderly, the high prevalence of age-related co-morbidities, and the overall high rate of COVID-19 pathology and necessity for critical care, means that such future outbreaks could place a sudden, unexpected and substantial burden on Singapore's healthcare resources.
- Very strict measures should be employed to avoid this from occurring, including heightened social distancing and quarantine measures for the elderly, broader-scale testing for the elderly (e.g. among asymptomatic individuals, for example), and prioritizing elderly-focused treatment regimes.
- While the number of new daily infections among migrant workers continues to decline, it remains the fastest-growing demographic, and heightened measures to prevent further transmission among foreign workers should be prioritized, including wider-scale testing and testing of asymptomatic individuals.
- Over the longer term, in order to prepare for both future pandemics, future resurgences of COVID-19 or the possibility of needing to maintain extended border closures, Singapore should also attempt to decrease its economic dependence on foreign workers and supply-chains by continuing to support the development of key skill sets within its domestic population, and to continue investing in automation, digitalization and technological innovation.



Japan
Special Case Study
Covid-19 Safety Assessment

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

COVID-19: SWOT Analysis of Japan

STRENGTHS

- A relatively low number of infections compared to size of population, and low number of deaths vs. number of infected.
- Aggressive use of contact tracing to offset comparatively lower testing rates, and the use of a “cluster-based” approach that assumes majority of infection comes from high-transmission cases, focusing efforts on quarantining highly transmittable cases.
- High numbers of elderly individuals voluntarily self-isolating.

WEAKNESSES

- A large elderly population (the demographic at greatest risk of infection and mortality from COVID-19)
- Fairly low per capita testing rates
- Growing public concerns over prioritizing economic recovery over healthcare and public wellbeing
- A four-year decline in GDP that will be further exacerbated by the postponement of the 2020 Tokyo Olympic Games.

OPPORTUNITIES

- To reduce potentials for future steep rises in number of infected due to outbreaks among elderly population, the Japanese government can preventively coordinate resources and logistics in advance to be maximally prepared for potential rises in number of infected.
- Prioritize government communication and transparent public relations strategies to offset the falling public acceptance rates over how the Japanese government is handling the pandemic.

THREATS

- Their large aging population puts the region at risk for large infection resurgences and future healthcare resource incapacitation due to the rapid rate of transmission in elderly care facilities and nursing homes.
- Growing public concerns over prioritizing economic recovery over healthcare and public wellbeing (e.g., 80% of public responding that state of emergency address was delivered too late).

Japan: COVID-19 Quarantine Efficiency

While Japan has been proactive in advising social distancing and self isolation measures, and in border control to prevent incoming travelers, it's critical weakness is that it lacks the legislative power to actually impose and enforce a mandatory quarantine, and is among a minority of regions that have not implemented mandatory lockdowns with associated monetary and criminal penalties for non-compliance.

To reduce person-to-person contact, the government has instructed the public to refrain from attending high risk environments and limiting long distance travel. It emphasized extreme caution when coming in contact with the elderly. The government also promoted reforms including home-based work, staggered commuting times, and long-distance learning for students.

In early May, Japan's Ministry of Health, Labour and Welfare released details on a program to maintain a "new lifestyle" for its population, to be practices on a daily basis moving forward. The program consists largely of behavioural changes aimed at reducing infection spread, such as avoiding high-risk environments and long-distance travel, wearing masks during face-to-face contact, avoiding eating face-to-face, and refraining from talking on public transportation, and it is the hope that the program will help to offer the fact that under current law the Japanese government has very limited capacity to actually impose and enforce mandatory lockdowns.

Indicators	Points
Scale of Quarantine	17.81
Quarantine Timeline	10.63
Criminal Penalties for Violating Quarantine	4.47
Economic Support for Quarantined Citizens	8.16
Economic and Supply Chain Freezing	9.30
Travel Restrictions	7.18
Final Score	57.62
Weight	2.2
Final Points	127

Japan: COVID-19 Government Risk Management Efficiency

Overall, Japan has achieved good results in terms of rapid and integrated government coordination to reduce COVID-19 infection and to enable best-case treatment of COVID-19 patients.

Fairly early in the overall timeline of the pandemic, the Japanese Ministry of Health, Labour and Welfare also coordinated with local governments to establish 536 consultation centres, covering all prefectures within the region, to give citizens with instructions on how to receive COVID-19 testing and treatment.

Japan's Health minister also coordinated Fujifilm to make their anti-influenza drug, favipiravir, available for use as a COVID-19 treatment, as well as to increase production and enable the distribution of the drug to hospitals for use in critical cases.

However, one key shortfall is the government's incapacity, under currently law, to impose and enforce mandatory lockdowns upon their citizens, with criminal penalties for noncompliance. Despite this, the region has offset this downside with efficient cross-department coordination and the rapid creation of dedicated task-forces and facilities, combined with proactive public communications and suggested public guidelines.

Indicators	Points
Level of Security and Defense Advancement	17.00
Rapid Emergency Mobilization	16.00
Efficiency of Government Structure	13.41
Economic Sustainability	10.93
Legislative Efficiency	12.00
Political Stability	14.42
Final Score	83.76
Weight	2.2
Final Points	184

Japan: COVID-19 Monitoring and Detection

One of Japan's largest comparative weaknesses in terms of monitoring and detection is its low rates of testing. For example, only 52,000 tests were performed in March 2020, which constitutes just 16% of the number of tests performed by South Korea that same month, and testing was restricted to large hospitals (i.e., a lack of local or remote testing) as of March 2020. While the government decided to expand testing by mid-April, many experts believe that this decision should have been made earlier in the COVID-19 timeline.

Despite its fairly low testing rates, the region has a comparatively low number of infection and death rates compared to other regions with more widespread and aggressive testing, in large part due to the region's unique "cluster-based approach", which assumes that large increases in infection rates are due specific individuals able to transmit the virus at much higher than average rates.

The region thus concentrates resources on very intensive and comprehensive contact tracing in order to identify individual sources of a large number of infected individuals, and imposing strict quarantining on identified source-cases. And, indeed, it is the region's very strong focus on contact tracing that sets it apart from other regions in terms of the strength of its COVID-19 monitoring and detection efforts.

Indicators	Points
Monitoring Systems & Disaster Management	18.00
Scope of Diagnostic Methods	15.00
Testing Efficiency	14.40
AI for Diagnostics and Prognostics	15.00
Government Surveillance Technology for Monitoring	15.30
Reliability and Transparency of Data	17.00
Final Score	94.70
Weight	1.5
Final Points	142

Japan: COVID-19 Healthcare Readiness

Early in the overall COVID-19 timeline, Japan's government pivoted from containment-focused efforts to heightening its prevention and treatment capacities in order to prepare for increased community-based transmission within its own borders. One key step in this regard was the launch of a dedicated testing and consultation system modelled after the National Institute of Infectious Diseases (NIID) and the government's 83 existing municipal public health institutions (separate from its public hospital infrastructure).

This infrastructure deals with the treatment of confirmed COVID-19 patients in order to help reduce their burden on the public hospital system (thereby reducing the risk of overwhelming their existing healthcare infrastructure) and to reduce transmission to critical front-line healthcare workers. Japan's Ministry of Health, Labour and Welfare also took key steps in reinforcing its medical system by prioritizing access to COVID-19 treatment for elderly people, pregnant women, people suffering from fatigue or shortness of breath, and people with underlying health conditions.

Another key advantage of Japan is its higher-than-average number of computed tomography (CT) scanners (111.49 per million people), which allows them to test and confirm cases of COVID-19 pneumonia prior to official COVID-19 testing.

Indicators	Points
COVID 19 Equipment Availability	16.80
Mobilization of New Healthcare Resources	14.25
Quantity and Quality of Medical Staff	12.03
Level of Healthcare Progressiveness	13.62
Level of Technological Advancement	12.74
Epidemiology System Level of Development	13.87
Final Score	83.31
Weight	1.3
Final Points	108

Japan: COVID-19 Region Resiliency

In terms of demographics, Japan's large elderly population remains one of its greatest threats, an outbreaks among its elderly (particularly in elderly care facilities) could create sudden spikes in the number of cases and deaths, and transmissions if it is unable to enforce mandatory quarantining of elderly COVID-19 patients.

Such possible outbreaks leave the region at risk for over-capacitating their healthcare system, both strictly in terms of the number of elderly infected, and especially in terms of transmission from their elderly demographic to other sectors of their general populace.

Japan's Societal Risks are very minimal, as it is a region that lacks serious existing geopolitical threats. However, the region is witnessing declining public support and sentiment regarding how its government has handled the crisis, citing its early decision to not postpone the 2020 Tokyo Olympics (which has since been postponed) and its lack of widespread economic freezing measures as an indication that it is prioritizing economic viability over public health and safety.

The region's overall infection spread risk is comparatively low, despite low per-capita testing rates and a lack of criminally-punishable quarantine mandates, in large part due to its focus on effective and intensive contact tracing to identify and isolate high-transmission cases.

Indicators	Points
Infection Spread Risk	5.39
Culture Specifics and Societal Discipline	13.11
Level of Modern Sanitization Methods	15.00
Demography	5.20
Chronic Diseases	13.92
Societal Risks	13.00
Final Score	65.62
Weight	1.3
Final Points	85

Japan: COVID-19 Emergency Preparedness

Japan's military prowess, both in terms of its overall size as well as its technological sophistication, lags behind many other regions included in the present analysis, which limits their overall preparedness for rapid mobilization of resources to neutralize national crises, at least (in comparison to other regions included in the present analysis).

The region does have some limited experience with chemical attacks relating to terrorist organizations in the mid-199's, but besides this, the region is relatively unprepared for major biological and chemical warfare.

However, many of these factors are offset by the very high degree of societal discipline among their populace. Due in part to their very strict and strongest professional and intensive business ethic. This comes into play both generally (e.g., wearing face masks is already common in Japan), and specifically in relation to COVID-19, in the general public's overall higher levels of obeying and respecting social etiquette.

This is seen in the fact that compliance with the government's social distancing and self isolation suggestions are seeing a much higher rate of compliance than would be expected considering that the government doesn't have monetary or criminal penalties in place for violating them.

Indicators	Points
Societal Emergency Resilience	20.25
Surveillance Capabilities (Scale, Scope and Technological Sophistication)	15.33
Emergency Military Mobilization Experience	13.50
Previous National Emergency Experience	11.50
Final Score	60.58
Weight	1.5
Final Points	91

Japan: COVID-19 Recommendations

- Japan should continue its efforts in very stringent and comprehensive contact tracing (based on a “cluster-based approach”, which assumes the majority of infections can be traced back to select individuals with higher-than-average capacity for transmitting the virus), since this has proved successful thus far in maintaining a lower-than-average number of infections and death.
- However, the region should also prepare to increase its capacities for widespread testing in the event that Japan sees substantial increases in infection rates due, for example, COVID-19 mutations that increase the overall, average level of viral transmissibility.
- Given Japan’s very large aging population, the region should prioritize investing into elderly-specific treatment regimes to improve patient outcomes in its elderly population, and consider broader testing (e.g. of asymptomatic elderly individuals).
- The region should also consider implementing more stringent mandatory lockdown mandates for elderly individuals in the event that the region sees a large spike in the number of elderly infections, which would have much lower negative effects on its economy compared to lockdowns imposed by working-age individuals)
- Additionally, Japan should seek to expand its legislative capacity to impose and enforce mandatory quarantine and social distancing measures (with criminal penalties for non-compliance) as much as possible, to protect against future and longer-term COVID-19 outbreaks.

Index Categories: All Scores	Points
Quarantine Efficiency	127
Government Efficiency of Risk Management	184
Monitoring and Detection	142
Healthcare Readiness	108
Regional Resiliency	85
Emergency Preparedness	91
Cumulative Score	738

Japan: COVID-19 Conclusions

- Japan has proven effective at efficiently coordinating government efforts across many departments to reduce infection spread and optimize COVID-19 prevention and treatment.
- One unique aspect of Japan's specific approach is that the country switched very early on within the overall pandemic timeline (i.e., in February 2020) from containment to prevention and treatment, in anticipation of very substantial increases in the rate of infection spread within its own borders.
- Another unique factor of Japan's particular approach is the use very stringent and comprehensive contact tracing to identify the original source of infections. This is considered a "cluster-based" approach, which assumes that the majority of COVID-19 infection is the result of a select number of individuals with much higher-than-average capacity to transmit the virus to others. Thus, the country's focus is less on nationwide quarantining, and more focused on dedicating resources to intensive contact tracing, and strict quarantining of select individuals.
- The government has also imposed some of the strictest monetary and criminal penalties (including fines and incarceration) for violating mandatory quarantine, self-isolation and social distancing mandates, which helps to significantly reduce the risk of infection spread.
- The country also has a generally optimal state of healthcare readiness, which in part owed to the fact that the country has been steadily increasing its per capita quantity of doctors and healthcare professionals. The Japan Healthcare 2020 Master Plan (released in 2012) details its ongoing efforts in this regard, including the addition of 500 new doctors on average per year, as well as measures to attract medically trained Singaporeans overseas to return.
- As a result, despite having the highest number of confirmed COVID-19 cases in all Southeast Asia, the country has not witnessed critical medical equipment shortages, and its healthcare system is not in immediate risk of being over-capacitated.

Japan: COVID-19 Conclusions

- Despite Japan's high efficiency in certain areas like reducing infection spread and integrated coordination of government departments for rapid mobilization of emergency resources (especially as it pertains to medical resources), and its proactive and widespread public communications efforts, one of the country's key weaknesses is its incapacity, under current law, to actually impose and enforce lockdown and social distancing mandates with criminal penalties for non-compliance.
- The Japanese government should pursue its available options for increasing its legislative capacity to deploy and enforce such mandates in the longer-term, while simultaneously prioritizing alternative efforts.
- Additionally, the country should consider developing specific, reward-oriented mechanisms and incentives for citizen and industry compliance with government-suggested quarantine, self-isolation and social distancing guidelines, given its comparative inability to legislatively enforce compliance via "punishment-oriented" mechanisms.
- Japan's large elderly population remains one of its greatest threats, an outbreaks among its elderly (particularly in elderly care facilities) could create sudden spikes in the number of cases and deaths, and transmissions if it is unable to enforce mandatory quarantining of elderly COVID-19 patients.
- Such possible outbreaks leave the country at risk for over-capacitating their healthcare system, both strictly in terms of the number of elderly infected, and especially in terms of transmission from their elderly demographic to other sectors of their general populace.
- To counteract these threats, the country should consider proactive measures including developing dedicated care facilities for elderly COVID-19 patients, more heavily-prioritized testing among asymptomatic elderly individuals, and prioritizing critical medical supplies and equipment for treatment of COVID-19 in elderly patients.



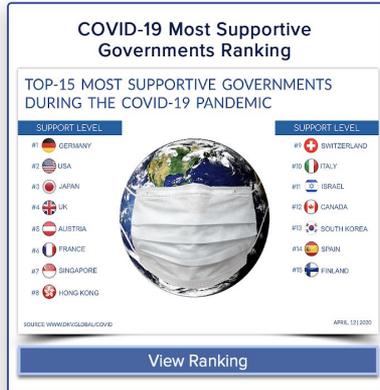
**Appendix
COVID-19
Deep Knowledge Group
Activities**

Deep Knowledge Group COVID-19 Analytics

Deep Knowledge Group's COVID-19 analytical frameworks and methodology have been designed to rapidly account for the new and ongoing actions of regions as they strive to mitigate the health and economic consequences of COVID-19 within their own borders. By applying Big Data Analysis to a large scope of quantified and relevant parameters, and comparing them in tangible practical ways, they are able to serve as the ideal tools for responsible governments and relevant decision makers to derive actionable data and insights on their own specific situation over time on the effectiveness of their counter-infection measures and how to adapt the best-case examples (and avoid the mistakes) of other regions in a way that is tuned to the specifics of their own regional, healthcare and economic circumstance. These frameworks are designed to identify positive cases such as these, and enable relevant decision makers to get a tangible understanding of how they can apply them to their own situations in an efficient, cost-effective and actionable manner.



Deep Knowledge Group COVID-19 Analytics



Deep Knowledge Group's COVID-19 Analytics in the Media

DER SPIEGEL 

"According to a ranking, the Federal Republic is currently the safest and most stable country in Europe and even the second safest in the world. Only Israel manages the crisis better, according to the country comparison of the London Deep Knowledge Group (DKG), which is exclusively available to SPIEGEL."

[Read Article](#)

NIKKEI ASIAN REVIEW 

"Deep Knowledge Group assessed countries based on 76 parameters. Some were conventional coronavirus cases and deaths, geographic size and demographics, hospital capacity and medical expertise. Others were less obvious "GovTech" or e-government systems and defence capabilities."

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DW Deutsche Welle 

"Germany is the safest country in Europe, with Greece in 30th place and Cyprus in 29th place. In their research, DKG analysts took into account many different criteria, such as the validity of restrictive measures, the number of quarantine violations, the range of travel bans, the number of diagnostic tests and the availability of hospital beds."

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YAHOO! NEWS 

"According to the "Deep Knowledge Group" website report, it released a list of "the safest countries in the world", one to five of which are: Israel, Singapore, New Zealand, Hong Kong and Taiwan. Although the Middle East is a severely affected area, Israel can effectively control the domestic epidemic through the mobile app."

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FOX NEWS channel 

"The Palestinians benefit from the Israeli assistance, since Israel was just ranked the safest country in the world during the pandemic by the Deep Knowledge Group." - Fox News says."

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Forbes 

Deep Knowledge Group's COVID-19 Rankings and DKG's General Partner's predictions were published in the Forbes Article "AI Can Help Us Fight Infectious Diseases In A More Effective Way", written by Margaretta Colangelo, contributor to Cognitive World.

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Forbes 

"The Deep Knowledge Group, a respected consortium of commercial and non-profit organizations, has just published an interim review of measures to combat the COVID-19 pandemic, including a "Safety Countries Ranking" of the 40 countries that are doing the best job of protecting their citizens against coronavirus."

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stuff 

And science is exactly what the Deep Knowledge Group are basing their latest findings on. According to the data published on the international group's website, New Zealand is the third-safest country in the world to be in during the on-going pandemic, behind Israel and Singapore.

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NIKKEI ASIAN REVIEW 

"The countries that will be able to provide long-lasting protection for their citizens, and stay stable, they will to some extent automatically attract financial activity," Dmitry Kaminskiy, DKG's founder and managing partner, told the Nikkei Asian Review.

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Esquire 

"...Where the Philippines makes an appearance. According to the Deep Knowledge Group's risk levels ranking, the top 10 countries that are the riskiest to stay in right now are the U.S.A., Italy, Indonesia, Spain, Iraq, Iran, the Netherlands, France, U.K., and the Philippines."

[Read Article](#)

RTL 

"In order to assemble the ranking, DKG analysts gathered information on several factors, including the period of lockdown and the number of confinement infractions per country. Other indicators are travel bans, coronavirus testing and how well hospitals are equipped in each country."

[Read Article](#)

JEWISHPRESS.COM 

"Israel completed a successful bond issue on Wednesday, selling \$5 billion worth of government bonds, including \$1 billion over 100 years. Two days before Israel was ranked as the safest place in the world in regard to the outbreak of the Coronavirus by the Deep Knowledge Group."

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Deep Knowledge Group's COVID-19 Analytics in the Media

Deep Knowledge Group's recent "[COVID-19 regions Health Safety Ranking](#)" attracted significant public interest. Since their initial publication, the rankings have received widespread media attention in [Der Spiegel](#), [NIKKEI Asian Review](#), [Deutsche Welle](#), [Esquire](#), [Forbes](#) and others, and was acknowledged by Israel's [Prime Minister Office](#), [Ministry of Foreign Affairs of Israel](#) and personally by Israel's Prime Minister, [Benjamin Netanyahu](#). The Group was also mentioned on i24 TV Channel. The Full Media Coverage can be found here: <https://www.dkv.global/media-news>

Nikkei Asian Review @NAR

New #coronavirus safety rankings suggest countries such as Indonesia and the Philippines face a dicey next few weeks.#COVID19
Read more here: s.nikkei.com/3elOdYk

Asia-Pacific coronavirus safety ranking
(As of April 12)

Rankings reflect lowest likelihood of infection, lowest chance of mortality, highest likelihood of recovery; based on efficiency of quarantine and government management, monitoring and detection, emergency treatment readiness
Source: Deep Knowledge Ventures

Levels: High Middle Low	
1 South Korea	11 Malaysia
2 Australia	12 India
3 China	13 Myanmar
4 New Zealand	14 Cambodia
5 Taiwan	15 Sri Lanka
6 Singapore	16 Nepal
7 Japan	17 Laos
8 Hong Kong	18 Bangladesh
9 Vietnam	19 Indonesia
10 Thailand	20 Philippines

1,763 5:06 AM - Apr 14, 2020

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DER SPIEGEL @derspiegel

Deutschland ist in der Coronakrise laut einem Länder-Ranking derzeit das sicherste und stabilste Land in Europa – und sogar das zweitsicherste der Welt.
spiegel.de/wissenschaft/m...



So sicher wie hier ist man fast nirgends: ...
Wo sind die Menschen am besten vor Covid-...
spiegel.de

1,184 2:29 AM - Apr 14, 2020

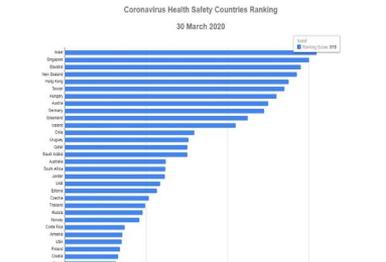
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Prime Minister's Office

Press Releases
Israel Ranked 1st in the Covid-19 Health Safety Countries Ranking on the Deep Knowledge Group Website

Government: The 34th Government, Benjamin Netanyahu Publish Date: 31.03.2020

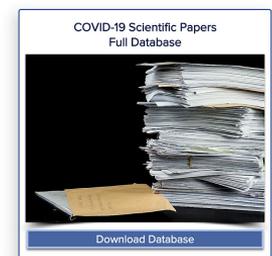
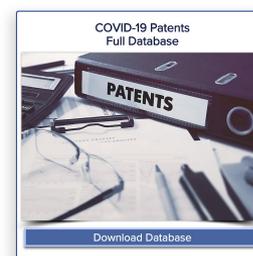
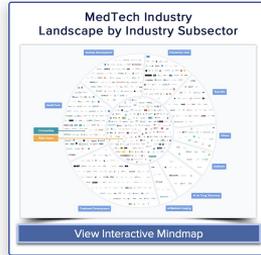
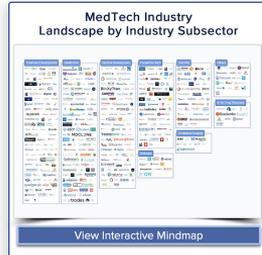
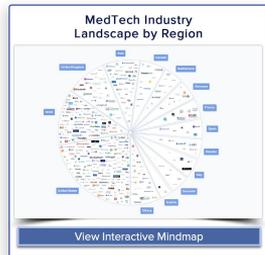
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Israel has been ranked first in the Covid-19 Health Safety Countries Ranking on the Deep Knowledge Group website.

Deep Knowledge Group's COVID-19 MedTech Analytics IT-Platform

Deep Knowledge Group's new [COVID-19 MedTech Analytics IT-Platform](#) is designed to serve as a comprehensive database of the most relevant entities, technologies, and developments in the COVID-19 MedTech ecosystem, aggregating, profiling and visualizing the companies, organizations, scientists and technologies at the forefront of neutralizing the COVID-19 pandemic and ensuring the health and safety of individuals and nations during this time of unprecedented crisis. The platform aims to cover all major sectors and relevant activities in the global COVID-19 MedTech landscape from science to technology, R&D, treatment, diagnostic and vaccine development, and practical applications occurring globally, providing data on particular scientific and technological sectors and geographical regions.



Deep Knowledge Group's COVID-19 MedTech Analytics IT-Platform

The platform was created by [Deep Knowledge Analytics](#) utilizing the sophisticated IT-solutions and [Interactive MindMap and Data Visualization](#) capabilities that the DeepTech analytics subsidiary of the group has developed over the past several years. Its ultimate aim is to serve a comprehensive database and one-stop informational resource designed to keep both the public and relevant decision makers informed on the latest developments in the COVID-19 MedTech landscape, profiling 95 Treatment Candidates, 85 Vaccine Candidates, 60 Preventative Tech, 40 Test Kits, 220 Scientists, 380 Companies, 535 Investors, 50 Funding Agencies, 1500+ Clinical Trials and 180 Universities, Labs and R&D Hubs working at the frontier of neutralizing the pandemic and promoting beneficial outcomes for those already infected.

420
Companies

240
Scientists

50
Funding Agencies

535
Investors

190
Labs and R&D Hubs

40
Test Kits

45
Preventive Technologies

85
Vaccine Candidates

95
Treatment Candidates

1,500+
Clinical Trials

7,000+
Patents

10,000+
Scientific Papers

Deep Knowledge Group Structure

INVESTMENT FUNDS



Longevity Fintech Company



Longevity.Capital



Deep Knowledge Ventures



AI-Pharma.Capital

ANALYTICAL SUBSIDIARIES



Deep Knowledge Analytics



Aging Analytics Agency



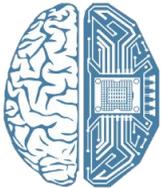
GovTech Division



Pharma Division



NeuroTech Analytics



Deep Knowledge Group

NON PROFIT



Biogerontology Research Foundation



Longevity Swiss Foundation



Longevity Media Company



AI Longevity Consortium at King's College London

LongevityUK

Secretariat for UK All-Party Parliamentary Group on Longevity

Analytical Subsidiaries



Deep Knowledge Analytics

Deep Knowledge Analytics is a deep tech analytical agency using multidimensional algorithms to produce advanced industrial reports on DeepTech and frontier technologies. An online analytics platform with interactive visuals updated in real-time was released early this year



Pharma Division

The Pharma Division of Deep Knowledge Analytics specializes in the production of the most comprehensive analytical reports on the topics of Artificial Intelligence, Drug Discovery, Data Science and Digital Health within the broader Pharma Healthcare Industry and intersection of AI and Pharma.



GovTech Division

The GovTech Division of Deep Knowledge Analytics focuses on producing sophisticated open-access and proprietary analytics that reveal factors driving the ongoing transformation of the global GovTech industry, main sectors to be changed, barriers to this process, and ways to overcome them.



Aging Analytics Agency

Aging Analytics Agency began producing reports before the industry emerged and it is exclusively focused on Longevity, Geroscience, AgeTech and Preventive Medicine. The company has been developing its methodology since 2015 and is the main source of market intelligence in the field.



NeuroTech Analytics

NeuroTech Analytics specializes in the production of open-access and commercial comparative analytics on the full scope of the global NeuroTech industry, ranging from brain-computer interfaces to implant technologies, neurostimulation and neuromodulation, and neuroplasticity-increasing apps.

Analytical Subsidiaries: Aging Analytics Agency



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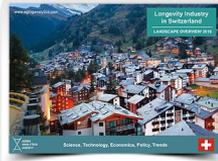
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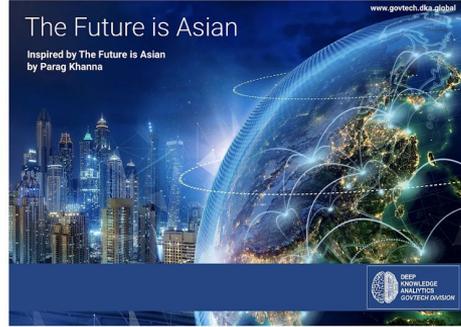
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Global Longevity Governance Landscape 2019



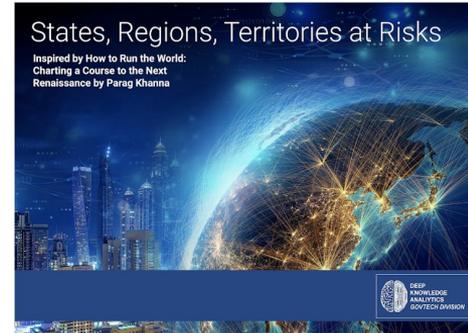
The Future is Asian



GovTech / E-governance Global Industry Landscape Overview 2019



National Longevity Development Plans: Global Overview 2019



States, Regions, Territories at Risks

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.

Information provided herein is intended for indicative and informational purposes only. Opinions, estimates and analysis represented constitute the current judgment and opinion of the author.

Knowledge is Power
Deep Knowledge is Transcendent Power

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