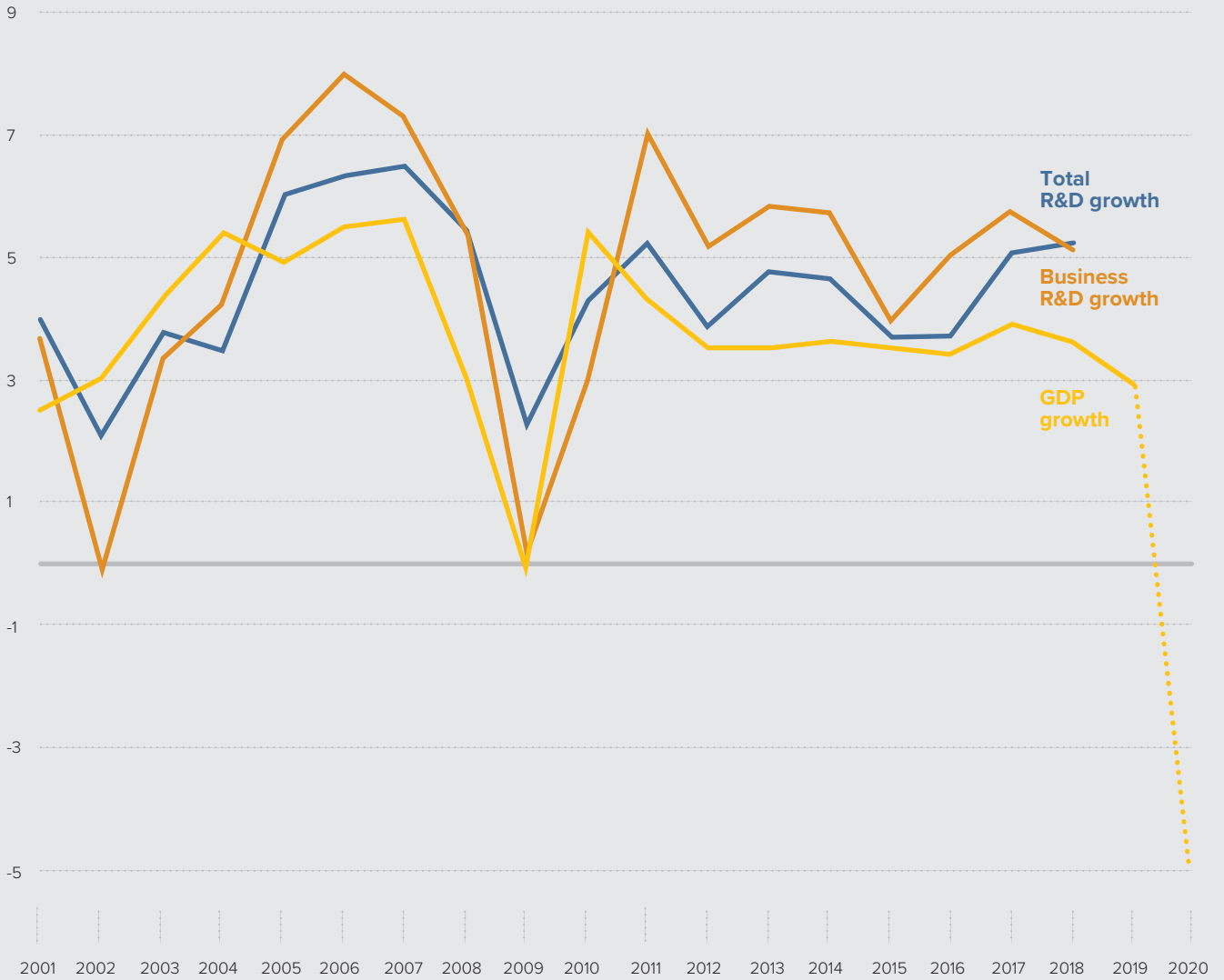


# KEY FINDINGS

FIGURE A

### Bracing for a downturn? Cyclical R&D investments, 2001–2020



▲ %                      ●●● GDP growth forecast  
► Year

Source: Figure 1.1 in Chapter 1.

# KEY FINDINGS 2020

These are the six key findings of the Global Innovation Index (GII) 2020.

## **1: The COVID-19 crisis will impact innovation—leaders need to act as they move from containment to recovery**

The coronavirus disease (COVID-19) pandemic has triggered an unprecedented global economic shutdown. At the time of finalizing the GI 2020 edition, restrictive measures are only starting to be relaxed, while fears of a possible “second wave” remain high.

The current crisis hit the innovation landscape at a time when innovation was flourishing. In 2018, research and development (R&D) spending grew by 5.2%, i.e., significantly faster than global GDP growth, after rebounding strongly from the financial crisis of 2008-2009. Venture capital (VC) and the use of intellectual property (IP) were at an all-time high. In recent years, political determination to foster innovation has been strong, including in developing countries; this is a relatively new and promising trend toward democratizing innovation beyond a select number of top economies and clusters only.

Now that global economic growth will fall deeply in 2020, the question becomes—will R&D, VC, IP, and the political determination to foster innovation also slump (Figure A)?

As innovation is now central to corporate strategy and national economic growth strategies, there is hope ahead that innovation will not slump as deeply as foreshadowed.

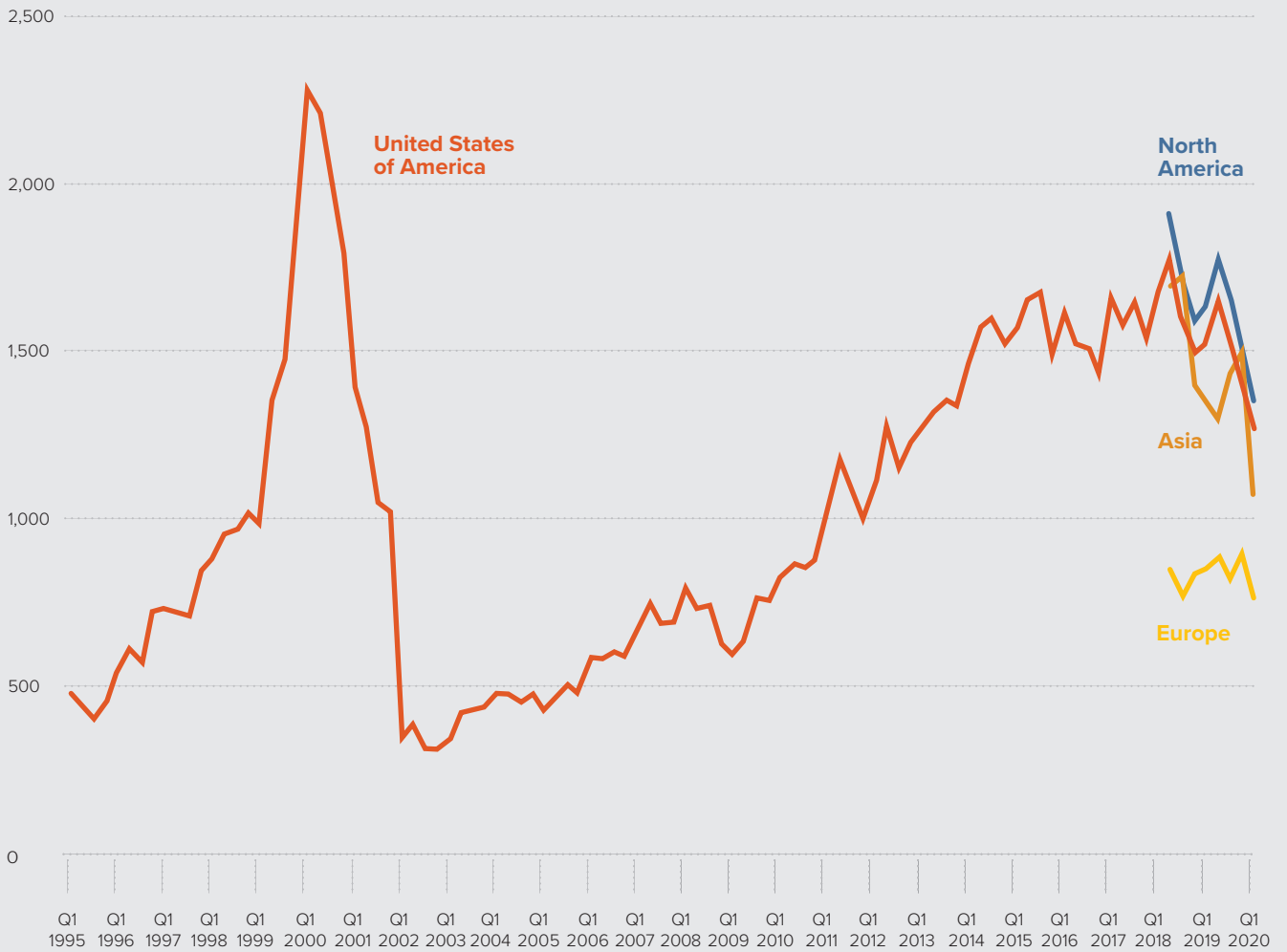
Fundamentally, the pandemic has not changed the fact that the potential for breakthrough technologies and innovation continues to abound. Clearly, the top companies and R&D spenders would be ill-advised to drop R&D, IP, and innovation in their quest to secure competitiveness in the future. Many top R&D firms in the information technology sector, for example, hold vast cash reserves, and the push to digitalization will fortify innovation. The pharmaceuticals and biotechnology sector, another top R&D spender, is likely to experience R&D growth boosted by the renewed focus on health R&D. Other key sectors, such as transport, will have to adapt faster as the quest for “clean energy” is receiving renewed interest. Further, the COVID-19 crisis might well catalyze innovation in many traditional sectors, such as tourism, education, and retail. It may also spark innovation in how work is organized at the firm- and at the individual level, and how production is (re)organized locally and globally.

Unleashing the above potential is now essential and requires government support as well as collaborative models and continued private sector investment in innovation.

What are policymakers doing to mitigate the possible negative effects of the COVID-19 crisis on innovation?

FIGURE B

## Bracing for impact: venture capital decline in North America, Asia, and Europe, Q1 1995–Q1 2020



- ▲ Number of deals
- Year

Source: Figure 1.3 in Chapter 1.

Governments at the head of the largest economies worldwide are setting up emergency relief packages to cushion the impact of the lockdown and face the looming recession. These packages aim to prevent short- to medium-term harm to economies. This is sensible. The immediate focus is on supporting businesses via loan guarantees, for example.

Yet, these emergency relief measures are not explicitly directed to financing innovation and start-ups. Start-ups are facing hurdles as they try to access the above emergency measures.

Moreover, so far, governments have not made innovation and R&D a priority in current stimulus packages. There is one exception—health. Countries have injected large and unprecedented sums of money into the search for a coronavirus vaccine. Naturally, governments are first and foremost responsible for the well-being of their people, and the emphasis on health is understandable and commendable.

However, once the pandemic is brought under control, it is crucial that support for innovation becomes more broad and that it is conducted in a countercyclical way—i.e., as business innovation expenditures slump, governments strive to counteract that effect with their own expenditure boosts to innovation, even in the face of higher public debt.

In tandem, the impacts of the pandemic on the science and innovation systems have to be monitored. Some aspects are positive, such as the unexpected level of international collaboration in science and the reduction of red tape for scientists. Some aspects, however, are alarming, such as the standstill of major research projects and the possible (and uneven) reduction of R&D expenditures in some fields.

## 2: Innovation finance declines in the current crisis, but there is hope too

In the context of the GII 2020 theme “Who Will Finance Innovation?”, a key question is the impact of the current crisis on start-ups, VC, and other sources of innovation financing.

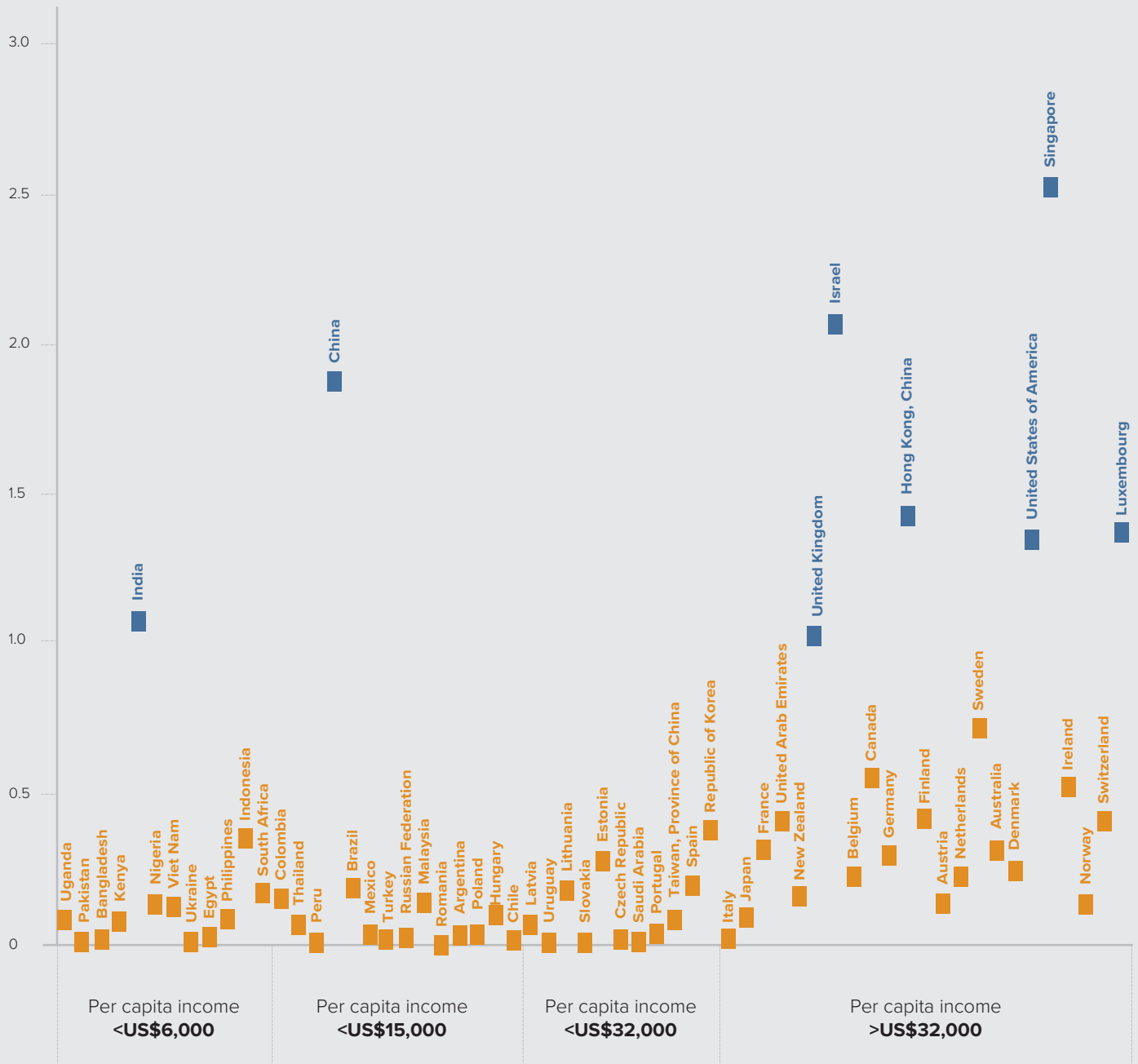
In contrast to 2009, the good news is that the financial system is sound so far. The bad news is that money to fund innovative ventures is drying up (Figure B). VC deals are in sharp decline across North America, Asia, and Europe. There are few initial public offerings (IPOs) in sight, and the start-ups that survive may grow less attractive to—and profitable for—venture capitalists, as exit strategies such as IPOs are compromised in 2020.

Interestingly, the crisis has only reinforced the decline in VC deals that had started before the pandemic. Rather than financing novel, small, and diverse start-ups, venture capitalists began focusing on so-called “mega-deals”—boosting a select number of large firms rather than giving fresh money to a broader base of start-ups. These investments, and the pursuit of so-called “unicorns”, did not play out as positively as expected. What will happen to innovation finance in the near and longer term? The likely answer is that VC will take longer to recover than R&D spending. The impact of this shortage in innovation finance will be uneven, with the negative effects felt more heavily by early-stage VCs, by R&D-intensive start-ups with longer-term research interests in fields such as life sciences, and by ventures outside of the top VC hotspots. Indeed, current VC investments are concentrated in a few VC hot spots in the world, and only a few of those hot spots are in emerging economies—notably in China and India (Figure C and the Theme Section elaborate on the geographic and sectoral bias of VC).

Yet, there is hope here too. The key VC hot spots—Singapore, Israel, China, Hong Kong (China), Luxembourg, the United States of America (U.S.), India, and the United Kingdom (U.K.)—will continue to be magnets for VC. They are likely to bounce back quickly, in part due to the thirst for return on capital worldwide. Chinese VC deals, which halved earlier this year, are already rebounding strongly. Importantly, the direction of VC and innovation seems to have been redirected towards health, online education, big data, e-commerce, and robotics.

FIGURE C

## Venture capital penetration in selected economies, 2016-2018



▲ % Venture capital investments/GDP

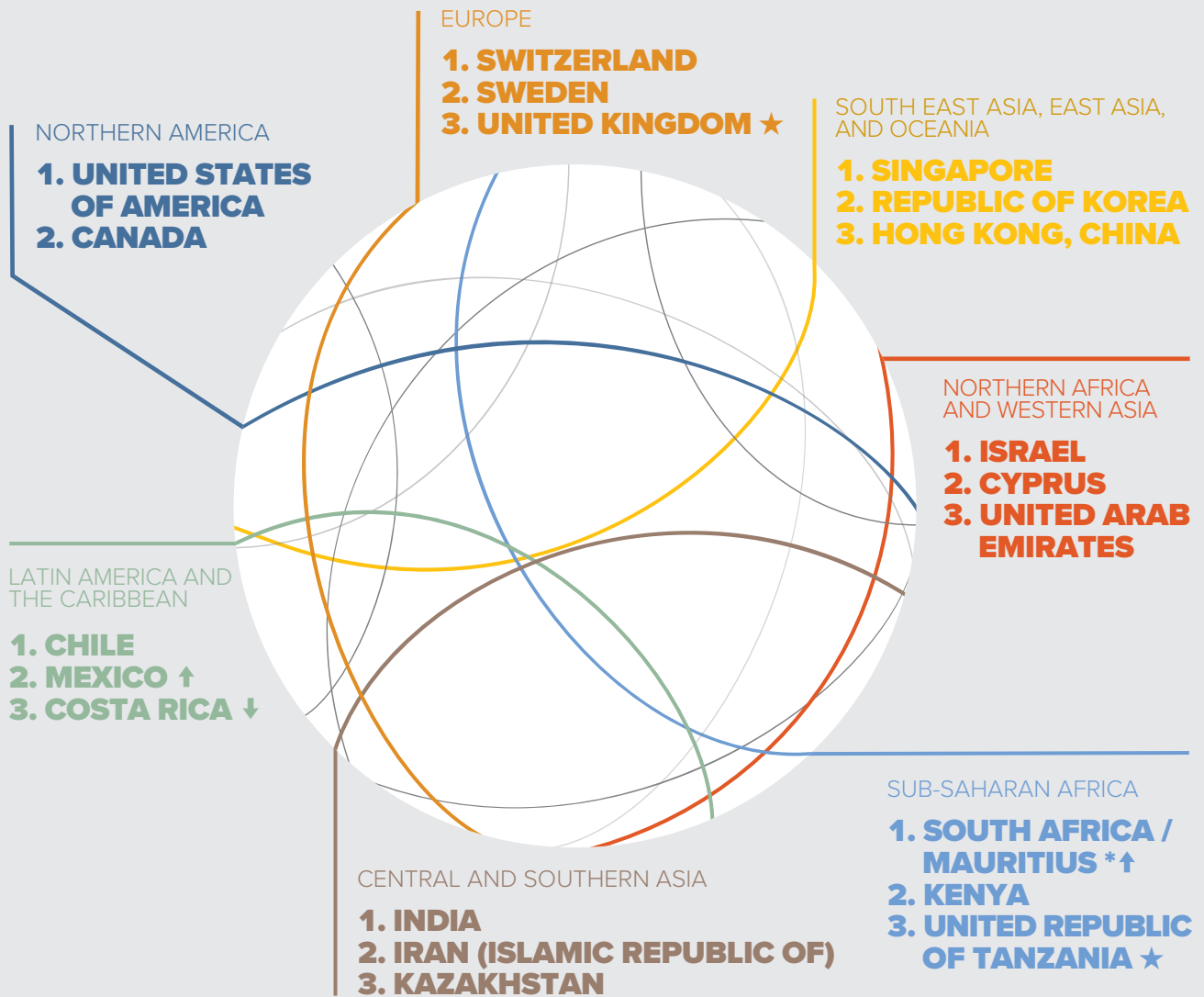
Source: Figure 2.3 in Chapter 2 and Figure T-1.1 in Theme Section.

FIGURE D

## Global leaders in innovation in 2020

Every year, the Global Innovation Index ranks the innovation performance of more than 130 economies around the world.

### Top 3 innovation economies by region



\* Mauritius is ranked above South Africa this year but with wide significant data variability as compared to last year.  
↑↓ indicates the movement of rank within the top 3 relative to 2019, and ★ indicates a new entrant into the top 3 in 2020.

### Top 3 innovation economies by income group



Source: Figure 1.4 in Chapter 1.

TABLE A

## 10 best-ranked economies by income group (rank)

Rank	Global Innovation Index 2020	Rank	Global Innovation Index 2020
<b>High-income economies (49 in total)</b>		<b>Upper middle-income economies (37 in total)</b>	
1	Switzerland (1)	1	China (14)
2	Sweden (2)	2	Malaysia (33)
3	United States of America (3)	3	Bulgaria (37)
4	United Kingdom (4)	4	Thailand (44)
5	Netherlands (5)	5	Romania (46)
6	Denmark (6)	6	Russian Federation (47)
7	Finland (7)	7	Montenegro (49)
8	Singapore (8)	8	Turkey (51)
9	Germany (9)	9	Mauritius (52)
10	Republic of Korea (10)	10	Serbia (53)
<b>Lower middle-income economies (29 in total)</b>		<b>Low-income economies (16 in total)</b>	
1	Viet Nam (42)	1	United Republic of Tanzania (88)
2	Ukraine (45)	2	Rwanda (91)
3	India (48)	3	Nepal (95)
4	Philippines (50)	4	Tajikistan (109)
5	Mongolia (58)	5	Malawi (111)
6	Republic of Moldova (59)	6	Uganda (114)
7	Tunisia (65)	7	Madagascar (115)
8	Morocco (75)	8	Burkina Faso (118)
9	Indonesia (85)	9	Mali (123)
10	Kenya (86)	10	Mozambique (124)

Source: Table 1.2 in Chapter 1.



### 3: The global innovation landscape is shifting; China, Viet Nam, India, and the Philippines are consistently on the rise

This year, the geography of innovation is continuing to shift, as evidenced by the GII rankings. Over the years, China, Viet Nam, India, and the Philippines are the economies with the most significant progress in their GII innovation ranking over time. All four are now in the top 50.

Switzerland, Sweden, and the U.S. lead the innovation rankings (Figure D and Figure 1.5 in Chapter 1), followed by the U.K. and the Netherlands. This year marks the first time a second Asian economy—the Republic of Korea—cracks the top 10, next to Singapore.

The top-performing economies in the GII are still almost exclusively from the high-income group (Table A). China is the only exception, ranking 14th for the 2nd time in a row and remaining the only middle-income economy in the GII top 30. Malaysia (33rd) is the second-most innovative middle-income economy. India (48th) and the Philippines (50th) make it to the top 50 for the first time. India now ranks 3rd among the lower middle-income group—a new milestone (Figure D). The Philippines achieves its best rank ever—in 2014, it still ranked 100th. Viet Nam ranks 42nd for the second consecutive year—it ranked 71st in 2014. In the lower middle-income group, Indonesia (85th) joins the top 10.

The United Republic of Tanzania tops the low-income group (88th) (Figure D).

### 4: Stellar innovation performance found in developing economies

Beyond GII top-level rankings, innovation performance reveals itself in a few other ways, highlighting that some top innovation performance takes place in emerging markets too.

First, the GII 2020 assesses which economies consistently hold the top global spots on particular GII innovation facets, such as VC, R&D, entrepreneurship, or high-tech production. Hong Kong (China) and the U.S. lead on this count; Israel, Luxembourg, and China tie for 3rd place; Cyprus ranks 4th; and Singapore, Denmark, Japan, and Switzerland tie for 5th place (Figure E).

Some top spots on selected innovation indicators are not held by high-income economies. In South East Asia, for example, Thailand is 1st in business R&D globally, and Malaysia is top in High-tech net exports globally. In Sub-Saharan Africa, Botswana ranks 1st in Education spending globally and Mozambique leads in Investment globally. In Latin America, Mexico is the largest creative goods exporter worldwide.

Second, the GII 2020 assesses the balance of the innovation system within GII economies. Twelve economies boast top performance across all GII pillars (Table 1.1 in Chapter 1); this is rare. Even among the top 35, many economies have pillars in which they lag. For instance, Australia, Norway, and the United Arab Emirates (UAE) rank lower in Knowledge and technology outputs; and Israel and China are weaker in Infrastructure. The reverse is also true: several economies outside the top ranks are among the top performers in specific innovation pillars. For example, India's high ranks in Knowledge and technology outputs and Market sophistication far exceed its other GII rankings.

Third, the "GII Bubble Chart" continues to be the GII's most conspicuous means to identify innovation outperformance relative to an economy's level of development (Table B and Figure 1.6 in Chapter 1). Regionally, Africa shines on this count. Out of the 25 economies identified as outperformers, 8 are from Sub-Saharan Africa. India, Kenya, Moldova, and Viet Nam hold the record of being innovation achievers for 10 consecutive years (Table 1.3 in Chapter 1).

FIGURE E

## GII economies with the most top-ranked GII indicators, 2020



Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

Note: The GII methodology allows for multiple economies to rank first in an indicator; see Appendix II and Appendix IV.

TABLE B

## Innovation performance at different income levels, 2020

	High-income group	Upper middle-income group	Lower middle-income group	Low-income group	
<b>Above expectations for level of development</b>	Switzerland	China	Viet Nam	Malawi	
	Sweden	Armenia	Ukraine	Rwanda	
	United States of America	South Africa	India	United Republic of Tanzania	
	United Kingdom	Georgia	Philippines	Niger	
	Netherlands	North Macedonia	Republic of Moldova	Madagascar	
	Denmark	Thailand	Mongolia	Mozambique	
	Finland	Serbia	Tunisia	Nepal	
	Singapore	Jamaica	Kenya	Burkina Faso	
	Germany	Costa Rica	Morocco	Tajikistan	
	Republic of Korea	Bulgaria	Kyrgyzstan	Uganda	
	Hong Kong, China	Montenegro	Senegal	Togo	
	France	Brazil	Indonesia	Mali	
	Israel	Colombia	El Salvador	Ethiopia	
	Ireland	Malaysia	Zimbabwe	Guinea	
	Japan	Jordan	Uzbekistan	Benin	
	Canada	Mexico	Honduras	Yemen	
	<b>In line with level of development</b>	Luxembourg	Bosnia and Herzegovina	Cabo Verde	
		Austria	Iran (Islamic Republic of)	Cambodia	
		Norway	Peru	Côte d'Ivoire	
Iceland		Albania	Pakistan		
Belgium		Belarus	Ghana		
Australia		Mauritius	Egypt		
Czech Republic		Romania	Cameroon		
Estonia		Lebanon	Bolivia (Plurinational State of)		
New Zealand		Ecuador	Bangladesh		
Portugal		Azerbaijan	Zambia		
Italy		Turkey	Nigeria		
Cyprus		Argentina	Lao People's Democratic Republic		
Spain		Paraguay	Myanmar		
Malta		Russian Federation			
Latvia		Sri Lanka			
Hungary		Guatemala			
Slovenia		Namibia			
Croatia		Botswana			
Poland		Dominican Republic (the)			
Greece		Algeria			
<b>All other economies</b>	Chile	Kazakhstan			
	Slovakia				
	Lithuania				
	Uruguay				
	United Arab Emirates				
	Panama				
	Saudi Arabia				
	Qatar				
	Brunei Darussalam				
	Trinidad and Tobago				
	Bahrain				
	Kuwait				
	Oman				

Source: Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

## 5: Regional divides persist, yet some economies harbor significant innovation potential

Despite some innovation “catch-up”, regional divides exist with respect to national innovation performance: Northern America and Europe lead, followed by South East Asia, East Asia and Oceania, and more distantly by Northern Africa and Western Asia, Latin America and the Caribbean, Central and Southern Asia, and Sub-Saharan Africa, respectively.

Latin America and the Caribbean continues to be a region with significant imbalances (Figure 1.12 in Chapter 1). The region is characterized by its low investments in R&D and innovation, its incipient use of IP systems, and a disconnect between the public and private sectors in the prioritization of R&D and innovation. With low innovation inputs, the region also struggles to translate these efficiently into outputs. Only Chile, Uruguay, and Brazil produce high levels of Scientific and technical articles, and only Brazil ranks high in Patents by origin.

The African continent—comprising Sub-Saharan Africa and Northern Africa—has one of the most heterogeneous innovation performances across continents (Figure F). While some economies rank in the top 75 (e.g., South Africa, Tunisia, and Morocco), others rank much lower.

Innovation systems in Africa are broadly characterized by having low levels of science and technology activities, high reliance on government or foreign donors as a source of R&D, limited science-industry linkages, low absorptive capacity of firms, limited use of IP, and a challenging business environment.

But these are broad regional generalizations. Some economies within regions stand out because they harbor significant innovation potential.

For example, the typical innovation leader in Africa usually has higher expenditure on education (Botswana, Tunisia) and R&D (South Africa, Kenya, Egypt), strong financial market indicators such as venture capital deals (South Africa), openness to technology adoption and inward knowledge flows, an improving research base (Tunisia, Algeria, Morocco), active use of information and communication technologies (ICTs) and organizational model creation (Kenya), as well as a stronger use of their IP systems (Tunisia and Morocco). Innovation is also more pervasive in Africa than what existing innovation data suggest.

## 6: Innovation is concentrated at the level of science and technology clusters in select high-income economies, plus mainly China

Divides also exist as to the ranking of the global science and technology (S&T) clusters (Special Section: Cluster Rankings).

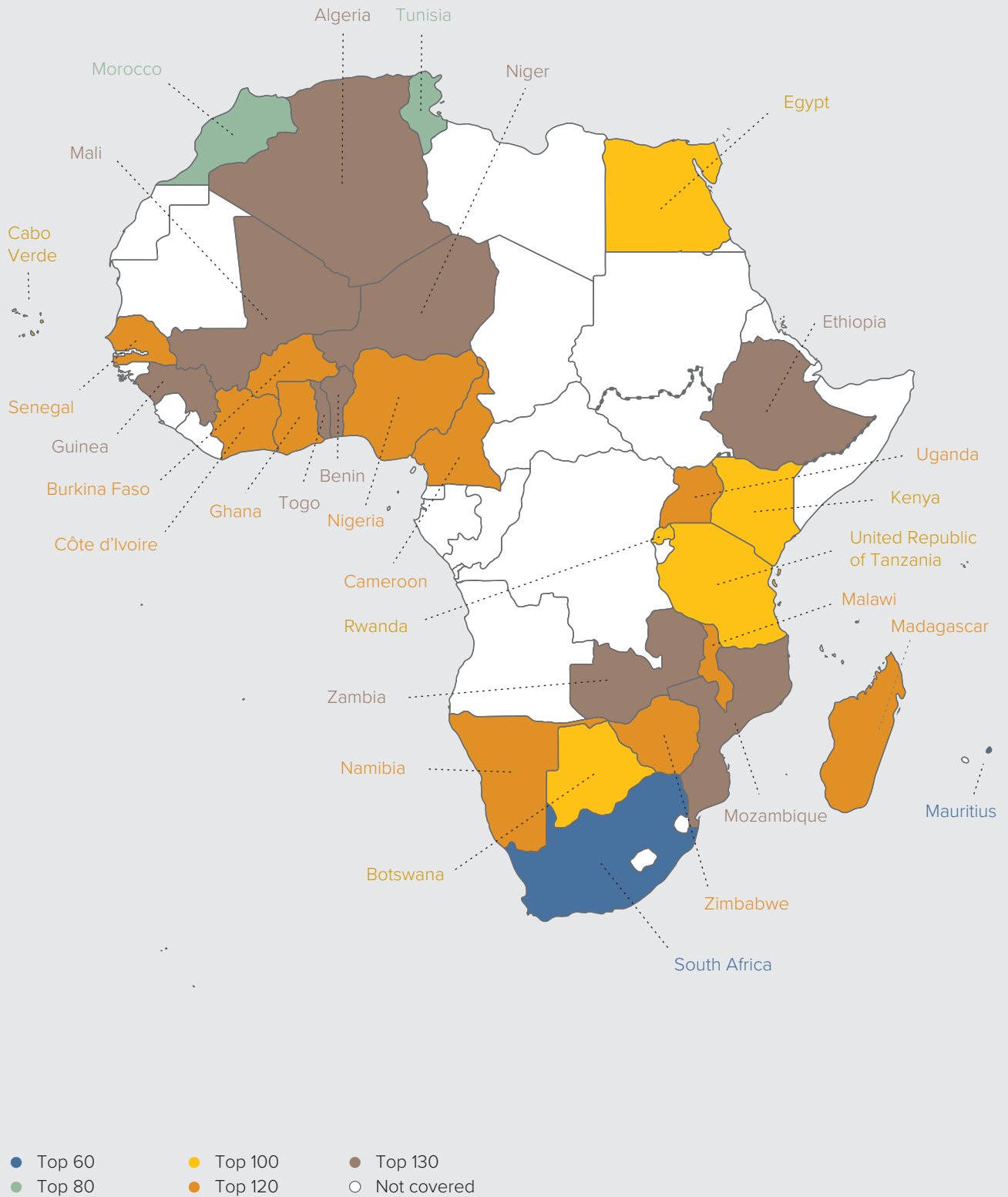
The top 100 clusters are located in 26 economies, of which 6—Brazil, China, India, Iran, Turkey, and the Russian Federation—are in middle-income economies. The U.S. continues to host the largest number of clusters (25), followed by China (17), Germany (10), and Japan (5).

In 2020, Tokyo-Yokohama is the top-performing cluster again, followed by Shenzhen-Hong Kong-Guangzhou, Seoul, Beijing, and San Jose-San Francisco (Table C).

For the first time, the GII 2020 presents the top 100 clusters ranked by their S&T intensity—that is, the sum of their patent and scientific publication shares divided by population. Through this fresh lens, many European and U.S. clusters show more intense S&T activity than their Asian counterparts. Cambridge and Oxford in the U.K. emerge as the most S&T-intensive clusters. These two clusters are followed by Eindhoven (the Netherlands) and San Jose-San Francisco (U.S.).

FIGURE F

## GII 2020 rankings in Northern Africa and Sub-Saharan Africa



Source: Figure 1.11 in Chapter 1.

TABLE C

## Top S&T cluster of each economy or cross-border regions, 2020

GII cluster rank	Cluster name	Economy	Rank change from GII 2019 to GII 2020
1	Tokyo-Yokohama	JP	0
2	Shenzhen-Hong Kong-Guangzhou	CN / HK	0
3	Seoul	KR	0
4	Beijing	CN	0
5	San Jose-San Francisco, CA	US	0
10	Paris	FR	-1
15	London	GB	0
18	Amsterdam-Rotterdam	NL	0
19	Cologne	DE	1
24	Tel Aviv-Jerusalem	IL	-1
27	Taipei-Hsinchu	TW	16
28	Singapore	SG	0
32	Moscow	RU	1
33	Stockholm	SE	-1
34	Eindhoven	BE / NL	-3
35	Melbourne	AU	0
39	Toronto, ON	CA	0
41	Brussels	BE	-1
43	Tehran	IR	3
45	Madrid	ES	-3
48	Milan	IT	0
49	Zürich	CH / DE	1
51	Istanbul	TR	3
54	Copenhagen	DK	1
60	Bengaluru	IN	5
61	São Paulo	BR	-2
68	Helsinki	FI	0
70	Vienna	AT	-1
89	Lausanne	CH / FR	-3
95	Basel	CH / DE / FR	-4
99	Warsaw	PL	1

Source: WIPO Statistics Database, March 2020.

## Conclusion

In conclusion, the GII continues to support and foster innovation across changing times. The aim of the GII is to provide insightful data on innovation and, in turn, to assist policymakers in evaluating their innovation performance and making informed innovation policy decisions. The GII 2020 edition—with its main conclusions on innovation developments generally, in the context of COVID-19 currently, and with respect to innovation finance specifically—makes a contribution to this effect.

At this juncture, when we face an increase of unilateralism and nationalism, it is important to remember that most economies that have moved up the ranks in the GII over time have strongly benefited from their integration in global value chains and innovation networks. China, Viet Nam, India, and the Philippines are prime examples.

There are now genuine risks to international openness and collaboration on innovation, however. Yet, if anything, the joint search for medical solutions during the pandemic has demonstrated how powerful cooperation can be. The speed and efficacy of this collaboration shows that internationally coordinated R&D missions can effectively counteract the tendency for increased isolationism and address important societal topics—now and in the future.

Future editions of the GII will track this phenomenon closely and continue the journey towards enabling policy and business leaders by fostering a better understanding and measurement of innovation.