

ARCHITECTONICS OF FISCAL SCIENCE AND DIVERGENCE OF CUSTOMS AND TAX INSTITUTIONS

Monograph.

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1. FINANCIAL POLICY FOR SUSTAINABLE DEVELOPMENT

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INNOVATION AND INVESTMENT POLICY TO ENSURE SUSTAINABLE DEVELOPMENT OF UKRAINE

The coronavirus disease (COVID-19) pandemic has triggered an unprecedented global economic shutdown – herefrom, some scientists suggest a decade-long slowdown, high unemployment rates, and lasting damage to globalized supply and value chains. The current crisis hit the innovation landscape too. It will be important to closely monitor the innovation finance goals set as per the United Nations (UN) Sustainable Development Goals (SDGs) in that light. The evolving political and economic climate since 2008 has brought about a revival in political and economic nationalism.

But 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.

But the COVID-19 pandemic is significantly exacerbating SDG financing gaps in developing economies, particularly in the LDCs and other structurally weak economies. International private investment will be key to alleviate public sector resource shortfalls for SDG-relevant investment and to spearhead the global campaign to build back better. Private investment constitutes the bulk of international resource flows to developing countries. In comparison, while cross-border greenfield investment in SDG relevant sectors in developing and transition economies amounts to about \$150 billion annually and international project finance for almost \$200 billion, total official development assistance was just over \$150 billion in 2019, with only about one third directed towards investment projects⁹⁹.

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

⁹⁹ Arundel, A., Athreye, S., & Wunsch-Vincent, S. (2020 forthcoming). *Harnessing Public Research for Innovation in the 21st Century* (WIPO Series on Intellectual Property, Innovation and Economic Development). Cambridge: Cambridge University Press.

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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. 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. Importantly, the direction of VC and innovation seems to have been redirected towards health, online education, big data, e-commerce, and robotics.

In 2020 investment and productivity growth around the world – of which innovation is an engine – were mostly sluggish by historical standards. This rather bleak account, however, was met with an upbeat innovation outlook. Over the last decade, average innovation expenditures worldwide have, in fact, been growing faster than GDP. According to our 2020 estimates, in 2017 and 2018, research and development (R&D) grew by 5.0% and 5.2% respectively – in line with the strong growth of the pre-crisis period and significantly stronger than global GDP growth. This growth in R&D expenditure – the highest over a six-year period – was sustained by growth in key emerging markets, such as China and India, and by leaders in high-income economies. China's R&D expenditure grew 8.6% in 2018, higher than the prior year. India's R&D spending growth in 2018 is estimated at 5.5%. In high-income economies, real R&D

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expenditure grew 3.8% in 2018. Expenditures grew 8.3% in the Republic of Korea, 3.4% in the United States of America (U.S.), 3.7% in Germany, and 2.4% in Japan (table 1).

Table 1

10 best-ranked economies by income group (rank)¹⁰⁰

№	High-income economies (49 in total)	Upper middle-income economies (37 in total)	Lower middle-income economies (29 in total)	Low-income economies (16 in total)
1	Switzerland (1)	China (14)	Viet Nam (42)	United Republic of Tanzania (88)
2	Sweden (2)	Malaysia (33)	Ukraine (45)	Rwanda (91)
3	United States of America (3)	Bulgaria (37)	India (48)	Nepal (95)
4	United Kingdom (4)	Thailand (44)	Philippines (50)	Tajikistan (109)
5	Netherlands (5)	Romania (46)	Mongolia (58)	Malawi (111)
6	Denmark (6)	Russian Federation (47)	Republic of Moldova (59)	Uganda (114)
7	Finland (7)	Montenegro (49)	Tunisia (65)	Madagascar (115)
8	Singapore (8)	Turkey (51)	Morocco (75)	Burkina Faso (118)
9	Germany (9)	Mauritius (52)	Indonesia (85)	Mali (123)
10	Republic of Korea (10)	Serbia (53)	Kenya (86)	Mozambique (124)

Private sector funding drove much of this growth in innovation expenditure as governments phased out the innovation stimulus measures they set up after 2009. The top 2,500 R&D companies invested 823 billion euros in R&D in 2018, an increase of 8.9% with respect to the previous period. Before the pandemic, global intellectual property (IP) filing activity also grew at a rapid pace, setting new records in 2018 and 2019. Worldwide patent filings grew by 5.2% in 2018; strong growth was also experienced in trademarks, industrial designs, and other forms of IP. The use of WIPO's IP systems also grew for the past decade, reaching a new peak in 2019. Before the crisis, venture capital (VC)

¹⁰⁰ Global Innovation Index Database, Cornell, INSEAD, and WIPO, 2020.

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and other sources of innovation financing were at an all-time high. Venture capital deal activity in North America, Asia, and Europe was healthy, with aggregate deal values climbing. Novel innovation financing mechanisms, including sovereign wealth funds, IP marketplaces, crowdfunding, and financial technology (fintech) solutions, contributed to the spike in innovation finance.

The more developed an economy is, the more it innovates, and vice versa. The curve in the figure1 below illustrates this rather predictable relationship between innovation and development.

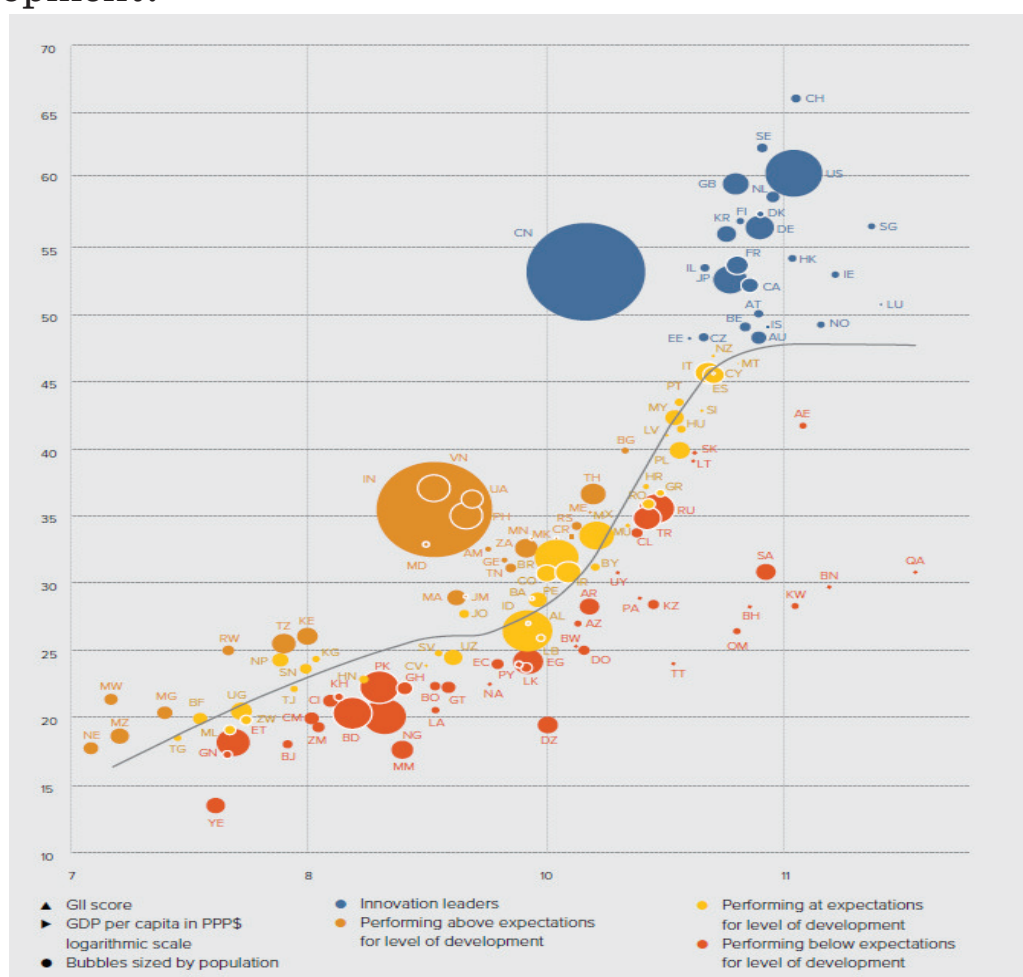


Fig. 1 The positive relationship between innovation and development¹⁰¹

¹⁰¹ Guadagno, F. (2020). Financing for innovation [background study to GII 2020, produced for WIPO]. URL: www.globalinnovationindex.org.

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Yet, some economies break from this pattern. They perform above or below expectations, relative to their predicted performance – sometimes so strongly. In this figure and analysis, the economies that rank in the GII top 25 are innovation leaders (in blue). The group of economies in this category is unchanged relative to last year with one exception: the Czech Republic joins this group. In return, New Zealand moves out. With the exception of China, all innovation leaders are high-income economies. Innovation achievers are those economies that outperform their peers (in orange). There are 25 economies in this group this year, the largest number ever. Jamaica and the Niger become innovation achievers for the first time.

Indeed, R&D expenditures are heavily concentrated in a couple of thousand firms across the globe, with the top 2,500 R&D-spending companies responsible for 90% of the world's business funded R&D, and the top 100 R&D-spending companies accounting for more than 50% of all corporate global R&D expenditures table 2 shows the distribution of global corporate R&D expenditures by sectors¹⁰².

Table 2

**Top R&D-spending sectors as share of global top R&D
spenders, 2018–2019**

ICT hardware and electronic equipment	23.5%
Pharmaceuticals & biotechnology	18.8%
Automobiles	15.6%
Software & ICT services	14.4%
Industrial engineering & transportation	3.8%
Travel, leisure, & personal goods	3.1%
Construction & industrial materials	2.9%
Chemicals	2.7%
General industrials	2.5%
Aerospace & defense	2.5%
Healthcare equipment & services	2.0%
Banks & financial services	1.7%

¹⁰² Global Innovation Index. URL: <https://www.wipo.int/globalinnovation/index/en>.

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Oil & gas	1.3%
Telecommunications	1.1%
Food and beverages	1.1%
Household goods	1.0%
General retailers	0.7%
Support services	0.5%
Media	0.3%
Alternative energy	0.3%
Real estate	0.2%

For most of top R&D corporations, innovation is now a vital component of their business strategy in an internationally competitive environment. Some top R&D spending firms are less negatively impacted by the COVID-19 crisis than others. An obvious example is software and ICT (information and communication technologies) services firms. Some of the top R&D spenders in this sector include ALPHABET (U.S.), Microsoft (U.S.), Facebook (U.S.), Oracle (U.S.), Alibaba (China), Tencent (China), Baidu (China), Softbank (Japan), and Ubisoft (France). These firms often hold vast cash reserves and, given the increased push to digitalization during this pandemic – namely the increase in Internet activity, cloud services, online gaming, and remote work – the revenue impact of the crisis on these firms might actually be positive. After the bursting of the dot-com bubble in the early 2000s and the financial crisis of 2008-2009, some of these firms reported strong growth in revenues and spent more on R&D. The current upbeat scenario is that firms expect to become profitable again after the temporary downturn and once economic confidence returns. The downbeat scenario is that, if the downturn and the negative impact on demand last longer, future profitability expectations and corresponding corporate investment will be adjusted downward.

Countries have donated large and unprecedented sums of money to inject into the search for a coronavirus vaccine. Health innovation-primarily in finding treatments and a

COVID-19 vaccine – is essential to overcome the lockdown and to avoid a deeper recession. Health-related innovation is key to the future. To emerge stronger from that crisis, governments created post-2009 stimulus packages that contained integral innovation related measures, including investments in infrastructure, research, green innovation, education, and support to innovation and innovative firms. These countercyclical innovation stimulus packages proved essential to stimulate R&D effectively and overcome shortages in finance innovation. After the worst scenarios of the lockdown have been averted, thanks to existing emergency measures, it will be crucial that support for innovation continues in an anti-cyclical way – even in the face of higher public debt.

As for Ukraine, the economic outlook was stable prior to the outbreak of COVID-19, with steady growth, moderate public debt and relative price and currency stability. However, a change of government in early March entailed a degree of political turmoil and reorganization that may have slowed the initial response.

Ukraine was already facing large foreign debt repayments in 2020, and negotiations with the IMF had stalled over issues like banking and land reform. Without an IMF deal, the risk of a sovereign default would increase. The unemployment rate in 2019 was above 9% of the labor force, the share of informal workers in the economy remains very high (up to 30%), and the social safety net is weak. The rise in unemployment so far has not been as sharp in Ukraine, although the unemployment rate reached 9.9% in Q2 2020 before falling back to 9.4% in Q3. Low domestic savings and limited fiscal space further constrain the ability of households or the public authorities to absorb exogenous shocks.

Throughout 2020 government of Ukraine set up emergency relief packages to cushion the impact of the lockdown and face the looming recession. Yet, these

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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. Investing in start-ups in Ukraine has also become a cornerstone of public innovation policies. Yet, start-ups are only one of the vehicles that facilitate firms' innovation, and the nature of innovation processes has deeply changed over the past few decades.

The contemporary innovation-intensive economy requires Ukrainian companies to have the capacity to repeat the development of potentially radical innovations at every stage of their existence to create sustainable long-term value. To do so, enlarging the range of existing products and making them increasingly more efficient is not enough: firms also need to shape «the unknown». In other words, current innovation management and design theory research insists on the crucial role of regeneration processes that do not only rely solely on the development of new profitable products but also on the extension of knowledge and exploration of unknown concepts. Mature companies in Ukraine in 2020 are confronted with these challenges to the same extent as growing start-ups.

Policy measures that stimulate investment, unlock future sources of growth, and encourage the pursuit of longer-term goals will be key going forward. This innovation orientation in future stimulus packages needs to be prioritized when the time is ripe – thus, when the most pernicious effects of the lockdown are averted by current short-term measures. Identifying which sectors or technologies need a boost will require work, however. As mentioned, the sectoral impact of the current crisis on innovation finance is uneven, with some sectors and firms doing well, whereas others are struggling.

Evidence-based policymaking will need a clear understanding of these sectoral differences, to possibly act with sector-specific innovation support measures when required.

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A firm's life cycle is usually depicted in four main linear steps, namely birth, expansion, maturation, and decline. Start-ups are often seen as the vehicle enabling the regeneration of the industry, by cannibalizing existing firms or by opening up new fields. However, innovation activities that sustain industry regeneration are not restricted to start-ups. While private equity support to innovation focuses on venture capital, investors also have a leading role to play in sustaining innovation in mature firms. However, current private equity investment models have not been tailored to support generative growth paths that enable the renewal of firms' activities over the long-run.

Fostering generative growth proves even more critical in lower-income countries. Regarding mature firms, most of those countries, currently face what is commonly called the «missing middle», which means that they suffer a shortage of small and middle-market firms that can spur national economic growth. Tempting aggregative growth strategies, such as the consolidation of an industry sector through the acquisition of multiple small firms by a platform company, certainly boost the growth of the selected firm but lead to misleading effects at the national level and occur at the risk of impeding national development. Besides, an increasing number of lower-income economies have embarked on programs to develop venture capital funds and attract additional national and foreign financial resources in order to fill equity gaps, boost innovation, and eventually enhance national competitiveness. Successful start-ups end up as mature firms. While launching their first products, start-ups will face the challenge of developing the next generations of innovation and the need to find investors supporting these generative growth strategies. A restricted public policy focused on supporting the mere provision of financial resources based on historical private equity strategies would likely worsen the liquidity gap. Thus, on

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top of the focus on reducing equity gaps, the challenges set by a liquidity gap shouldn't be underestimated. States have a leading role to play in structuring private equity industry, not only by providing additional financial resources but also by fostering new rationales supporting generative growth.

Generative growth should be carefully distinguished and prioritized. Public policies can contribute to tackling this challenge. Various stakeholders, investors, and companies can be trained to distinguish the needs of growing companies and adapt private equity strategies. The most recent strategies of innovation financing and management would help in this regard, especially to renew scouting, selection, post-investment, and exit processes. For instance, as disruptive innovation requires dealing with new design logic that goes beyond uncertainty reduction, it requires investors to master alternative reasoning on risk mitigation.

Besides, exploration is crucial to generative growth strategies; thus, investors can, for instance, support firms' involvement in side organizations that collectively explore innovation fields, as these ensure crucial sharing of new phenomena, technologies, uses, etc. Instead of composing a portfolio of independent firms, investors can benefit from these interactions by investing in firms that are investigating supplementary innovation fields. It could also be beneficial to design and promote investment strategies that enable some firms to pull out of private equity cycles and become independent again. Overall, the need for a balance between extension or enhancement activities on one side and regeneration strategies on the other occurs along the entire firm's life cycle and is even more significant in middle market firms. Thus, these recommendations apply, to various extents, to private equity investors of all asset classes.

Public-private partnerships can, and should, make efforts to provide financial security and support to enable budding entrepreneurs to take big risks and stick to them. Additional

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measures could include models encouraging young companies to collaborate more closely with each other and even merge to create more stable and scalable businesses.

It is important to capture the significant benefits of having MNCs within a national economy. Incentives to lure MNCs are common; have awarded them hefty tax incentives while offering MNCs access to unmatched talent and technologies. In exchange for those tax benefits and access to precious human capital, local governments should encourage MNCs to support innovation within and for the benefit of the local ecosystem. Rather than merely «absorbing» innovation, these programs would see MNCs investing in external, independent innovation hubs that leverage resources and expertise brought by the MNC to build strong and scalable enterprises, without a commitment to be absorbed into the MNC or to serve its exclusive proprietary needs. A rising tide lifts all boats – with a more vibrant and independent innovation platform supported by MNCs, the ecosystem as a whole stand to benefit.

Regulators should also work to create attractive growth opportunities for experienced domestic and foreign players to engage with the innovation ecosystem. In Ukraine where there are so many innovators, the fact that there so few growth funds have been – and continues to be – a major roadblock.

Partially the problem is in the scarcity of institutional investors playing major roles in the growth sector. Institutional investors shouldn't be the first in line to risk public capital on a field they don't fully understand, but it is up to regulators to catalyze their participation and make them more educated and comfortable with the specific challenges and value propositions of growth-stage companies. Even a small fraction of institutionally managed capital can dramatically shift the opportunity.

As in many emerging economies, investors in Ukraine have been liquidating their positions in local assets and

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moving their funds to safe haven assets. The policy action is very bold given the limited means available to the government and covers the groups most severely affected by the containment measures. With limited fiscal space and urgent need for IMF support, the authorities are under greater pressure than ever to meet the Fund's conditions. If Ukraine does not receive its second scheduled IMF tranche this year, and the corruption agenda further derails, even the massive issue of international Eurobonds would not suffice to maintain the financial stability, and the country may risk insolvability in the midst of a political crisis and a weak public administration.

In late 2019, the government's real GDP growth projection for 2020 was in the 3.7–4.8% range; however, the new government forecast points to a contraction in the range of 4-8% this year. The National Bank of Ukraine forecasts a contraction of 6-7%. Nonetheless, if containment measures are extended for much longer, these scenarios may further deteriorate. According to the latest economic forecast provided by the Ministry of Economic Development, Trade, and Agriculture, GDP growth is forecast to reach 4.6% in 2021, 4.3% in 2022 and 4.7% in 2023. Even if economic recovery is foreseeable in the years ahead, the pace and path of reforms in sectors such as energy, state-owned enterprises and decentralization will be critical to ensure a positive outcome in the longer term.

Due to the COVID-19 pandemic, Ukraine may face the worst recession in decades, leaving more than 9 million people in poverty. UN OCHA in Ukraine reports that since the beginning of the pandemic, more than 80% households have lost income and in more than 40% of families, at least one family member has lost her/his job. Although there is no data on eastern Ukraine, the socio-economic consequences of the pandemic in the conflict-affected region will be destructive¹⁰³.

¹⁰³ The covid-19 crisis in Ukraine. URL: <https://www.oecd.org/eurasia/competitiveness-programme/eastern-partners/covid-19-crisis-in-ukraine.pdf>.

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First, notwithstanding the current tragedy, crises are often a source of creativity and innovation, and, at times, industrial renewal. The COVID-19 crisis has already catalyzed innovation in many sectors, such as education, remote work, and retail. It might accelerate progress and industrial renewal more broadly. The opportunities for breakthrough technologies and innovation continue to abound, for example, artificial intelligence, robotics, 3D printing, or nanotechnology.

Second, to reduce damage and catalyze change, it will be essential to assess the short-term and longer-term impacts of the pandemic on the science and innovation systems. It will be important to kick-start dormant innovation projects and to assess the harm caused. On the one hand, the crisis to date has halted ongoing research projects outside of COVID-19. Universities, research institutes, and big science infrastructures are shut down. A survey of researchers has shown a decline in work hours, in particular for female researchers with children.

Third, the crisis might further impact the international openness and knowledge flows so critical to the development of future innovation leaders from emerging economies and, more generally, to international innovation networks.

Restrictions in knowledge and technology diffusion, the unraveling of the global economy, and a return to nationalist policies are risks to innovation. Ukrainian policy-makers are well advised to ensure that this scenario of more nationally-oriented innovation systems is averted.