

CHALLENGES AND OPPORTUNITIES OF CROATIA'S NATIONAL INNOVATION SYSTEM



UNLEASHING ECONOMIC PROSPERITY THROUGH R&D AND INNOVATION



Croatia’s muted growth in recent years may be attributed to low productivity, especially outside of tourism

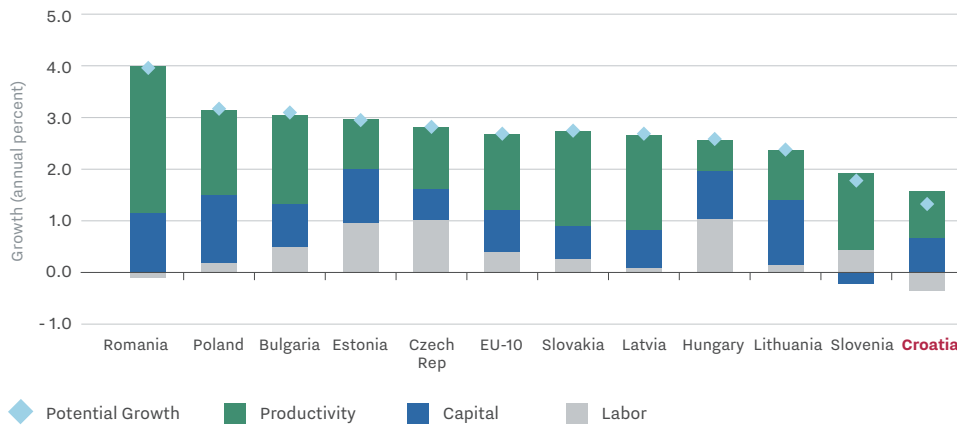
Productivity is low because resources are going to less productive firms

Productivity, a key determinant of growth, is low in Croatia, with no tendency toward converging with more developed economies. Between 2015 and 2018, growth in Croatia was muted, with a lower contribution of productivity to economic growth compared to peer countries (Figure 1). In most sectors, apart from hotels and restaurants, Croatian firms are 2-3 times less productive than the average EU firm. At the same time, in Croatia, more productive firms tend to create better-paying jobs. Raising productivity can help Croatia address its demographic challenges of an aging population and net negative migration. Productivity can be raised through innovation, adoption of better technologies, better managerial practices, as well as better conditions for market competition, entry, and exit.

A deeper analysis of productivity suggests that, while existing firms have become more productive, more productive firms have not expanded their market share. In other words, economic resources (capital and labor) are going toward less productive firms. This means that there are barriers to efficient competition, such as market entry and exit conditions, and similar.

FIGURE 1

Potential economic growth in Croatia between 2015 and 2018 was low



Source: European Commission.

Business environment conditions and lack of market competition contribute to misallocation of resources and discourage innovation

Most international benchmarks for ease of doing business place Croatia well behind its peers, especially when it comes to business dynamism, firm entry and exit. Market entry procedures are burdensome and costly, as evident from Croatia's low Doing Business ranking on registering a business (114th). Starting a business involves seven procedures lasting 19.5 days and costing 6.2 percent of income per capita. The insolvency framework is inefficient and impedes businesses from exiting and re-entering markets, contributing to resource misallocation and discouraging innovation and risk-taking. State-owned enterprise reforms are still incomplete, and product and service market regulations remain restrictive, despite recent progress.

Weaknesses in access to finance, especially at early stages of firms' life cycle, hamper business dynamism

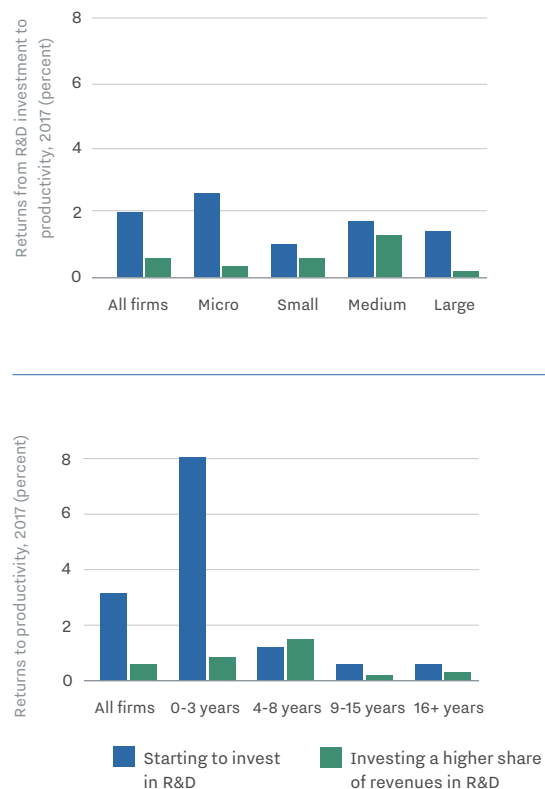
The availability of early-stage financing is critical for the survival and growth of innovative start-ups. Croatia's bank-centric financial system caters mostly to incumbent firms, while significant gaps in early-stage finance persist. In 2017, Croatia was at the bottom of business angel investments compared to peers. Most of the assets of risk capital funds in Croatia are concentrated private equity funds, investing in more mature medium-sized enterprises with stable cash flows. True venture capital activity is severely limited, in part due to regulatory restrictions.

One opportunity to raise Croatia's productivity could be to support R&D-based innovation, especially in smaller and younger firms

While Croatia has been catching up with the EU on non-R&D innovation, R&D-based innovation has been stagnant. Few firms spend on R&D, and firms that spend on R&D have a low share of R&D in total expenditures. At the same time, there is a positive relationship between R&D-based innovation and productivity growth in Croatia. All firms see productivity gains from investing in R&D, but they are up to two times higher in micro firms and up to ten times higher in young firms (Figure 2).

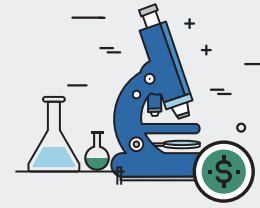
FIGURE 2

Micro and young firms see the highest returns from R&D spending



Source: Staff calculations based on FINA data.
 Note: The reported figures are partial correlations estimated from a regression of TFP growth on investment in R&D and other intangible assets, controlling for firm age, size, industry and ownership.

UNDERSTANDING THE CAPABILITIES AND POTENTIAL OF THE RESEARCH SECTOR



Reform in the public research sector is incomplete, limiting its ability to foster research excellence and create linkages with the economy

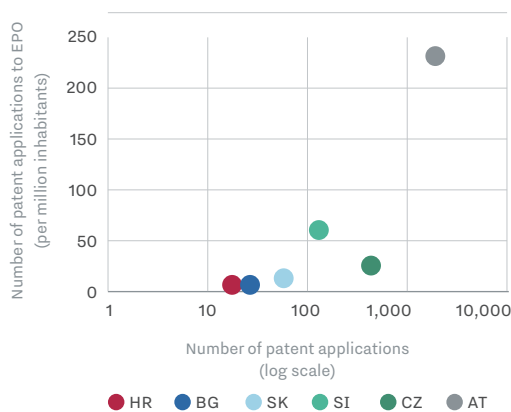
Collaboration and internationalization are key to increasing the quality of publications

Fragmentation and weak governance in the research sector do not allow for the implementation of transformative actions in the system. The lack of competitive research hampers internationalization and encourages brain drain. The current governance and institutional framework stifles R&D activities of higher education institutions and disincentivizes collaboration both (i) within the research sector and (ii) between the research sector and the private sector. The career advancement system provides no incentive for researchers to pursue research that would promote innovation, working with business, or to foster technology transfer. Commitment to technology transfer is weak, as demonstrated by a lack of institutional and financial support and inadequate support systems. The result is limited commercialization of research results and low patenting (Figure 3), trademark and design applications.

Croatia is among European countries with the highest average of uncited papers per full-time equivalent (FTE) researcher (Figure 4), with a few notable pockets of excellence. Half of the published papers get cited once every two years or less. Some institutions consistently outperform their peers in terms of research quality. However, the discrepancies in performance are not reflected in funding patterns, which appear to favor institution size rather than research excellence criteria. Internationalization and collaboration raise the quality of research outputs and help national research actors integrate into global research networks. Publications resulting from international collaboration tend to get cited more (Figure 5). Even national collaboration is better than no collaboration. Papers published by authors from two or more national institutions tend to attract more citations than papers originating from a single institution.

FIGURE 3

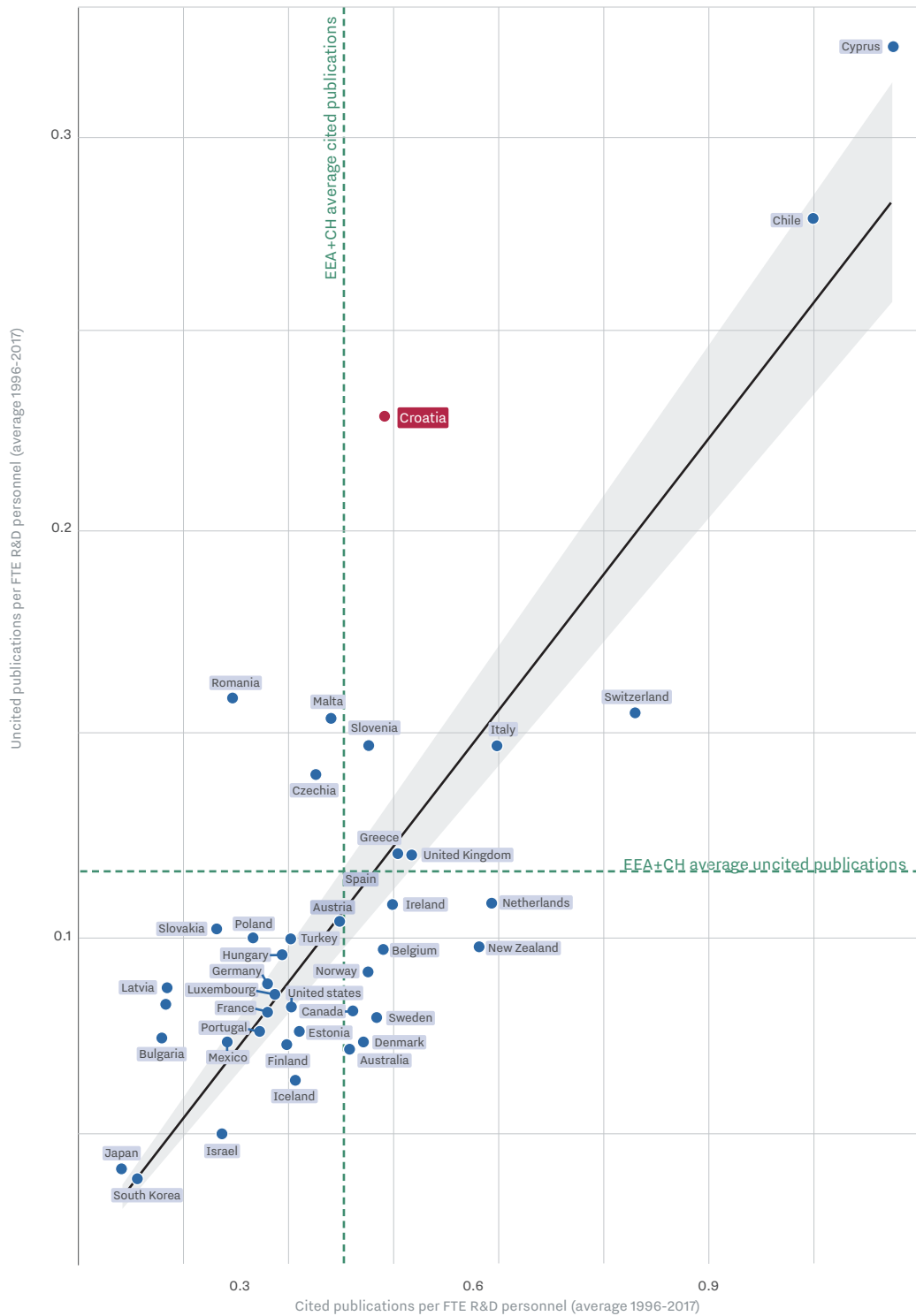
Croatia has the lowest number of patent applications (EPO) compared with peers and in EU



Source: Eurostat.

FIGURE 4

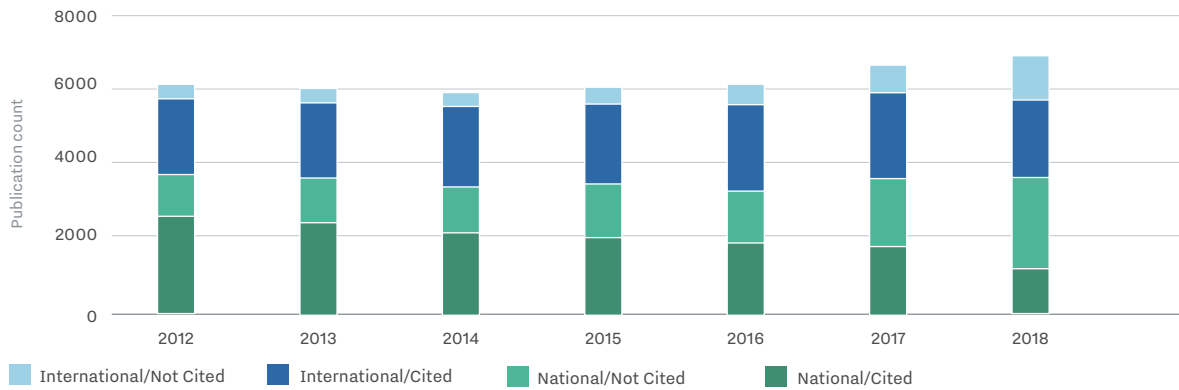
Croatia overproduces publications while exhibiting low scientific efficiency



Source: Staff elaboration based on Scimago and Eurostat data.

FIGURE 5

International collaboration reduces the share of uncited publications



Source: Staff elaboration based on Scopus data.

REVIEWING CROATIA'S INNOVATION PERFORMANCE

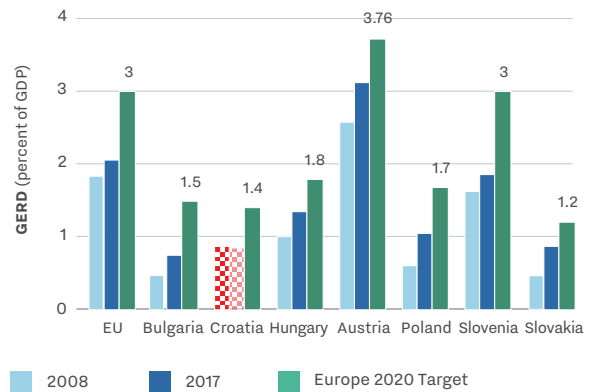


Croatia is falling behind the EU in multiple aspects of innovation performance

The summary innovation index of the European Innovation Scoreboard 2019 places Croatia at the bottom of the group of so-called moderate innovators, ranking 32nd of 36 countries. Croatia's poor performance can be attributed to low scores on investment, scientific productivity, public-private collaboration, creation of intellectual assets, and access to early-stage finance. A similar conclusion may be drawn from the Global Competitiveness Report 2019, which ranks Croatia 73rd (of 141 countries) on innovation capability, its lowest score among all of the competitiveness indicators measured. Despite access to significant EU funds, Croatia is not getting closer to meeting R&D intensity targets set as part of the Europe 2020 strategy (Figure 6).

FIGURE 6

Croatia has not progressed toward its Europe 2020 target



Source: Eurostat.

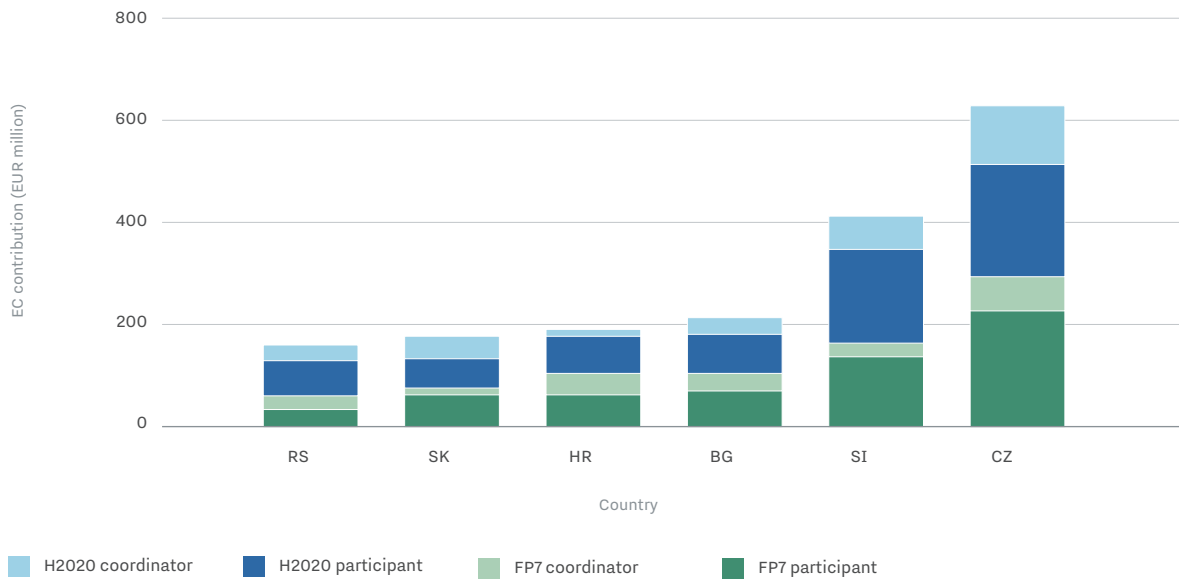
Croatia has had limited success in attracting internationally competitive funding for R&D

Croatia’s overall performance in internationally competitive programs for science and innovation is among the lowest in the EU. This is especially significant when it comes to the EU’s eighth Framework Programme (FP)

for R&D and innovation, Horizon 2020. With one year left until program closure, Croatia is yet to surpass the amount it absorbed during the seventh FP, and it also performs poorly compared to peers (Figure 7). In recent years, Croatia has improved the quality of its proposals, as demonstrated by a higher-than-average success rate of eligible proposals. However, the volume of eligible proposals has not increased, resulting in a negative effect on overall absorption. Systemic weaknesses of the RDI framework and legacy constraints are likely an underlying issue for Croatia and its inability to take full advantage of EU financing.

FIGURE 7

Croatia lags EU and regional peers in attracting Horizon 2020 funding, and is yet to reach the level of FP7 funding



Source: Community Research and Development Information Service (CORDIS), 2019.

RECOMMENDED ACTIONS

Support R&D investment in younger firms in knowledge-intensive sectors to target productivity growth because young and micro firms see the highest productivity gains from R&D spending.

Improve conditions for market entry, exit and competition by facilitating business registration, simplifying bankruptcy and insolvency regimes, resuming the reform of state-owned enterprises and reducing regulatory restrictions on services.

Amend the legislation regarding establishment of alternative investment funds to reduce tax and operational burdens for venture capital funds.

Simplify the governance of public research institutions by integrating public research organizations and reinforcing accountability principles. This would allow for the kinds of transformative actions that are impossible under the current highly fragmented structure, such as rewarding research excellence and providing incentives for collaboration and internationalization.

Foster public-private linkages by supporting technology transfer activities and allocating more funds toward applied research and experimental development. This should help the public research sector get closer to the market, commercialize its research and transform new knowledge into intellectual property.

