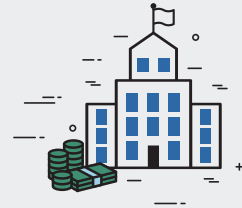


PUBLIC SPENDING IN CROATIA ON SCIENCE, TECHNOLOGY AND INNOVATION

The science, technology, and innovation (STI) policy mix in Croatia consists of budget financing for public higher education institutions (HEIs) and public research institutes (PRIs), and project-based financing from EU, national, and other sources. This brief presents an overview of STI financing and explores whether the composition of STI spending effectively addresses the challenges and opportunities of Croatia's National Innovation System.



INTENSITY AND COMPOSITION OF BUDGET SPENDING ON SCIENCE, TECHNOLOGY AND INNOVATION

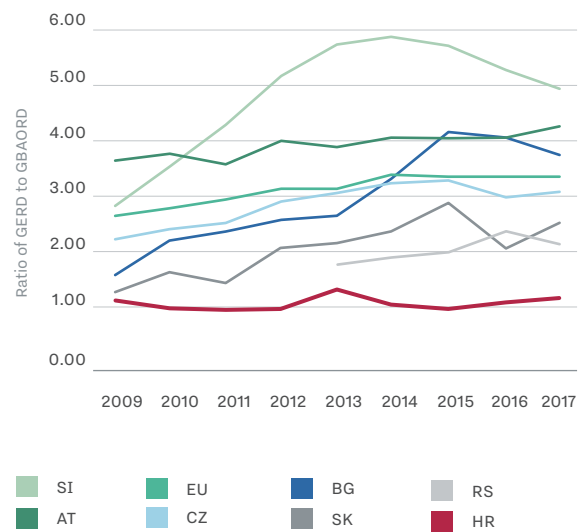


Budget spending on R&D has increased in recent years, but this has had a limited effect on national spending on R&D

Total budget spending on R&D in Croatia has grown since 2013, from around EUR 260 million per year to EUR 350 million per year in the last three years. However, this is still half the level of the EU in per capita terms. Moreover, budget spending on R&D in Croatia is creating very limited spillover effects on the rest of the economy (Figure 1), as evidenced by stagnant gross expenditures on R&D (GERD) in the last decade. In fact, government-funded business expenditures on R&D have been historically low (Figure 2), suggesting that a significant portion of public funds is reabsorbed by the public sector and does not stimulate private funding. With a more effective policy mix, access to EU funding could provide an opportunity for Croatia to increase GERD in the upcoming period.

FIGURE 1

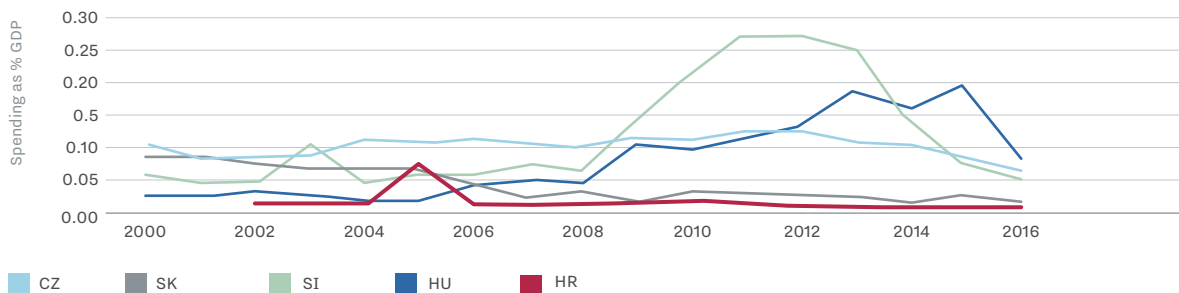
Spillover effects of government spending are the lowest among peers



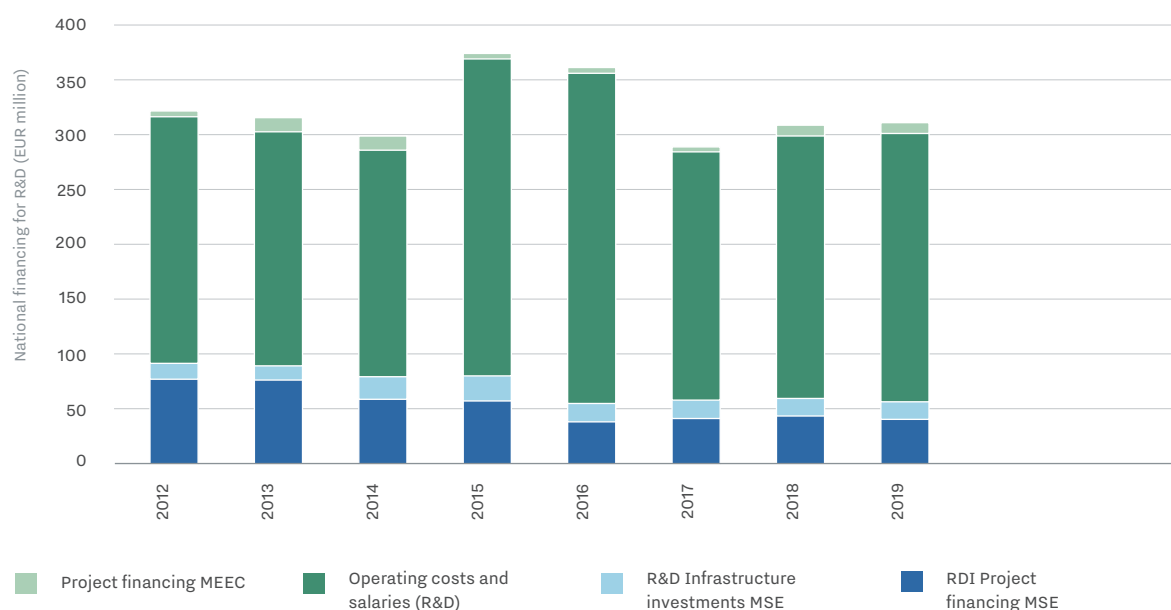
Source: Staff calculations based on EUROSTAT, 2019.

FIGURE 2

Government spending on BERD has been historically low



Source: OECD.

FIGURE 3*Operating costs and salaries dominate in the structure of RDI spending*

Source: Staff elaboration based on national budget data

Note: Operating costs and salaries (R&D) were estimated by assuming half of the allocation for HEIs is related to R&D.

The bulk of institutional financing for STI is spent on public research organizations, with a limited performance-based component

Most of institutional financing for STI is delivered by Ministry of Science and Education (MSE) through public funding of higher education institutions and public research institutes (Figure 3). This covers salaries of academic staff and researchers, as well as other salaries and overheads. Recently introduced performance-based agreements are an attempt to stimulate research excellence through a more meritocratic and transparent distribution of funds. However, these arrangements are still optional and constitute a small portion of the financing of HEIs and PRIs. The high fragmentation of the research sector further dilutes the already small performance-based allocation, severely limiting incentives for excellent, market-oriented research.

The substitution of national RDI project financing with ESIF funds should be reversed

The national budget allocation for research, development and innovation project financing has halved from 2013 until 2019 (to EUR 40 million) likely due to substitution with EU funding. This substitution is not entirely equivalent because European Structural and Investment Funds (ESIF) funding has a more complex governance framework and imposes a greater administrative burden on both institutions and potential beneficiaries. National funds for research, development, and innovation (RDI) could be used to complement ESIF financing, especially in programs that require a greater degree of flexibility and faster processing.

CHARACTERISTICS OF THE PORTFOLIO OF PROGRAMS SUPPORTING SCIENCE, TECHNOLOGY AND INNOVATION



Project financing constitutes an important portion of the policy mix thanks to a substantial allocation from European Structural and Investment Funds

The supported outcomes, objectives and target beneficiaries are broad and do not entirely correspond with the needs of the National Innovation System

After adopting its Smart Specialization Strategy (S3) in 2016, Croatia gained access to substantial ESIF resources for innovation (EUR 979 million, Figure 4), giving project financing a more prominent role in the policy mix. The complex governance framework for ESIF financing creates some practical challenges. The MSE and the Ministry of Economy, Entrepreneurship and Crafts (MEEC) are in charge of around 90 percent of the available funding, but other ministries also have some funds at their disposal, most notably the Ministry of Regional Development and EU Funds, the Ministry of Agriculture, and the Ministry of Environmental Protection and Energy. In addition, the Ministry of Labor and Social Protection is involved as the Managing Authority for European Social Fund (ESF) financing. This form of institutional complexity makes coordination all the more important to ensure that there are no overlaps or gaps in the policy mix.

On the research sector side, most of the funding was dedicated to research excellence, but its effects are yet to be seen. Notably missing are programs that support technology transfer, which is a weak link in the innovation chain in Croatia. The portfolio of support programs for the business sector is heavily skewed toward interventions to support existing firms, while diversification and new ventures are supported to a lesser degree (Figure 5). Similarly, there are few, if any, focused interventions for access to finance for innovation and managerial capabilities (Figure 6). Some programs bundle together SMEs and large firms (Figure 7), which makes program design more challenging and puts smaller firms at a disadvantage considering the resources necessary to apply for funding. Similarly, there appears to be little targeting in terms of firm age at program design stage. In practice, ESIF funding went predominantly to mature companies, especially those established before 2010. Tailoring program design to the needs and capacities of the target beneficiaries and the desired outcomes would help Croatia achieve its overarching growth and productivity objectives.

FIGURE 4

Project financing was predominantly funded from EU sources

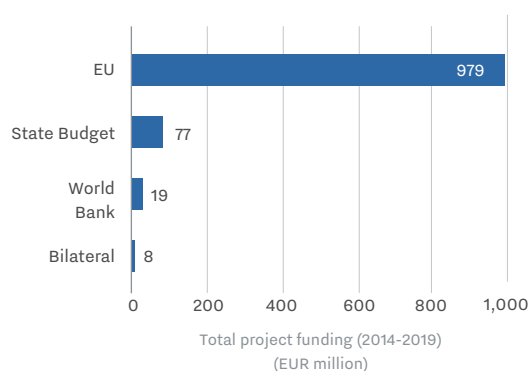
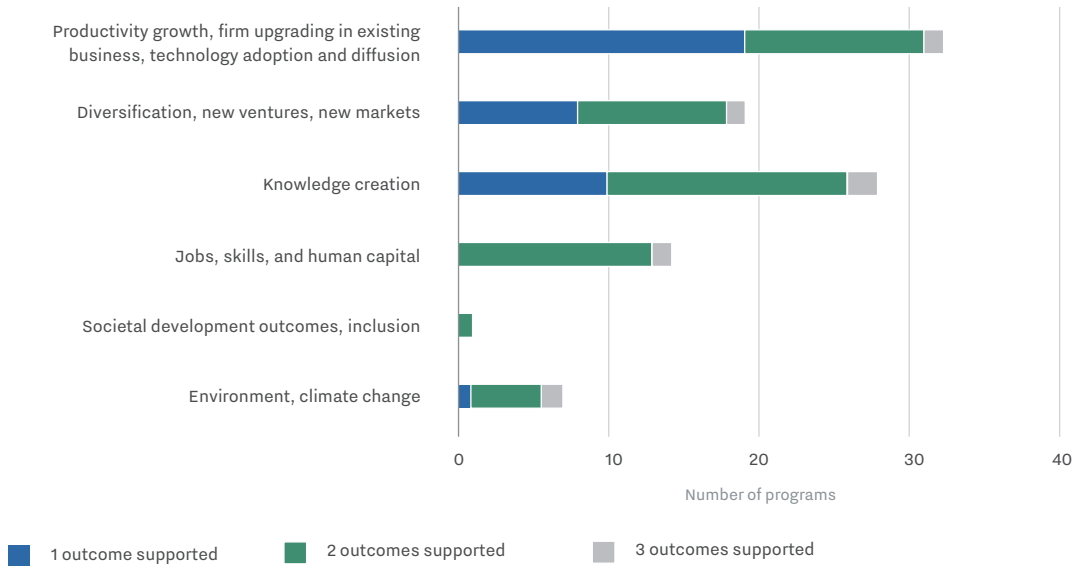


FIGURE 5

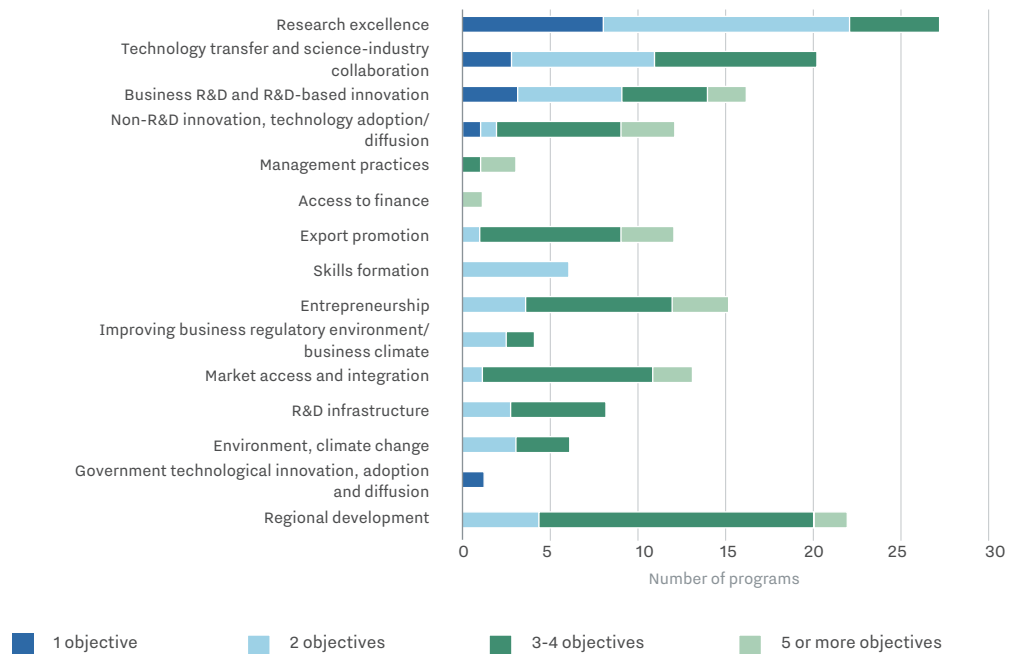
Most programs aim to support firm upgrades in existing markets and knowledge creation



Source: Staff elaboration.
 Note: One program may have multiple outcomes.

FIGURE 6

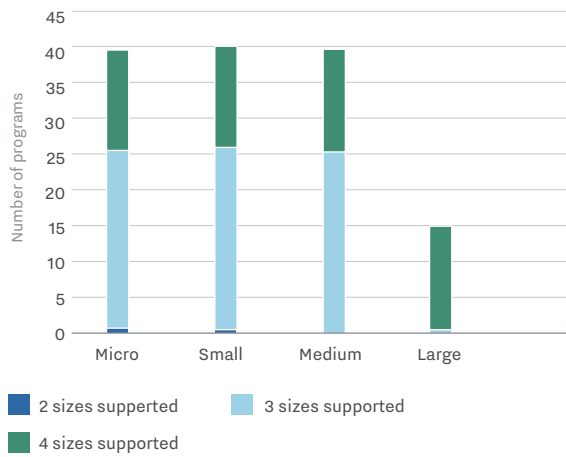
Research excellence is the most frequent objective



Source: Staff elaboration.
 Note: One program may have multiple objectives.

FIGURE 7

Some programs bundle support for SMEs and large firms



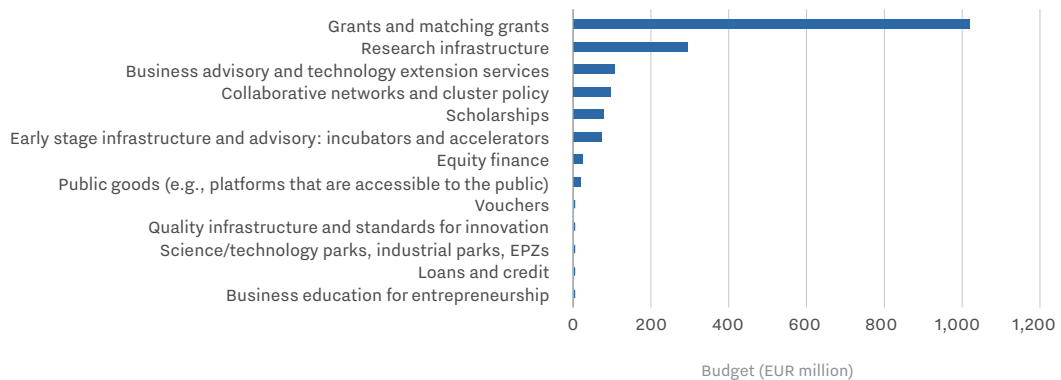
Source: Staff elaboration.

The policy mix relies heavily on grants, while other forms of finance are underutilized

Overall, there is a lack of variety in the support instruments to finance innovation. The portfolio of support programs is overwhelmingly based on grants (Figure 8). This may not always be the optimal mechanism to elicit the behavioral changes needed for the STI system to work more efficiently. Only one recently introduced support program (Venture Capital Fund) is devoted to closing the gap in early stage financing of innovation. Initial feedback suggests that there is a demand for the program, and that it could even spur migration of start-ups to Croatia. Other forms of financing such as loans and loan guarantees are not prominent in the policy mix, likely due to the abundance of grants.

FIGURE 8

Grants are the dominant instrument, both in number of programs and in allocated budget



Source: Staff elaboration.

There is a strong focus on research in the public sector and commercialization in the private sector

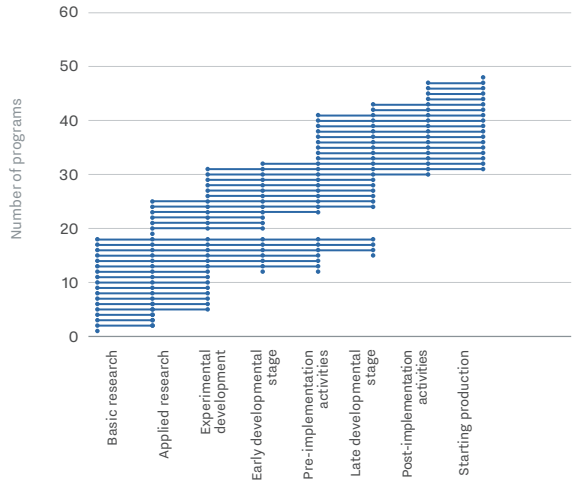
Several programs have experienced implementation delays, which vary depending on the lead institution and budget size

Many programs cover a seemingly wide range of R&D and technology readiness level phases (Figure 9). In fact, 15 programs cover five or more phases. While this may provide flexibility, it obscures biases ingrained in the design of the program. Depending on the lead ministry in charge of the program, elements such as selection criteria, results framework, or eligible partners favor either pure research or commercialization. This leaves the innovation pipeline underserved, particularly for technology transfer and early-stage private sector research.

Many programs, including some of the largest ones, have experienced implementation delays. This is mainly due to complex program design and slow application evaluations. In some cases, evaluations have taken several years. On average, it takes ten months for projects to complete the cycle from call announcement to contract signing, though the length of the process varies depending on the lead institution and budget size (Figure 10). Language restrictions have made finding experts in frontier fields very difficult.

FIGURE 9

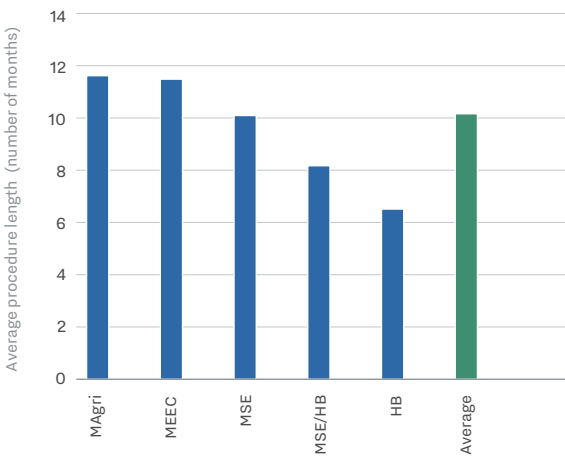
Many programs have a very broad coverage of R&D phases



Source: Staff elaboration.
 Note: Excludes infrastructure projects.
 The horizontal lines represent programs that cover different R&D phases.

FIGURE 10

Some programs have experienced implementation delays



Source: Staff elaboration.
 Note: Procedure length calculated as number of months between call start and contract signing.

RECOMMENDED ACTIONS

Use the existing interministerial National Innovation Council (NIC) as a platform for regular, structured discussions and coordination between different line ministries for STI support and financing.

Review and streamline the process of program design and implementation to minimize administrative burdens and delays.

Establish a dedicated innovation agency with a clear mission to support MSE and MEEC through policy coordination, design, monitoring and evaluation.

Increase national funds for RDI to finance projects that require a greater degree of flexibility (e.g., proof of concept), build up the pipeline of applications for ESIF funding, or facilitate procedures within ESIF-funded programs.

Introduce a mechanism of institutional financing of technology transfer offices in public research organizations.

Increase innovation financing through ESF, with a focus on increasing human capital for research and innovation.

Provide more targeted funding to smaller and younger firms in knowledge-intensive sectors, with a simple application process that does not require a lot of resources.

Design soft support programs and interventions to motivate smaller and younger firms to invest in R&D, as well as to improve managerial capabilities and investment readiness in start-ups.

Provide tailored and targeted funding for R&D stages between research and commercialization.

Improve the link between innovation market failures and appropriate policy instruments, especially addressing the lack of lending and loan guarantees for innovation.

