

# Challenges for science and Technology in the post-COVID-19 era

Organization of R & I and Higher Education in  
Croatia



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# Croatian higher education and research landscape

- Croatia is the newest member joining the European Union in 2013.
- Roughly 4 million inhabitants, 163 000 students
- Higher education system comprise mainly public HEI (over 90 % students) and several private HEI (<10% students)
- HEA in Croatia consist of:
  - 12 universities (9 public, 3 private),
  - 17 universities of applied science (11 public, 6 private),
  - and 18 high schools (3 public, 15 private).
- About 30% students study one of the study programs in the STEM area.

- Most of Croatian research and higher education facilities are located in Zagreb with the University of Zagreb being the largest university in Croatia with more than 72 000 students and over 7000 teaching staff.
- the largest public institute “Rudjer Bošković” employs more than 500 researchers and is also located in Zagreb



# Legislation framework for technology-oriented research

- National Science, Education and Technology Strategy
- Smart specialization strategy
- National innovation strategy

# National Science, Education and Technology Strategy

- The gross domestic expenditure for research and development undertaken in 2013. was low, and it has been declining.
- The share of the business sector was much too low and far below the European average.
- General refocusing of expenditures towards research and innovation, and towards small and medium-sized enterprises
- Incentives and support to strengthen the role of small and medium-sized enterprises in research, development and innovation,
- Establishment and growth of innovation enterprises was set as priority,
- The growth of investments of the business sector in external services of R&D and in the acquisition of external knowledge had been foreseen to depend on the competitiveness of the higher education and research community, as well as on state measures for strengthening research, development and innovation.

# Smart specialization strategy

- Two specific strategic goals
  - the increase of the capacity of the science-research sector for executing high quality research that reflect the needs of the economy
  - modernization and diversification of Croatian economy through investments of the business sector in research, development, and innovation
- Thematic areas:
  - Health and life quality
  - Energy and sustainable environment, traffic, and mobility
  - Safety
  - Food and bio-economy

# National innovation strategy

- two strategic goals:
  - incentivizing co-operation and knowledge stream between the business, public, and research sectors
  - strengthening human potential for innovation and creation of supportive environment for internationally competitive researchers

# What do all strategies have in common?

- All three strategic documents clearly defined the need of intensifying collaboration between universities and public institutes on one side and the production and service providing organizations on the other.
- Initiative in the development of collaboration was on the side of the governmental bodies and should have been achieved by incentive financing of joint projects.
- Different programs have been outlined providing budgets for research oriented technology development for one, or both partners in the project.
- Strengthening of capacities of institutional support of technology oriented research was required.



# Institutional support of technology-oriented research

- Ministry of Science and Education
- Croatian Science Foundation
- Croatian Agency for SMEs, Innovations and Investments (HAMAG-BICRO)
- BICRO-BIOCENTRE
- University/faculty technology transfer centres and units

# What is the outcome ?

- Generally, the public research and innovation sector in Croatia is still underbudgeted
- Gros Domestic Spending on R&D (GERD) increased in the period 2015 to 2019 by 60% (in the same period the increase of GERD in EU28 was 16%).
- Administrative obstacles removed
- Steady increase in the European Innovation Score from 57.57 to 78.22 in the period 2015-2021 resulting in a comparative shift of Croatia from rank 29 to 26 out of 38 European countries
  - R&D expenditures in the public sector are ranked 18, while those in the business sector are ranked 26
  - pronounced trend of opening new SMEs (in 2021 Croatia is ranked 2<sup>nd</sup> in the category “Enterprise births”, and 10<sup>th</sup> in “SMEs”)

# What have we learned ?

- Research and innovation oriented economy can be promoted only systematically by remodeling the public investments in research
- Strategic (legislative) framework is required
- European funds can be applied to fulfill the strategic goals (EFRD, ESF, JTF)
- Obstacles:
  - Inertness of the academic system
  - Personal security of the population
  - Lack of readiness for taking new political decisions

