

# Croatian Science and Technology System

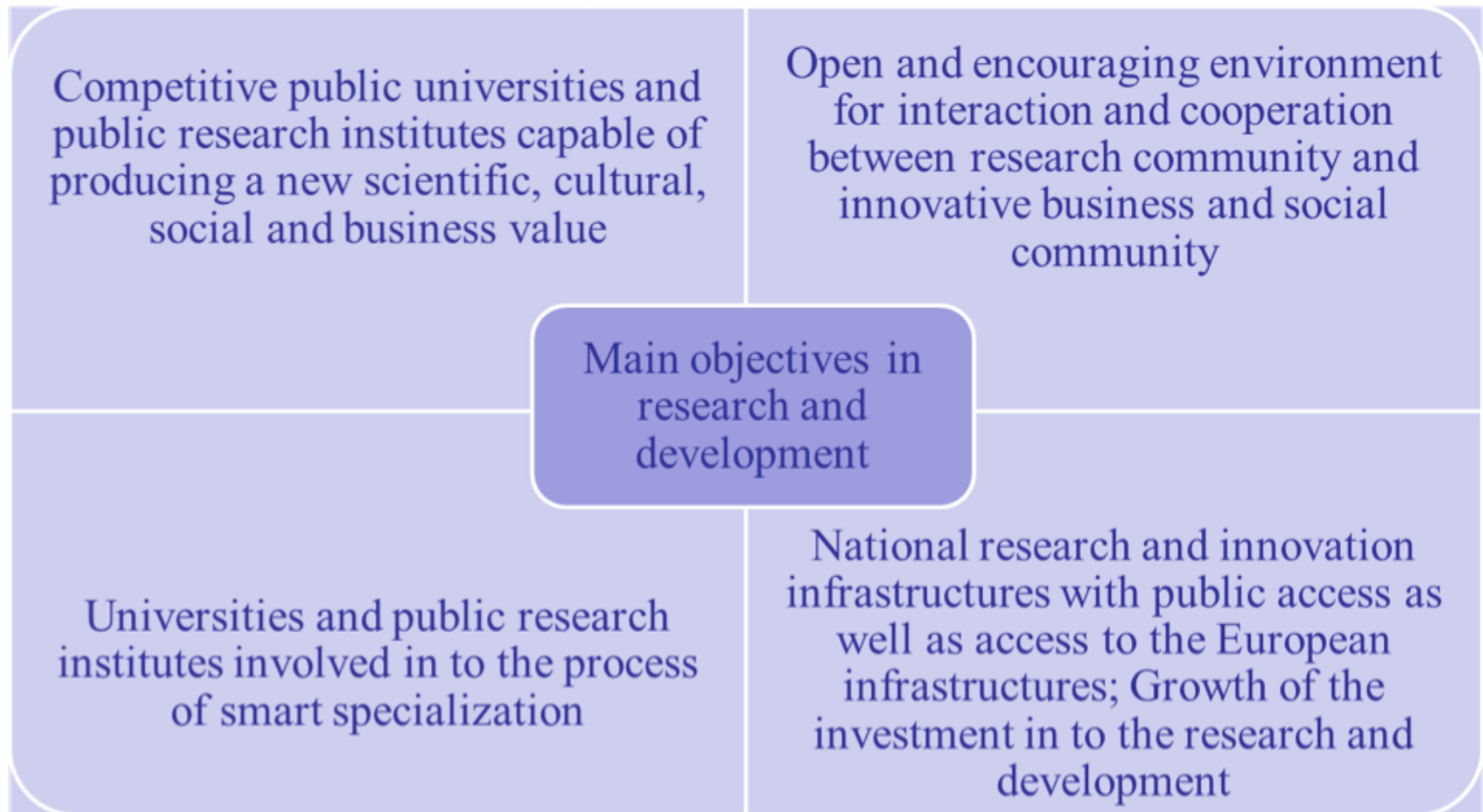
Tome Antičić, Ph.D.

Ministry of Science and Education

## Strategic documents

- In 2014 the Croatian parliament adopted the **Strategy of Education, Science and Technology** and the Croatian government adopted the **National Innovation Strategy for period 2014-2020**
- **Croatian Research and Innovation Infrastructure Roadmap** was adopted in 2014 and revised in 2016
- **Smart Specialization Strategy** was approved by the European Commission in December 2015 and adopted by the Croatian Government in March 2016

# Strategy of Education, Science and Technology



# National Innovation Strategy - indicators and goals until 2020

<b>Gross expenditure on R&amp;D 0.81%</b>		<b>Gross expenditure on R&amp;D 1.4%</b>
<b>Business expenditure on R&amp;D 0.41%</b>		<b>Business expenditure on R&amp;D 0.7%</b>
<b>7% total investments in R&amp;D related to innovation projects</b>		<b>33% total investments in R&amp;D related to innovation projects</b>
<b>6.6 PCT patent applicatins per million inhabitants</b>		<b>25 PCT patent applicatins per million inhabitants</b>
<b>14.7% foreign direct investment related to R&amp;D</b>		<b>25% foreign direct investment related to R&amp;D</b>
<b>Researchers in the business sector 1.164</b>		<b>Researchers in the business sector 1.571</b>



## Increasing the level of competitiveness of the Croatian economy and increase social well-being as a result of investments in knowledge, creativity and innovation

Development of the national innovation system and the **improvement of the regulatory and fiscal framework** to encourage innovation

Strengthening the **innovation capacity of the economy**

Encouraging **cooperation and flow of knowledge** between business, the public and the scientific and research sector

Strengthening **human resources for innovation** and help create an **attractive environment for internationally competitive researchers**

# Croatian Research and Innovation Infrastructure Roadmap

Research and innovation infrastructure refers to a wide range of tools, facilities and other resources that are essential for the research community to conduct top quality research in all fields of science. New knowledge and innovation can only develop in environment with an adequate research infrastructure.

## **Principles and additional criteria in project evaluation of research and innovation infrastructure:**

- Strategic embeddedness
- Scientific potential
- Usage, size and availability of the user base
- Relevance for Croatia
- Sustainability

# The Smart Specialisation Strategy thematic priority areas and cross-cutting themes



**HEALTH  
AND  
QUALITY  
OF LIFE**

**ENERGY AND  
SUSTAINABLE  
DEVELOPMENT**

**TRANSPORT  
AND MOBILITY**

**SECURITY**

**FOOD  
AND BIO-  
TECHNOLOGY**

**Cross cutting themes: KET, ICT**

# State of the Art

- Only 0.85% of GDP (2015) goes to R&D sector (36,4% from public funds)
- Almost 81.5% of the MSE budget is allocated for salaries, with an annual growth rate for salaries in science and HE of more than 5%
- In 2014 and 2015 - **13 Research Centre of Excellence** were established.
- **Research Centre of Excellence** are research organisation, its part or a group of scientists that for the originality and importance of its research activities is at the international forefront in the respective scientific field.



## Investment in competitive research

- In 2013 Croatian Scientific Foundation became the central independent financing authority for competitive S&T (larger projects, excellent individuals, set-up of national user labs, matching funds for EU projects, young scientists career enhancement, ...)
- In 2013 and 2014 the CSF funded 430 projects = total value of projects was 31.5 milion Euro (236 million kuna)
- In 2015 the CSF funded 2 more projects in collaboration with the private sector, the total value of which was 210.000 Euro (1.6 million kuna)
- In 2016 CSF invested additonal 2,5 milion Euro (17 million kuna) in 10 projects in the filed of climate change
- In total, the CSF is currently funding **600 projects**, the total value of which is around **40 milion Euro** (300 million kuna)

## **New model of multiannual funding of research activity**

- negotiations with the representatives of PROs and HEIs on new model of multiannual funding of research activity based on clear and transparent indicators
- the process of collecting the initial data on research productivity, number of PhD holders, FTE researchers citation index
- PROs and Ministry signed multiannual performance based agreements in 2013 based on which institutions were financed in the period 2013-2015
- The model of funding is based on ex-post evaluation of negotiated indicators and it facilitates implementation and oversight of disbursement of public funds for R&D activities

### *Indicators:*

- Research productivity – weight 60%
- National and international competitive projects and mobility of researchers – weight 25%
- Popularization of research activity – weight 5%
- Cooperation with business sector, governmental and regional bodies, civil sector and NGO's – weight 10%

### *Coefficients:*

- Natural sciences = 2,7
- Technical sciences = 2,5
- Biomedicine and health = 2,7
- Biotechnology = 2,6
- Social sciences = 1,2
- Humanities = 1,2

- The basis for the calculation of the amount of funds which will be allocated to particular institution is based on the number of researcher in FTE, coefficient for the research area and the amount of funds ensured in the State Budget
- Amount of funds per researcher in FTE is calculated based on set performance indicators, set weight of particular and financial basis calculated for every research area

Institution	2013 based on data 2008-12	2014 based on data 2009-13	2015 based on data 2010-14	2.016,00 €	2017 based on data 2012-2016
Institute of Oceanography and Fisheries	109.907,44 €	105.960,99 €	98.183,06 €	98.082,83 €	100.190,90 €
Institute of Economics	18.127,90 €	16.904,15 €	17.859,30 €	17.785,18 €	17.145,98 €
Institute for Development and International Relations	14.786,03 €	14.824,71 €	13.737,04 €	13.694,83 €	15.336,65 €
Croatian Institute of History	11.971,12 €	12.990,81 €	13.510,65 €	13.399,86 €	18.294,52 €
Institute of Art History	7.743,60 €	9.053,58 €	9.730,22 €	9.682,74 €	11.272,66 €
Institute for Medical Research and Occupational Health	90.738,04 €	87.936,37 €	95.327,31 €	95.179,87 €	107.832,73 €
Croatian Forest Research Institute	29.244,03 €	29.317,02 €	30.595,39 €	30.540,00 €	33.541,88 €
Institute of Physics	68.446,44 €	65.358,94 €	53.259,49 €	53.179,04 €	48.273,58 €
Veterinary Institute	25.802,99 €	23.827,58 €	25.894,00 €	25.809,59 €	38.955,10 €
Agricultural Institute Osijek	24.533,43 €	22.535,12 €	21.699,86 €	21.628,64 €	20.851,96 €
Institute for Migration and Ethnic Studies	12.087,37 €	11.575,88 €	9.315,50 €	9.270,65 €	7.903,16 €
Old Church Slavic Institute	9.199,22 €	8.693,16 €	8.368,14 €	8.339,12 €	12.774,79 €
Institute for Adriatic Crops and Karst Reclamation	40.776,65 €	45.381,97 €	39.260,20 €	39.218,00 €	39.490,64 €
Ruđer Bošković Institute	426.519,89 €	445.563,06 €	445.730,16 €	444.885,30 €	481.649,26 €
Institute for Social Research	16.559,27 €	17.963,04 €	17.196,35 €	17.146,24 €	16.205,30 €
Institute of Tourism	11.954,63 €	13.618,87 €	16.566,91 €	16.532,62 €	25.065,69 €
Institute for Agriculture and Tourism	12.340,85 €	13.538,03 €	18.416,29 €	18.382,00 €	30.786,22 €
Institute of Public Finance	3.867,76 €	4.707,41 €	5.573,38 €	5.553,59 €	8.520,29 €
Croatian Geological Survey	37.682,72 €	33.781,36 €	32.860,16 €	32.783,67 €	35.850,92 €
Institute of Ethnology and Folklore Research	25.439,43 €	30.495,52 €	20.752,37 €	20.702,26 €	19.016,12 €
Institute of Philosophy	14.248,44 €	11.898,69 €	12.490,15 €	12.445,05 €	8.983,47 €
Institute of Social Sciences Ivo Pilar	31.816,21 €	30.483,14 €	29.278,86 €	29.140,11 €	27.735,12 €
Institute of Anthropology	21.764,85 €	18.996,76 €	17.170,59 €	17.125,75 €	17.427,73 €
Institute of Archaeology	14.693,06 €	12.211,77 €	12.132,65 €	12.098,36 €	12.865,21 €
Institute of Croatian Language and Linguistics	20.381,20 €	14.506,00 €	13.514,70 €	13.451,39 €	17.337,62 €
<b>Total Institutes</b>	<b>1.100.632,57 €</b>	<b>1.102.123,92 €</b>	<b>1.078.422,73 €</b>	<b>1.076.056,71 €</b>	<b>1.173.307,49 €</b>



Institution	2013 based on data 2008-12	2014 based on data 2009-13	2015 based on data 2010-14	2016 based on data 2011-15	2017 based on data 2012-2016
University of Split	668.850,77 €	832.091,21 €	964.811,24 €	887.075,86 €	1.053.494,48 €
University of Zadar	88.330,72 €	141.079,66 €	138.057,23 €	126.659,71 €	200.769,01 €
University of Dubrovnik	61.786,02 €	87.176,71 €	69.167,97 €	63.532,92 €	107.891,02 €
University of Jurja Dobrila in Pula	43.233,78 €	63.544,42 €	69.070,54 €	63.367,02 €	141.623,01 €
University of Zagreb	3.402.193,07 €	2.955.652,98 €	3.197.552,41 €	2.937.640,64 €	3.512.507,88 €
University of Rijeka	819.293,86 €	848.939,46 €	898.669,69 €	826.136,21 €	866.024,62 €
University of J. J. Strossmayer in Osijek	385.724,57 €	548.314,67 €	634.669,09 €	583.019,52 €	746.982,06 €
University North	€ -	€ -	€ -	15.458,78 €	26.347,78 €
<b>Total Universities</b>	<b>5.469.412,79 €</b>	<b>5.476.799,12 €</b>	<b>5.971.998,18 €</b>	<b>5.502.890,66 €</b>	<b>6.655.639,88 €</b>

# Operational Programme Competitiveness and Cohesion

- First objective = Strengthening research, technological development and innovation
- 1a = Enhancing research and innovation (R&I) infrastructure and capacities to develop R&I excellence and promoting centres of competence in particular that of European interest

## The guiding principles for the selection of operations within investment priority 1a

Compliance with the Smart Specialization Strategy

Justification on how the results of the research will be used to benefit the economic development of the country

Infrastructural investments projects have to be in line with the criteria defined in Croatian Roadmap

Contribution to the achievement of expected results of Investment priority 1a

Contribution in building the "stairway to excellence" for enabling participation in Horizon2020



# Complementarity of Investments from Operational Programme Competitiveness and Cohesion (Priority 1a) and Horizon 2020



# Operational Programme Efficient Human Resources

- Based on the concentration of investments in 4 thematic objectives (TO) of the Common Strategic Framework and their specific investment priorities:

1. High employment and labour mobility

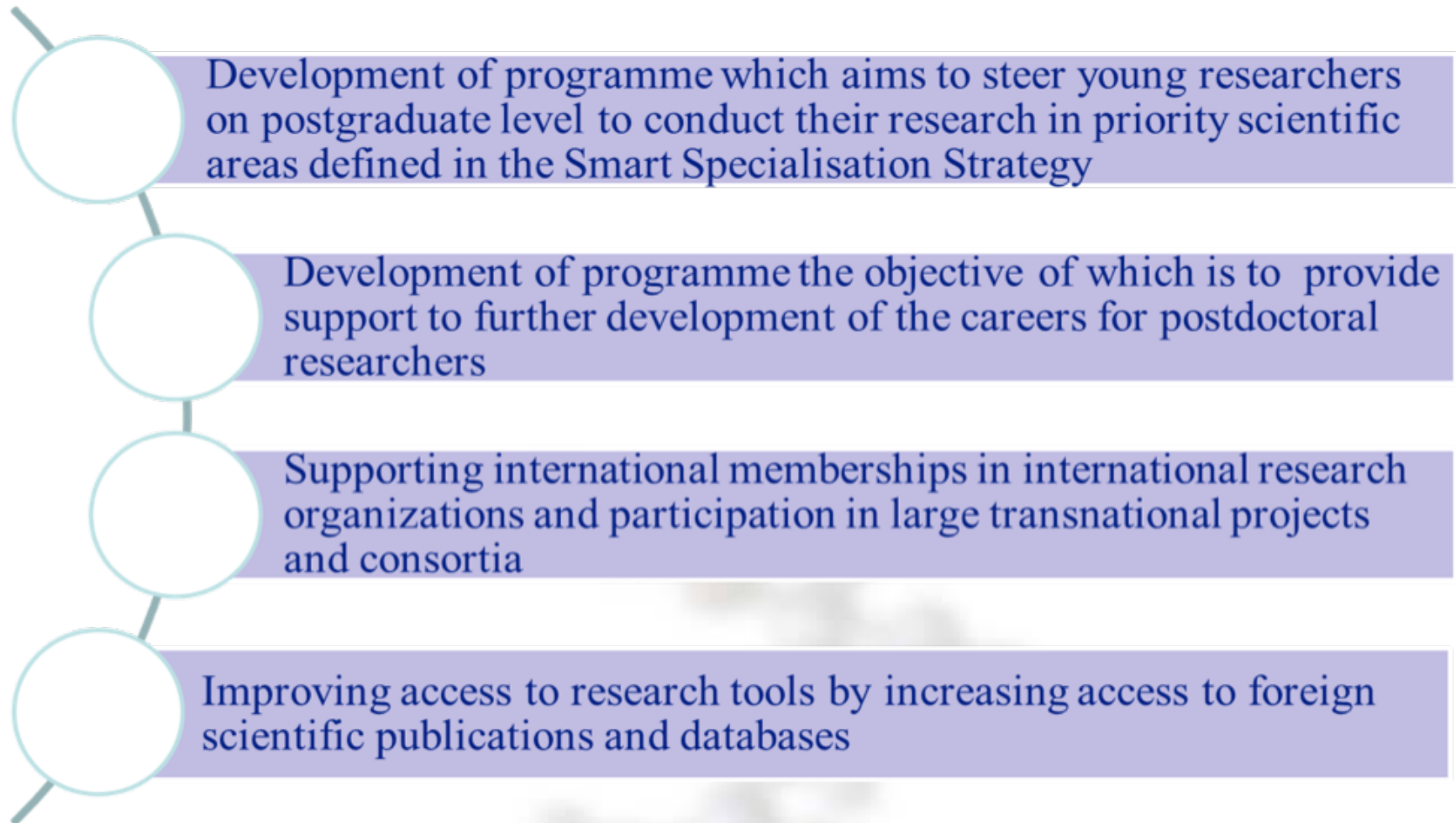
2. Social inclusion

3. Education and lifelong learning

4. Good governance

- **10 thematic objectives** = Investing in education, training and vocational training for skills and lifelong learning
- **Investment priority** = 10.2. Improving the quality and efficiency of, and access to, tertiary and equivalent education with a view to increasing participation and attainment levels, especially for disadvantaged groups
- **Specific objective** = 10.2.3. - Improving the environment for Croatian researchers

## Operational Programme Efficient Human Resources - Actions to be supported (Priority 10.2.3.)



## Network of national contact points

---

### **Ministry of Science and Education**

Coordinator

#### **Agency for mobility and EU programmes:**

MSCA, ICT, SC 1-7, Financial and legal affairs, Widening participation,  
Science in and for society,

---

#### **Croatian Agency for SME, Innovation and investment - HAMAG-BICRO:**

SME;

Access to finances

---

#### **State office for radiological and nuclear safety:**

EURATOM

---

#### **Ministry of Science and Education:**

ERC, FET, Infrastructure

---

H2020 Applications and Requested EC Financial Contribution by Country									
MEMBER	All Proposal Applications								
	Eligible Proposals				Retained Proposals		Success Rates		R&D expenditure  %
	Country	EU Financial Contribution in Eligible Proposals to Applications from a Country (euro)		EU Financial Contribution in Retained Proposals to Applications from a Country (euro)		Applications from a Country %	EU Financial Contribution to Applications from a Country %		
		Applications in Eligible Proposals from a Country	Applications in Retained Proposals from a Country	Applications in Retained Proposals from a Country	Applications in Retained Proposals from a Country	%	%		
	AT - Austria	12438	5.336.008.334,0	2101	828.520.032,0	17%	16%	3,07	
	BE - Belgium	19285	7.955.161.319,0	3375	1.374.891.349,0	18%	17%	2,45	
	BG - Bulgaria	3367	937.095.750,0	324	58.820.581,0	10%	6%	0,96	
	CY - Cyprus	2828	943.559.799,0	332	91.875.356,0	12%	10%	0,46	
	CZ - Czech Republic	5428	1.713.196.379,0	766	187.924.274,0	14%	11%	1,95	
	DE - Germany	56329	27.671.964.504,0	9171	4.939.395.113,0	16%	18%	3,03	
	DK - Denmark	11510	5.845.814.900,0	1693	724.954.162,0	15%	12%	1,5	
	EE - Estonia	2623	989.662.800,0	342	98.198.704,0	13%	10%	2,9	
	EL - Greece	16361	5.726.468.929,0	2101	647.081.868,0	13%	11%	0,96	
	ES - Spain	54027	21.420.937.501,0	7543	2.679.118.776,0	14%	13%	1,22	
	FI - Finland	10958	6.024.384.867,0	1502	622.269.158,0	14%	10%	2,9	
	FR - France	38555	19.308.201.320,0	6640	3.203.931.546,0	17%	17%	2,23	
	HR - Croatia	2575	696.569.209,0	307	52.727.659,0	12%	8%	0,85	
	HU - Hungary	6161	2.168.520.324,0	675	183.967.376,0	11%	8%	1,38	
	IE - Ireland	8196	3.918.680.620,0	1208	492.705.790,0	15%	13%	:	
	IT - Italy	56425	22.898.407.191,0	6868	2.392.000.095,0	12%	10%	1,33	
	LT - Lithuania	2079	509.076.102,0	250	37.893.698,0	12%	7%	1,04	
	LU - Luxembourg	1387	531.074.450,0	215	67.421.323,0	16%	13%	1,31	
	LV - Latvia	1800	524.700.142,0	222	46.584.049,0	12%	9%	0,63	
	MT - Malta	795	220.804.766,0	107	17.742.958,0	13%	8%	0,77	
	NL - Netherlands	28464	13.911.224.015,0	4660	2.209.314.743,0	16%	16%	2,01	
	PL - Poland	9763	3.060.423.484,0	1196	277.114.790,0	12%	9%	1	
	PT - Portugal	12191	4.372.476.706,0	1555	457.520.334,0	13%	10%	1,28	
	RO - Romania	5177	1.409.728.062,0	619	107.714.976,0	12%	8%	0,49	
	SE - Sweden	14530	7.614.201.440,0	2272	1.029.365.971,0	16%	14%	3,26	
	SI - Slovenia	5585	1.797.583.669,0	605	174.014.709,0	11%	10%	2,21	
	SK - Slovakia	2359	844.859.723,0	303	75.685.141,0	13%	9%	1,18	
	UK - United Kingdom	59767	29.934.483.751,0	8829	4.119.538.633,0	15%	14%	1,7	
	<b>Total for MEMBER</b>	<b>450963</b>	<b>198.285.270.055,0</b>	<b>65781</b>	<b>27.198.293.163,0</b>	<b>15%</b>	<b>14%</b>		

H2020 Applications and Requested EC Financial Contribution by Country							
Country	Proposal Coordinators			Retained Proposals		Success Rates	
	Eligible Proposals		Applications in Retained Proposals from a Country	EU Financial Contribution in Retained Proposals to Applications from a Country (euro)		Applications from a Country %	EU Financial Contribution to Applications from a Country %
	Applications in Eligible Proposals from a Country	EU Financial Contribution in Eligible Proposals to Applications from a Country (euro)		EU Financial Contribution in Retained Proposals to Applications from a Country (euro)			
				Applications in Retained Proposals from a Country	EU Financial Contribution in Retained Proposals to Applications from a Country (euro)		
AT - Austria	2564	2086847650	392	311450761	15%	15%	
BE - Belgium	3574	3078165523	549	529231151	15%	17%	
BG - Bulgaria	1040	471014360	31	7668554	3%	2%	
CY - Cyprus	653	394788120	63	30848800	10%	8%	
CZ - Czech Republic	1077	647675240	78	54475670	7%	8%	
DE - Germany	12067	11413563080	1745	2136272128	14%	19%	
DK - Denmark	3567	3113610236	485	345644010	14%	11%	
EE - Estonia	827	578436460	90	49863188	11%	9%	
EL - Greece	3156	1882734456	305	158373317	10%	8%	
ES - Spain	17051	10513486711	1954	1105505791	11%	11%	
FI - Finland	3390	3467989570	298	261789739	9%	8%	
FR - France	10411	9607142718	1440	1306771524	14%	14%	
HR - Croatia	516	251432653	24	10291527	5%	4%	
HU - Hungary	2101	1188683912	111	66557887	5%	6%	
IE - Ireland	2498	2016299580	340	254345601	14%	13%	
IT - Italy	17309	10950710022	1372	795093670	8%	7%	
LT - Lithuania	470	189335690	47	11464499	10%	6%	
LU - Luxembourg	230	175886052	33	23260204	14%	13%	
LV - Latvia	556	278795974	30	16881830	5%	6%	
MT - Malta	151	87837679	18	5593882	12%	6%	
NL - Netherlands	6902	6662700531	1050	1017879774	15%	15%	
PL - Poland	2672	1342506033	166	84580613	6%	6%	
PT - Portugal	2880	1889279365	295	155786722	10%	8%	
RO - Romania	921	495114540	40	12061082	4%	2%	
SE - Sweden	3821	3831205151	428	384758328	11%	10%	
SI - Slovenia	1503	739071927	91	57541760	6%	8%	
SK - Slovakia	636	440884013	35	32847119	6%	7%	
MEMBER	UK - United Kingdom	19636	16092407905	2858	2052240605	15%	13%
Total for MEMBER		122179	93887605151	14368	11279079739	12%	12%

# Participation in Horizon 2020 – 2017; Croatian perspective

Total number of participants, total EU financial contribution € million	245 receiving € 37,53 m in H2020
Total number of SME participants, total EC financial contribution € million	38 SMEs receiving € 7,25 m in H2020
Number of ERC Principal Investigators, total EC financial contribution € million	3 ERC grantees receiving € 2,58 m in H2020
Number of Marie Skłodowska-Curie Actions Participations, total EC financial contribution € million	18 MSCA Fellows receiving € 3,15 m in H2020
Number of applicants	2.172 (0,58% of EU-28)
Success rate (EU-28 = 13,3%)	11,2%
Rank in number of participants signed contracts (EU-28)	24
Rank in budget share (EU-28)	26
Top collaborative links	<ol style="list-style-type: none"> <li>1. IT - Italy (337)</li> <li>2. ES - Spain (323)</li> <li>3. DE - Germany (303)</li> <li>4. UK - United Kingdom (273)</li> <li>5. FR - France (264)</li> </ol>
Total population & EU 28 population share (source: Eurostat)	4.262.140 (0.8% of EU-28)



## Topics within Horizon 2020 with most signed grant agreements of Croatian institutions 2017

H2020 activity	% of all grant agreements
Secure, clean and efficient energy	20
Smart, green and integrated transport	16
Food, agriculture and forestry, marine and water research and bioeconomy	11
Health, demographic change and wellbeing	7
Marie-Sklodowska-Curie Actions	6
Research Infrastructures	6
Climate action, environment, resource efficiency and raw materials	6
Europe in a changing world - inclusive, innovative and reflective Societies	6



### H2020 Project Participants

Top 100 organisations by EU financial contribution granted to the H2020 research projects  
HR - Croatia

No.	Legal Name	Number of Participations	EU Financial Contribution (euro)
1	Ruđer Boskovic Institute (RBI)	10	6,288,552.50
2	Faculty of electrotechnics and engineering University of Zagreb (UNIZG-FER)	9	2,628,555.00
3	Mi-plast llc manufacturing, trading and services (Mi-plast)	7	2,243,021.38
4	Genos ltd	4	2,118,855.00
5	School of Medicine University of Zagreb	4	1,098,562.50
6	EIHP Energy Institute Hrvoje Pozar	10	1,030,160.50
7	Croatian Academic and Research Network CARnet	4	961,152.00
8	Faculty of Science University of Zagreb	4	901,196.00
9	Faculty of Mechanical Engineering and Naval Architecture University of Zagreb	6	758,510.00
10	SDEWES Centre	4	712,884.25
11	University of Split	6	646,810.00

<http://www.mzo.hr>

- phone: +385 (1) 4569 000; 4594 444
- fax: +385 (1) 4594 301
- Donje Svetice 38, 10000 Zagreb
- E-mail: [znanost@mzo.hr](mailto:znanost@mzo.hr)  
[fp@mzo.hr](mailto:fp@mzo.hr)