

The European Research Council



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Ten years ERC: experience and outlook

Theodore Papazoglou, PhD
HoU A1: Support to the Scientific Council/ ERCEA

Athens, 16 March 2017



Celebrating ERC-10 in Europe and beyond



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- ✓ ERC Week: 13-19 March
- ✓ >100 events in 35 countries
- ✓ Twitter: **#ERC10yrs**
- ✓ More information:
erc.europa.eu/ERC10yrs/erc-week





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*".....to reinforce the excellence,
dynamism and creativity of European
research"*

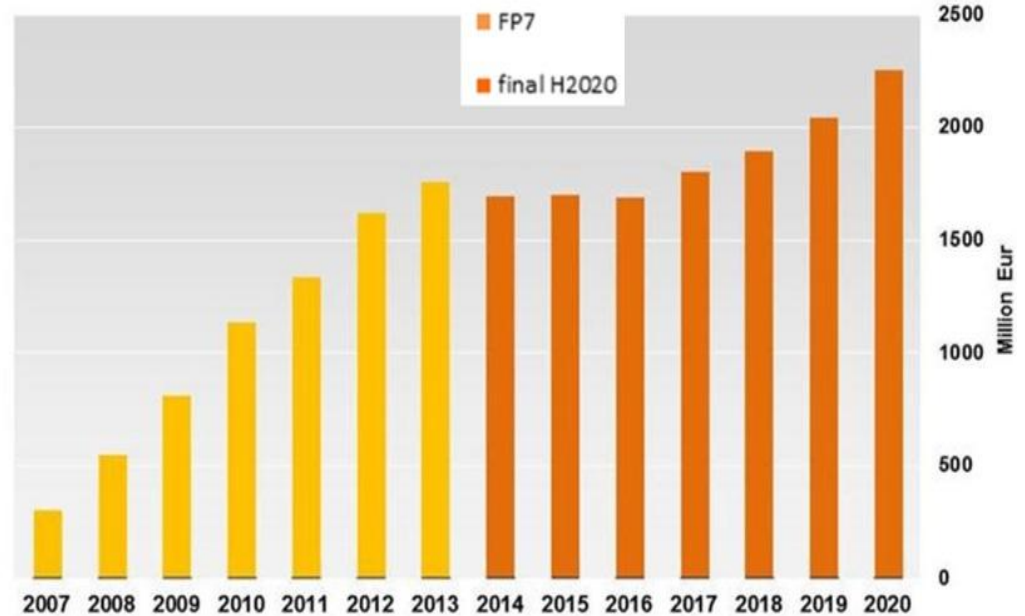
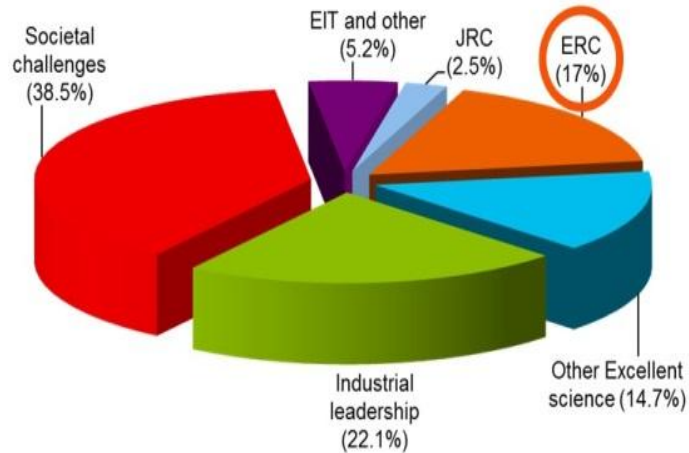
FP7 & H2020 Legal Basis

Important elements during the first 10 years



- ✓ The Scientific Council: 22 renowned scientists as decision makers
- ✓ The evaluators: high-level scientists from all over the world
- ✓ Strict bottom-up approach: no thematic priorities, all disciplines eligible
- ✓ Scientific and financial independence of the grantees
- ✓ The size of the grants: €1.5 million for Starting Grants, €2 million for Consolidator Grants, €2.5 million for Advanced Grants
- ✓ The simplicity of the schemes and of the procedures
- ✓ A very efficient management by the executive agency (ERCEA)

Resources – the ERC



Demand



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Number of applications evaluated between 2007 and 2016	61772
Number of researchers that have applied for an ERC grant	44175 (<5% of EU public sector researchers)
Total funding awarded as of 31 January 2017	All grants: €12.43 billion All grants except Proof of Concept and Synergy: €12.07 billion
Total funding requested by applicants to the ERC as of 31 January 2017	€121 billion (including PoC & SyG)
Average number of evaluators per call, estimate	350 Panel Members; 2000 referees
Average number of proposals assessed by each Panel per call, estimate	100
Percentage of "leading researchers" that have applied for an ERC grant (2007-2014)	~30% (of the EU/AC based)
Percentage of researchers that applied for an ERC grant in the course of Horizon 2020 that had not applied for an ERC grant in the course of the Seventh Framework Programme	70%

Leading researchers were identified as researchers included in at least one of six categories:

- 1) highly-cited scientists based in Europe, using the bibliographic database Web of Science as a source
- 2) US NAS foreign associates
- 3) Laureates of four prestigious national research prizes: Spinoza Prize (NL), Leibniz Prize (DE), FNP Prize (PL), Medaille d'Or (FR)
- 4) Europe-based Howard Hughes Grantees
- 5) EMBO members
- 6) Gordon Research conferences chairs



Horizon 2020
European Union funding
for Research & Innovation

Where do these resources go?



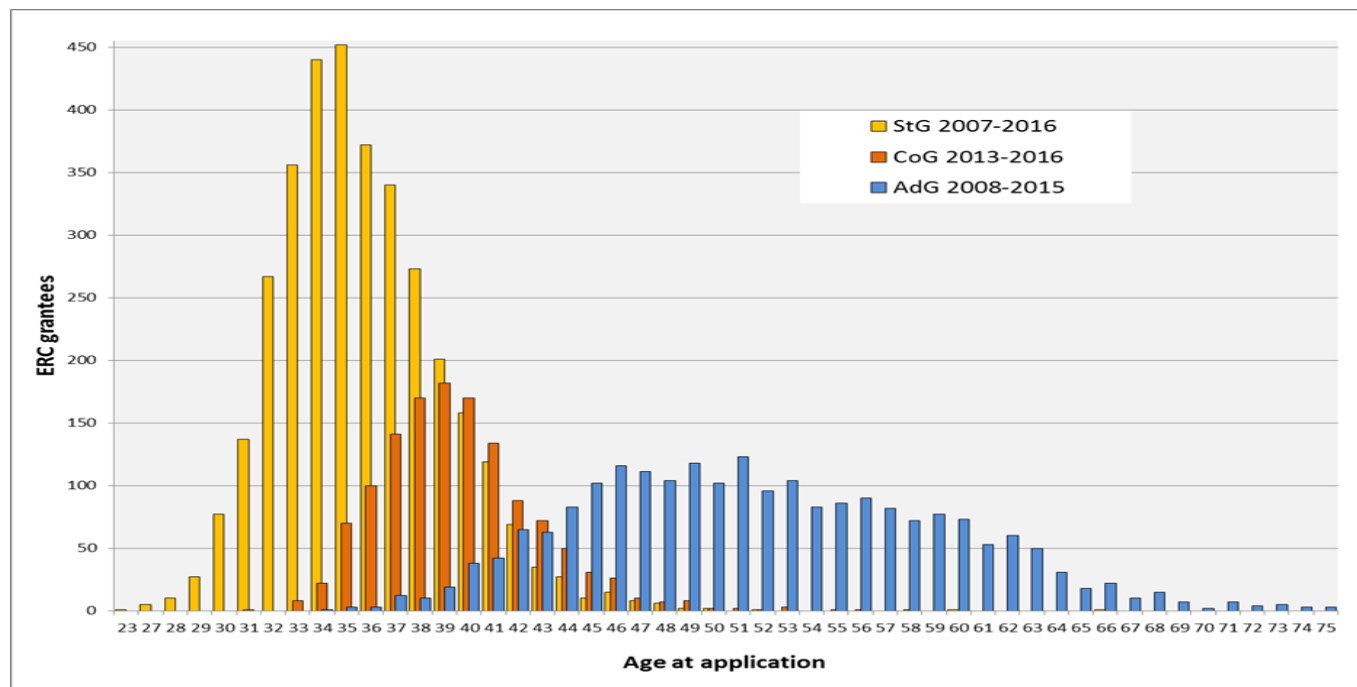
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Budget allocated to the ERC by the Seventh Framework Programme (2007-2013)	€7.5 billion (€1.1 billion per year on average)
Budget allocated to the ERC by Horizon 2020 (2014-2020)	€13 billion (€1.9 billion per year on average)
Total number of funded projects	6907 (main grants)
Total number of PIs funded	6491 (<1% of EU public sector researchers)
Number of Principal Investigator Host Institutions	707
Average funding awarded per project	€1.7 million
Average funding per Host Institution	€17.1 million
Percentage of "leading researchers" funded by the ERC	~16% of the EU/AC -based
Average number of PI team members per project, estimate based on project reports	7.5
Percentage of Horizon 2020 grantees that were not Seventh Framework Programme Grantees	89%
Number of ERC project proposals that received the highest assessment grade ("A") in the ERC peer review process and that remained unfunded under Horizon 2020 ("unfunded As")	1327 unfunded As out of 3880 total As
Unfunded As as a percentage of all As	34.2%

to the young (and not so young)



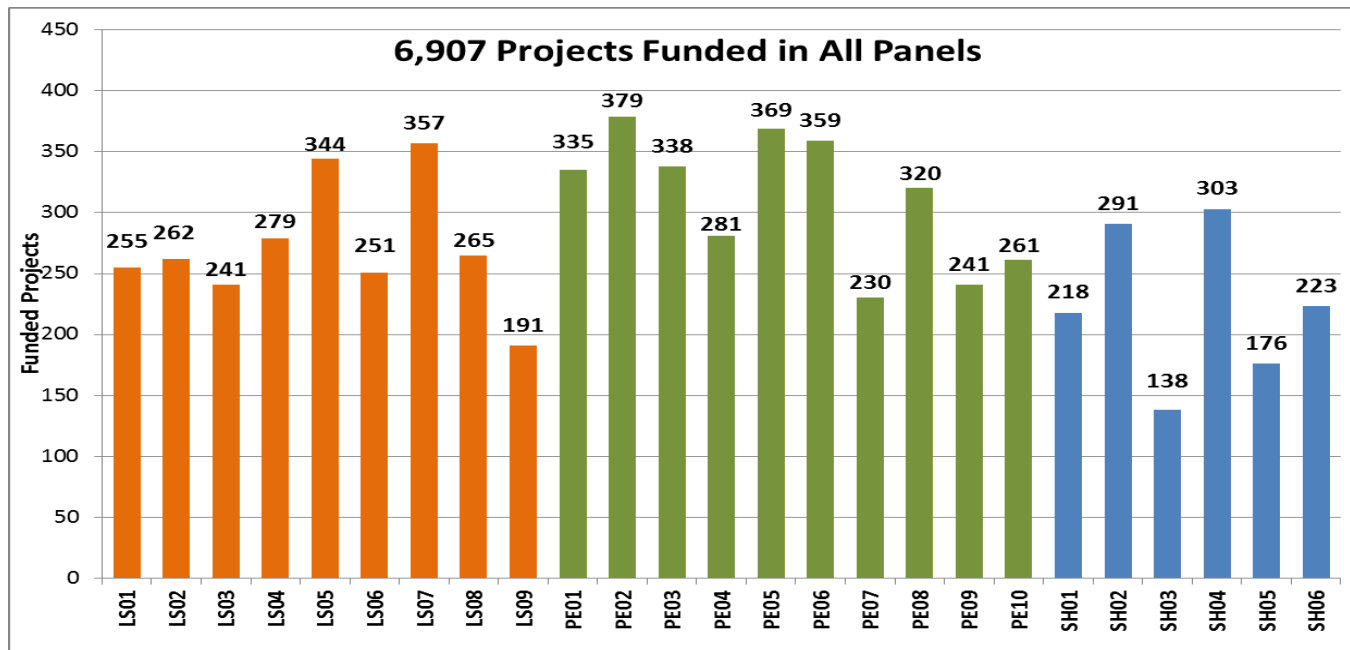
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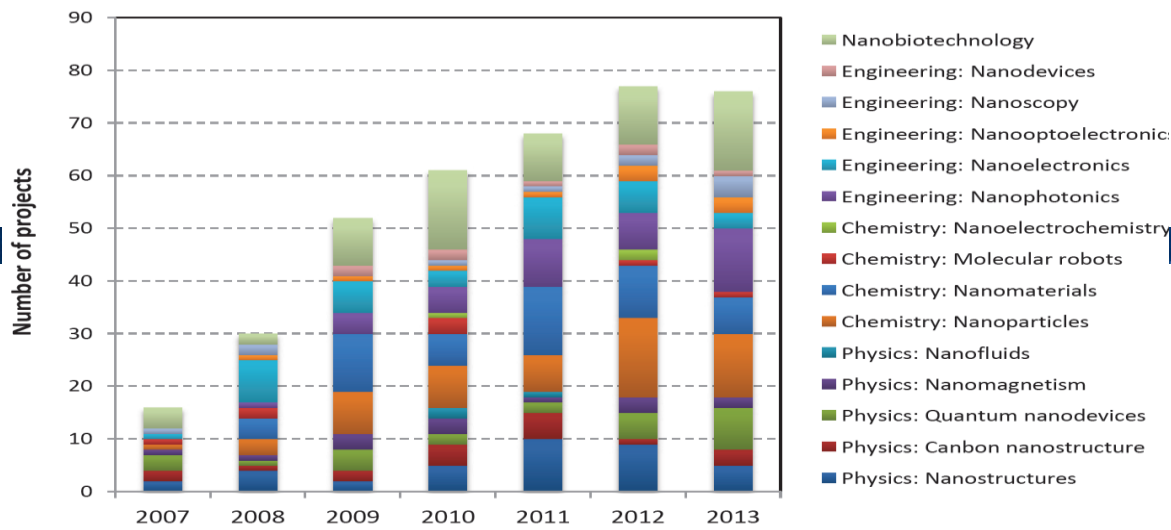


..through the panels



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...sometimes to look at the frontier with an eye towards future technologies, sometimes to ask fundamental questions about an important societal challenge





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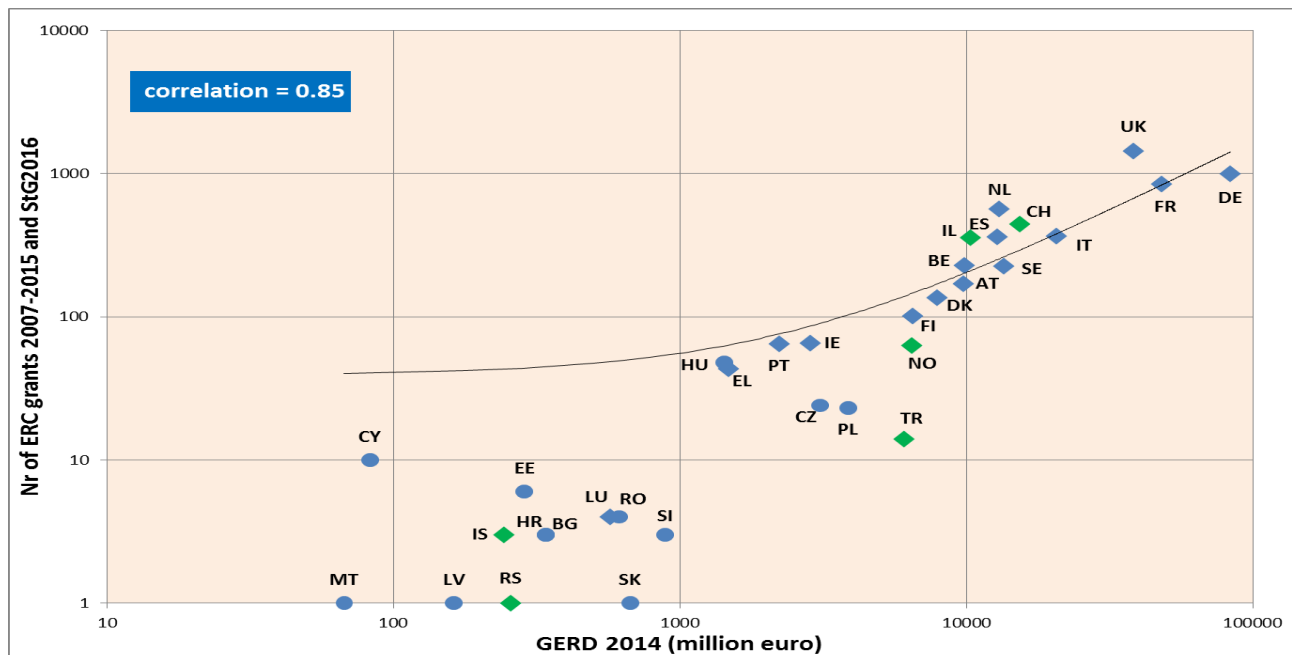
**..to scientists
hosted by
universities and
research centers
in EU Member
States and
Associated
countries**



..... that have invested in R&D



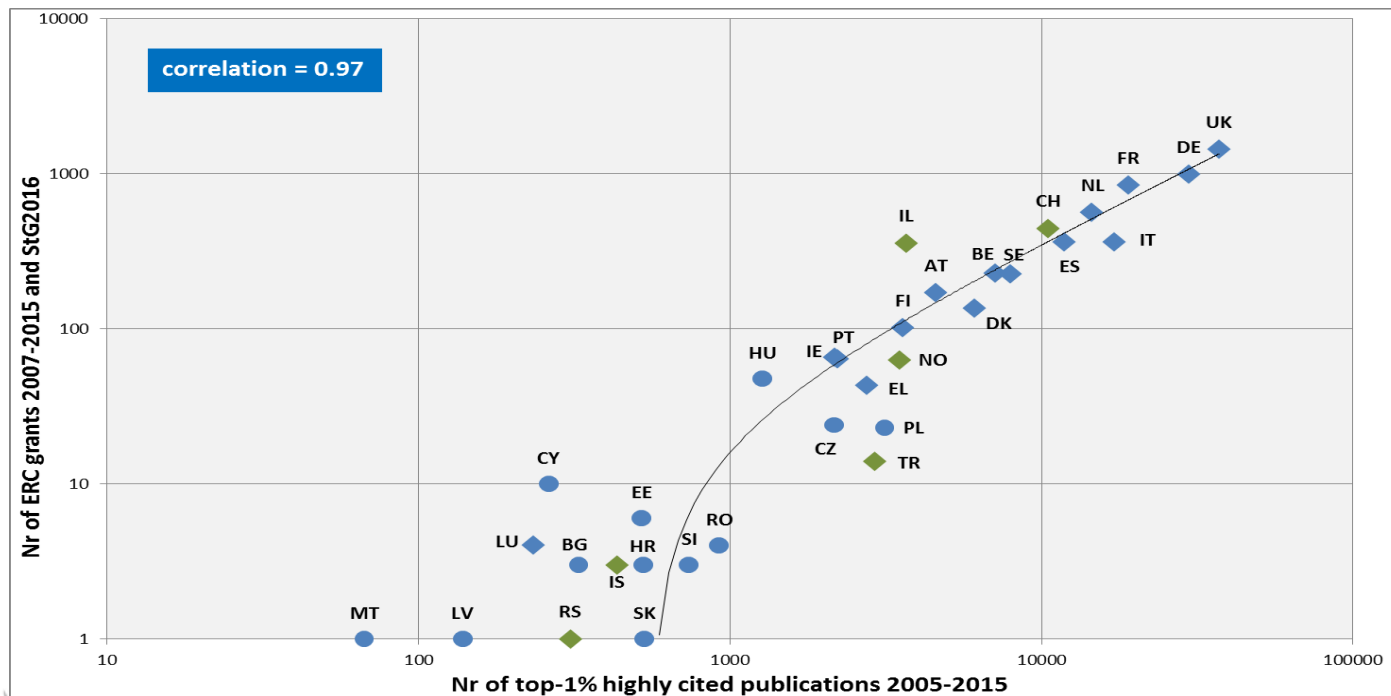
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...and already have an excellent science base



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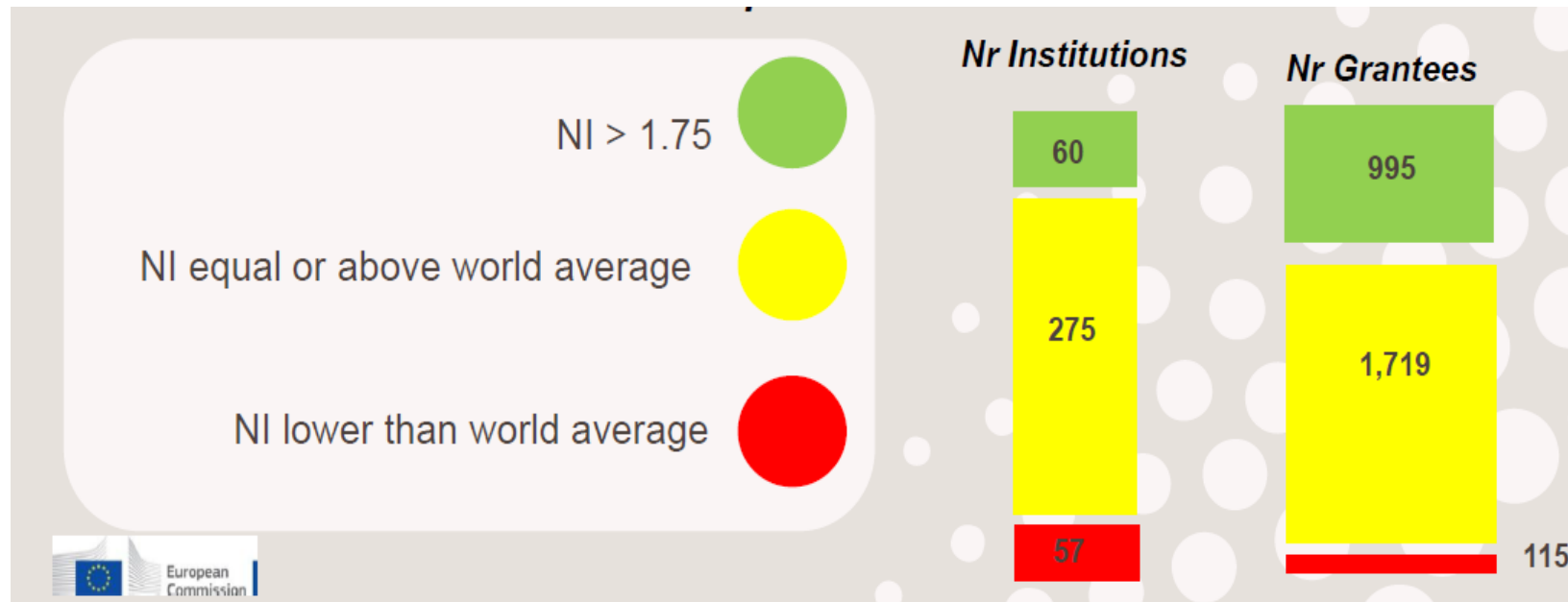


...BUT not only to them



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NI: normalised publications impact

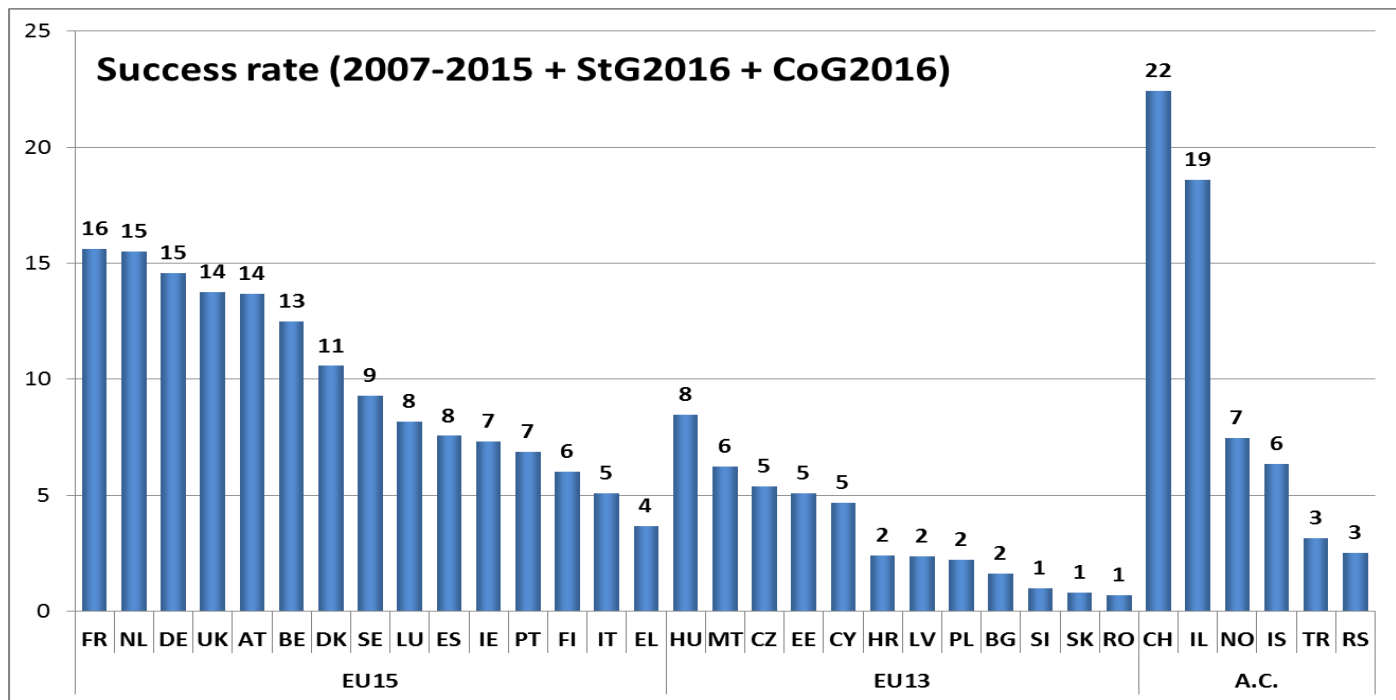


Horizon 2020
European Union funding
for Research & Innovation

...the "associated to the FP" still lead



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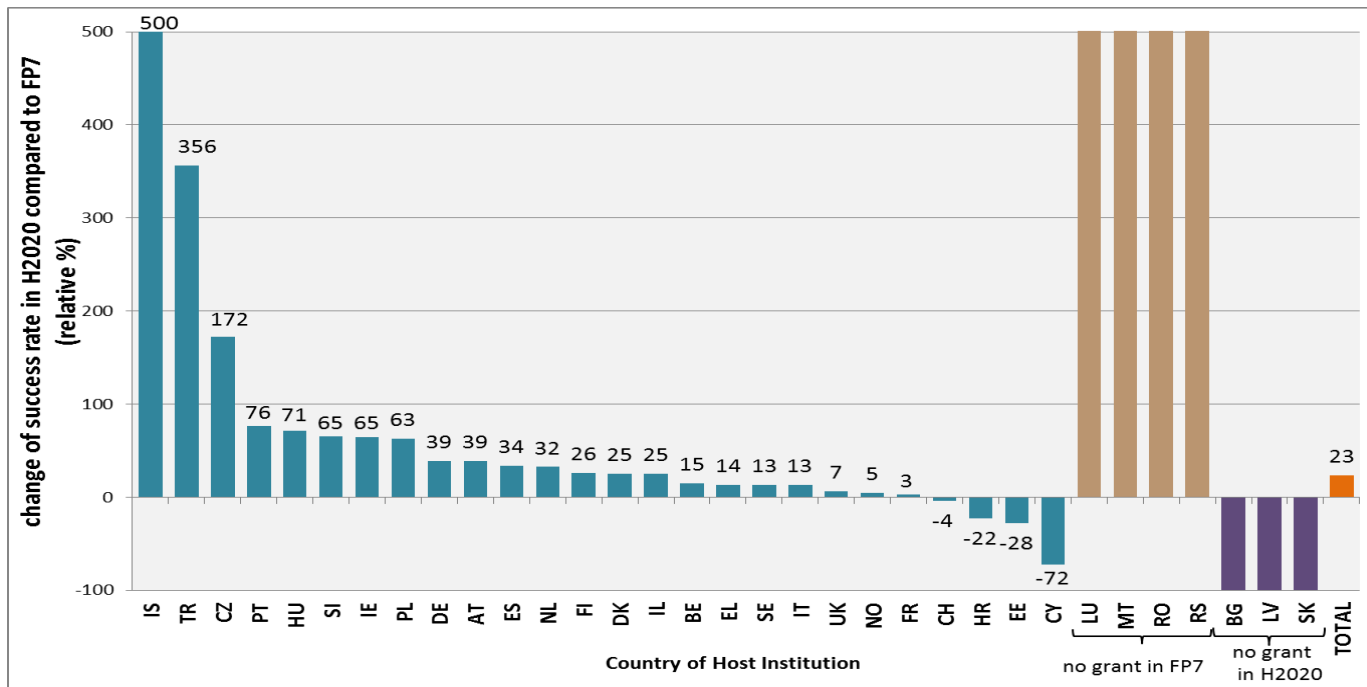
European
Commission

Horizon 2020
European Union funding
for Research & Innovation

...and there are some "dynamics" over the years

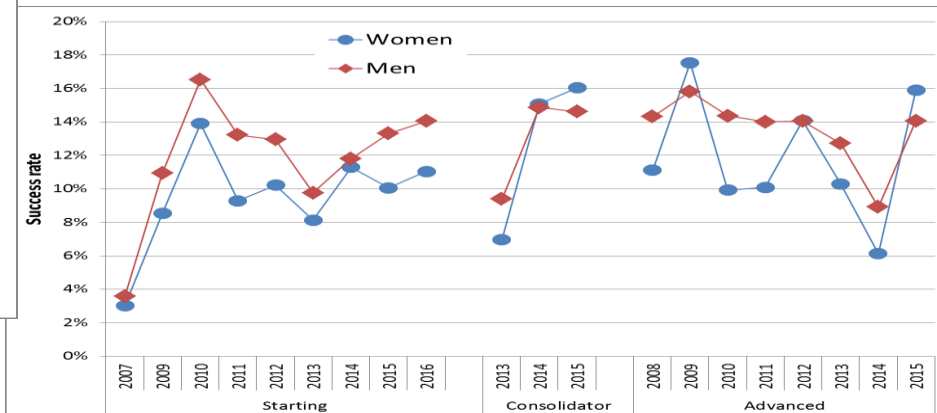
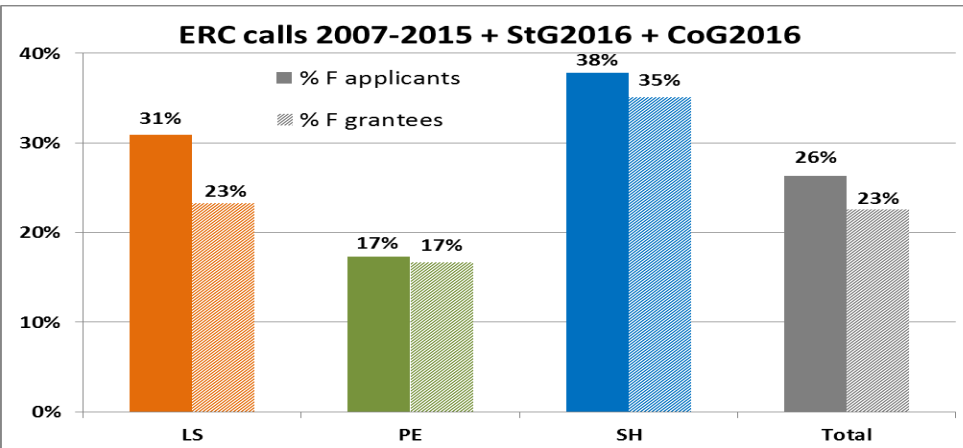


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ERC call	Share of women		Success rate	
	evaluated	funded	F	M
StG (2007-2016)	31%	27%	8%	10%
CoG (2013-2016)	29%	28%	12%	13%
AdG (2008-2015)	15%	13%	12%	13%
TOTAL	26%	23%	10%	12%

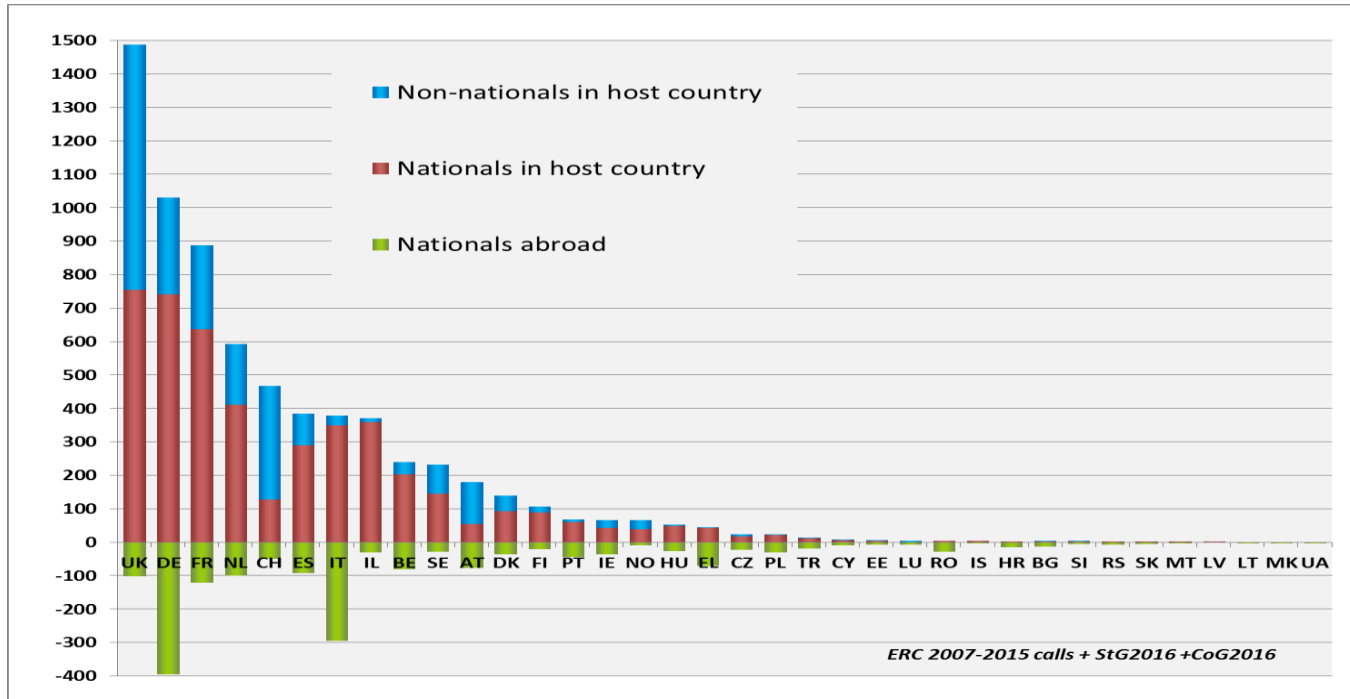
Gender:
The overall difference is persistent - certain calls and domains need to be analyzed in more detail



A Europe without borders



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Non-EU/AC Principal Investigators	Starting and Consolidator grants	Advanced grants	Total grants
USA	136	82	218
Canada	54	9	63
Russia	35	9	44
India	36	2	38
Australia	32	5	37
Japan	21	4	25
China	23	0	23
New Zealand	11	6	17
Argentina	14	0	14
Other	50	8	58
Total	412	125	537



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.....and open to the world

Country of residence	International grantees	EU/AC nationals	Total
Argentina	1		1
Australia	1	6	7
Canada	3	5	8
China		1	1
India	1	1	2
Japan		2	2
Korea		1	1
Lebanon		1	1
Malaysia		1	1
Pakistan		1	1
Russia	1		1
Senegal		1	1
USA	43	113	156
Total	50	133	183

'ERC-Open to the World'



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ERC Europe @ERC_Research · 15h

#ERCworld: An international career to push the frontiers of epigenetics
bit.ly/1U4W5iY @AlsaceBiovalley



"I choose Europe because there is a strong stress on hypothesis-driven research. International mobility is essential, you can learn a lot from experiencing various approaches. And culturally, it's very enriching."

Dr Maria Elena Torres-Padilla
ERC grantee from Mexico



#ERCworld erc

Pinned Tweet

ERC Europe @ERC_Research · Mar 10

ERC breathes new life into its mission to make Europe a hub for global talent
#ERCWorld bit.ly/1SBJCT0

Horizon 2020, Carlos Moedas, European Commission and 7 others



ERC - Open to the World

ERC grants are open to top researchers of any nationality ready to work in Europe

ERC Europe @ERC_Research · 20h

#ERCworld: Dr Chembo works on the next generation of microwave systems for aerospace engineering @CNRS



"The fact that excellence is the ERC's sole criterion of selection is of particular importance for scientists from all over the world who want to lead their research in Europe."

Dr Yanne K. Chembo
ERC grantee from Cameroon



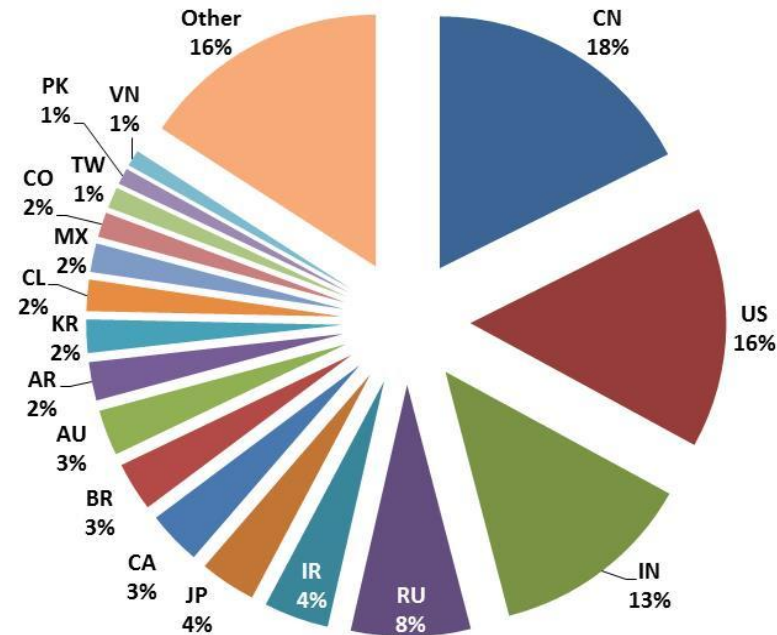
#ERCworld erc

...not only as PIs

Nationality of ERC project teams (PIs not included)
Analysis of 1,901 Starting and Advanced Grants

EU: 71%
Assoc. Countries: 10%
non-ERA: 17%
unknown: 2%

In all ERC grants
+ 9,000 non-ERA team members
most from
China, US, India, and Russia



Country	Higher-Education Institution	No	StG	CoG	AdG	Total	LS	PE	SH
UK	University of Oxford	1	78	36	75	189	52	76	61
UK	University of Cambridge	2	83	34	71	188	66	88	34
UK	University College London	3	65	27	41	133	53	39	41
CH	Swiss Federal Institute of Technology Lausanne (EPFL)	4	53	15	48	116	33	81	2
CH	Swiss Federal Institute of Technology Zurich (ETH Zurich)	5	45	7	58	110	34	72	4
IL	Weizmann Institute	5	55	23	32	110	64	44	2
IL	Hebrew University of Jerusalem	6	55	15	34	104	45	42	17
UK	Imperial College	7	49	14	23	86	30	54	2
UK	University of Edinburgh	8	34	14	35	83	28	32	23
NL	University of Amsterdam	9	38	14	19	71	7	24	40
DK	University of Copenhagen	10	32	21	16	69	29	24	16
IL	Tel Aviv University	11	40	10	16	66	29	31	6
BE	University of Leuven	12	34	11	20	65	18	33	14
DE	University of Munich (LMU)	13	28	4	29	61	25	21	15
NL	Radboud University Nijmegen	14	32	10	14	56	21	12	23
NL	Delft University of Technology	14	27	14	15	56	6	44	6
NL	Utrecht University	14	26	17	13	56	10	25	21
UK	University of Bristol	15	22	7	26	55	9	36	10
CH	University of Zurich	16	22	9	20	51	31	9	11
NL	Leiden University	17	25	9	16	50		21	29
FI	University of Helsinki	18	25	8	15	48	32	11	5
IL	Technion - Israel Institute of Technology	18	32	6	10	48	16	31	1
Country	Research Organisation	No	StG	CoG	AdG	Total	LS	PE	SH
FR	National Centre for Scientific Research (CNRS)	1	186	83	83	352	103	210	39
DE	Max Planck Society	2	86	24	68	178	95	72	11
DE	Helmholtz Association of German Research Centres	3	50	28	20	98	58	39	1
FR	National Institute of Health and Medical Research (INSERM)	4	43	23	23	89	83	3	3
FR	French Alternative Energies and Atomic Energy Commission	5	40	5	16	61	9	50	2
ES	Spanish National Research Council (CSIC)	5	27	18	16	61	19	36	6
FR	INRIA	6	29	4	14	47		47	



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The top hosting organizations 2007 - 2016

Higher-Education Institution	StG	CoG	AdG	Total
University of Cambridge	22	23	15	60
University of Oxford	22	16	15	53
University College London	14	17	12	43
University of Edinburgh	15	11	11	37
University of Amsterdam	22	8	2	32
University of Copenhagen	15	13	3	31
Tel Aviv University	26	3	2	31
Hebrew University of Jerusalem	15	9	4	28
Swiss Federal Institute of Technology Zurich	15	1	11	27
Swiss Federal Institute of Technology Lausanne	9	6	11	26
Delft University of Technology	13	7	5	25
Weizmann Institute	13	7	4	24
University of Munich (LMU)	18	2	3	23
Imperial College	12	7	1	20
University of Warwick	9	5	4	18
Utrecht University	9	7	2	18
University of Leuven	9	3	5	17
Technical University of Munich	7	5	5	17
Research Organisation	StG	CoG	AdG	Total
National Centre for Scientific Research (CNRS)	56	43	17	116
Max Planck Society	43	13	18	74
Helmholtz Association of German Research Centres	16	17	4	37
National Institute of Health and Medical Research (INSERM)	12	8	5	25
Spanish National Research Council (CSIC)	6	11	4	21
INRIA	11	3	2	16



The top hosting organizations 2014 – 2016 (some moves and some "rivalries" to watch)

Motivation to Apply for an ERC Grant



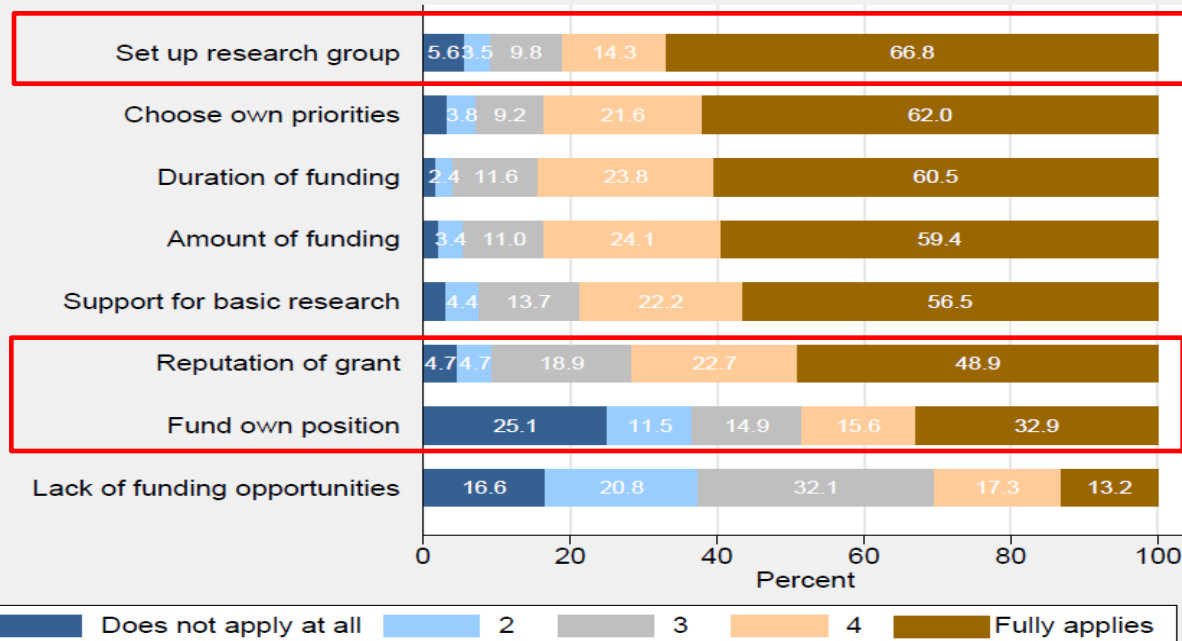
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Findings of the ERC-commissioned MERCI study:

Empirical evidence of the Starting Grants funding on careers of young researchers

iFQ - Institute for Research Information and Quality Assurance (2008-2012)

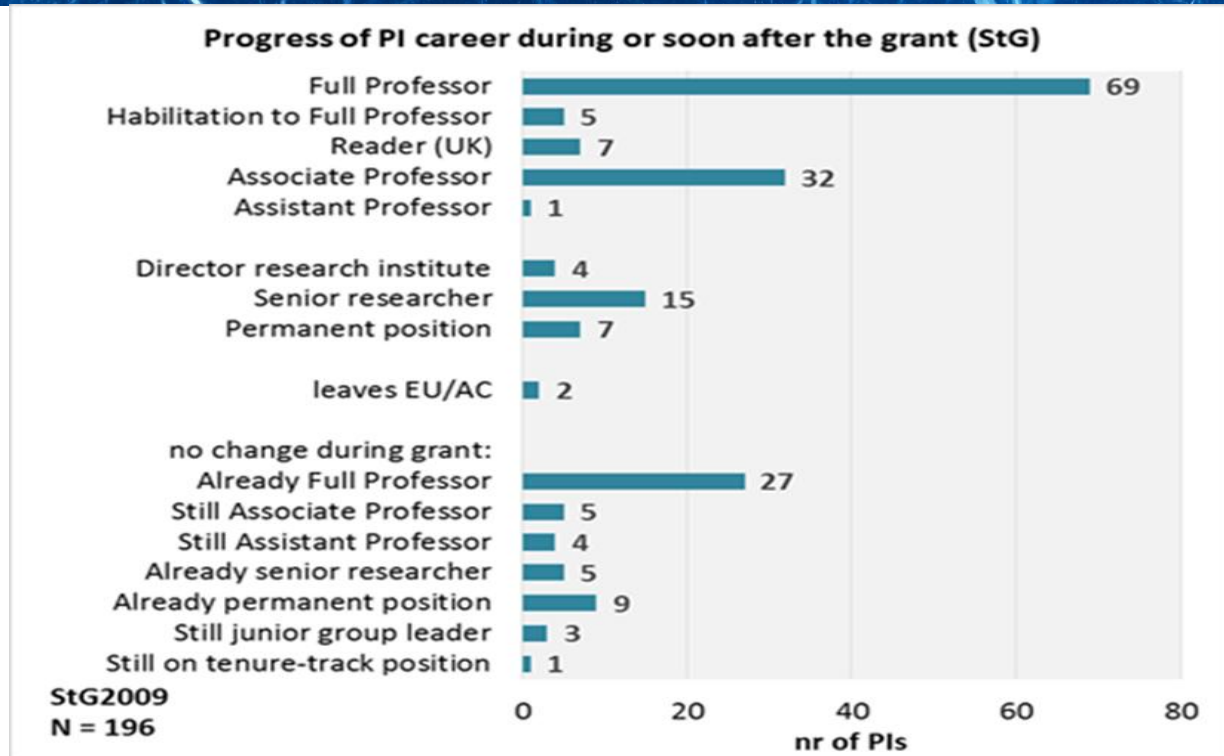
Motivation to apply for a StG



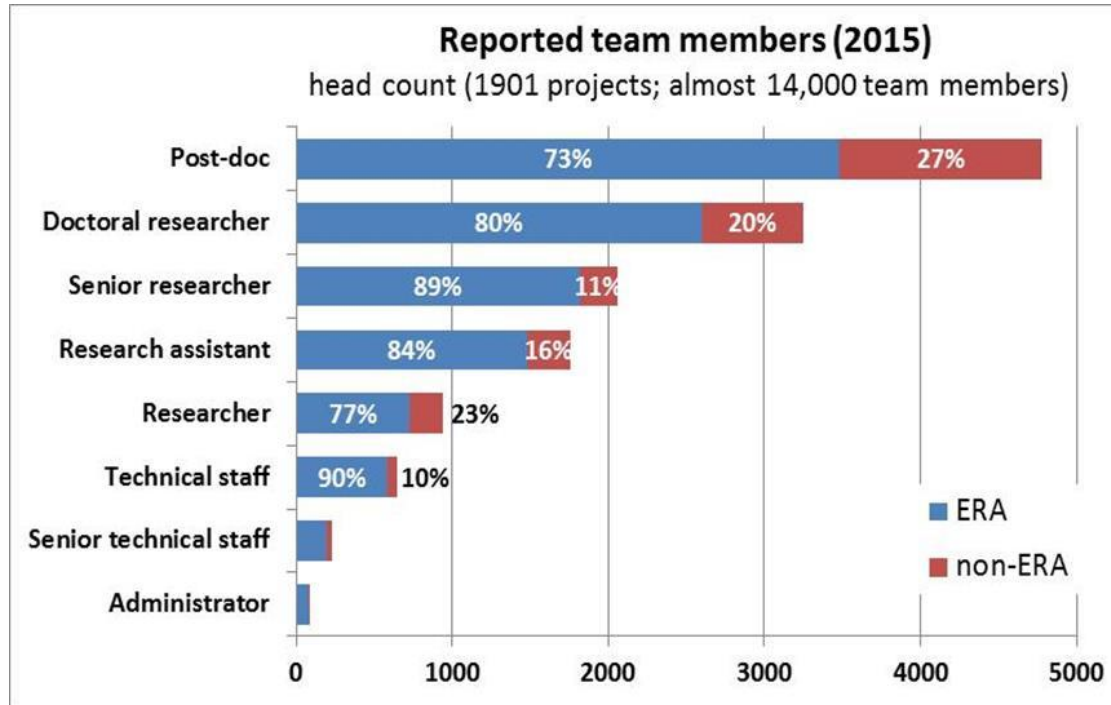
Does the grant have an impact on the PI career? (StG-2009)



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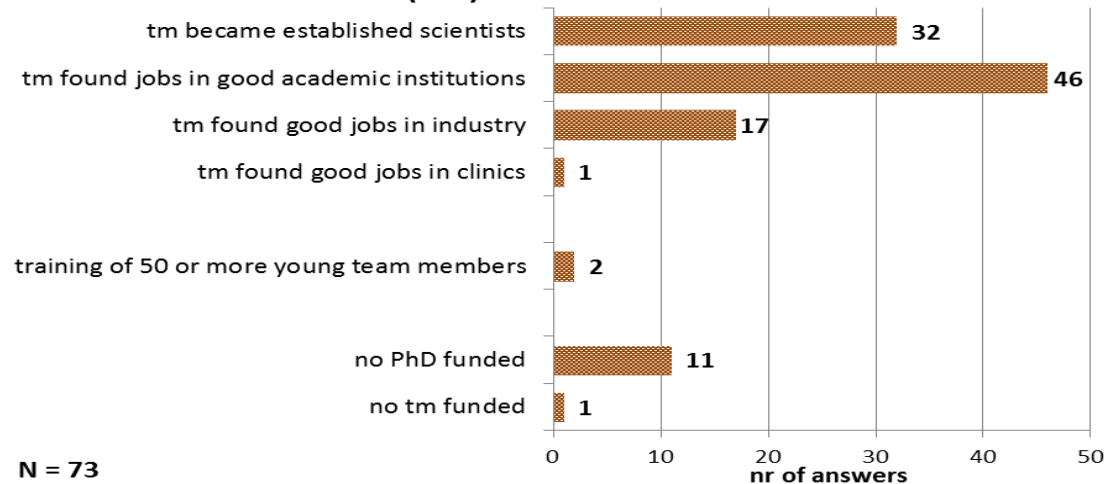
30 000 PhD and Post-doc Researchers Working in ERC Teams



Career of the Team Members (StG)

Findings from Final Project Reports

Careers of team members (StG)



37% StG2009 reports offered information about the careers of the team members

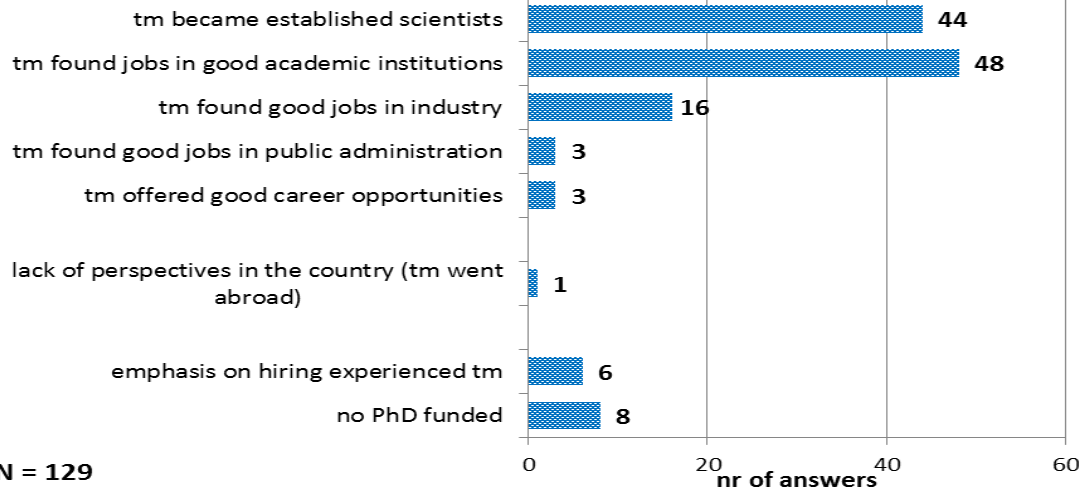
In **44%** of the projects the team members became established scientists (researchers employed on permanent or tenure-tracked positions in research institutions). In **60%** of the projects the team members found jobs in good academic institutions (researchers employed on temporary contracts or for whom the type of job was not specified).

In **23%** of the projects the team members found good jobs in industry after the project.

Career of the Team Members (AdG)

Findings from Final Project Reports

Careers of team members (AdG)



In **34%** of the projects the team members became established scientists (researchers employed on permanent or tenure-tracked positions in research institutions). In **40%** of the projects the team members found jobs in good academic institutions (researchers employed on temporary contracts, e.g. as post-doctoral researchers, or for whom the type of job was not specified).

In **12%** of the projects the team members found good jobs in industry after the project.

55% AdG2008 reports offered information about the careers of the team members

..and finishing with some bibliometrics (and other forms of output), always in some context

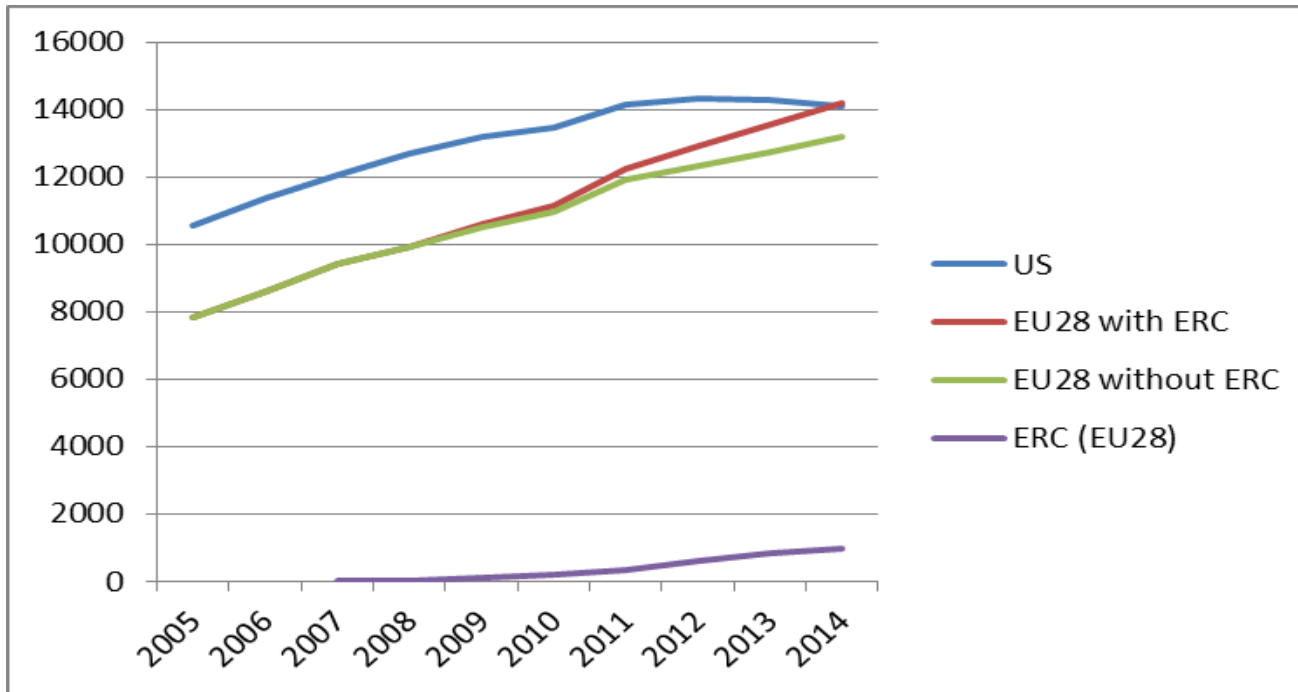
Total number of reported publications from ERC projects as of January 2017	> 100 000
Average number of publications per project, estimate based on 314 completed projects, total and by evaluation domain	Total: 34 Life Sciences (LS): 23 Physical Sciences and Engineering (PE): 48 Social Sciences and Humanities (SH): 18
Reported publications among top 1% most highly cited publications in Scopus database as a percentage of the total reported publications by ERC grantees	7%
Number of recorded cases of ERC grantees that have been awarded one or more major scientific recognition or prize after the award of the ERC grant	407
Percentage of completed Proof of Concept projects that have spun out a new venture	20%
Percentage of completed PE and LS projects that have reported at least one patent	20%

Scientific Breakthroughs (Physics World)

In the last 10 years, 65 "discoveries" have been highlighted and European researchers had contributed to 40 of them. Of this 40, ERC funding contributed to 15 of them (12 during the last 8 years, see below), which represents 23 % of all the highlighted discoveries and 37 % of the discoveries co-authored by European researchers

Loophole-free Bell inequality violation using electron spins separated by 1.3 kilometres	Ronald Hanson	Delft University
Evidence for a spectroscopic direct detection of reflected light from 51 Pegasi b	Jorge Martins	University of Porto
Observation of J/ψ p Resonances Consistent with Pentaquark States in $\Lambda_b(0)(b) \rightarrow J/\psi K(-)p$ Decays	-	LHCb Collaboration
Conventional superconductivity at 203 kelvin at high pressures in the sulfur hydride system	Mikhail Erements	Max Planck Institute for Chemistry
Turbulent amplification of magnetic fields in laboratory laser-produced shock waves	Gianluca Gregori	Oxford University
Cloning of Dirac fermions in graphene superlattices	Andre Geim	University of Manchester
Signatures of Majorana Fermions in Hybrid Superconductor-Semiconductor Nanowire Devices	Leo Kouwenhoven	Delft University
Non-invasive imaging through opaque scattering layers	Allard Mosk	University of Twente
Quantum Entanglement of High Angular Momenta	Anton Zeilinger	University of Vienna
Observation of the dynamical Casimir effect in a superconducting circuit	Per Delsing	Chalmers University of Technology
Indication of Electron Neutrino Appearance from an Accelerator-produced Off-axis Muon Neutrino Beam	-	T2K Collaboration
Control of Graphene's Properties by Reversible Hydrogenation: Evidence for Graphane	Konstantin Novoselov	University of Manchester

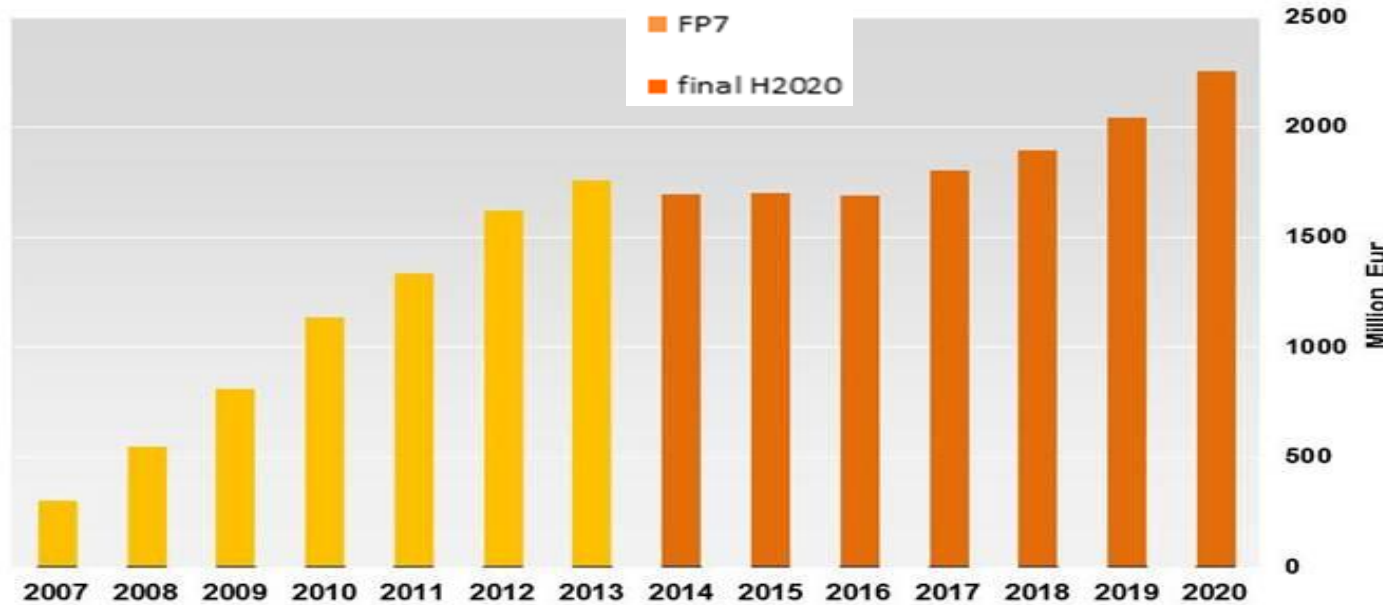
Evolution of number of top 1% most highly cited publications 2005 – 2014



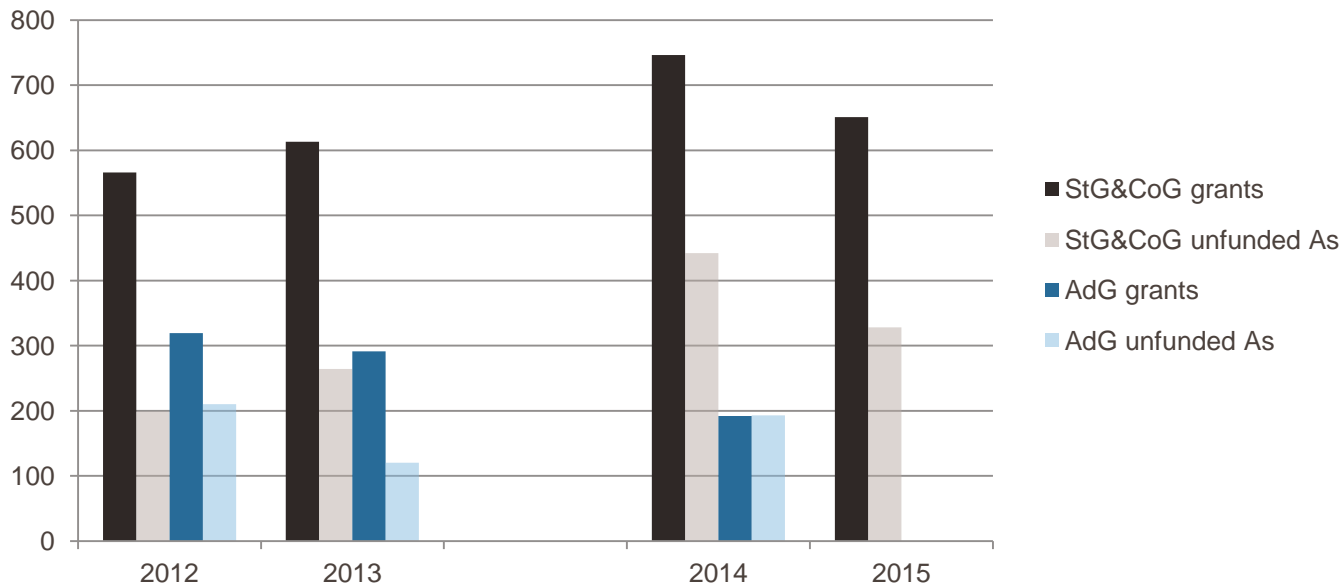
ERC Budget



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Unfunded "A"s



Since scoring was introduced in 2012, each year there has been an average total of 300 unfunded "A"s in the StG and CoG calls and 175 per AdG call.

A lot expected of the ERC

In order to have the desired impact, the ERC should during the first 3-5 years reach a grant volume of at least 2 billion a year. The purpose of the ERC will only be realized when the effects of its work are visible and evident in the member states.

Mayor Report (2003)

The ERC could become a Champions' League for research and we have to accept that research needs autonomy and freedom.

Angela MERKEL, Chancellor of Germany (2007)

The ERC must have a funding capacity that exceeds at least 5% of existing (sub)national funding, at a minimum of 4bn € per year.

LERU input to the independent review of the ERC (2009)

A lot expected of the ERC

The specific objective is to reinforce the excellence, dynamism and creativity of European research.

Horizon 2020 (2013)

Having been involved in the setting up of the European Research Council, I am pleased that it channels today about 1.8 billion Euros a year to the highest quality peer-reviewed European research. That has been a good news story. But there aren't enough such tales. And I wish that the ERC was getting a larger share of the EU cake. Spending for the future seems hugely preferable to trying to protect and bail out the past.

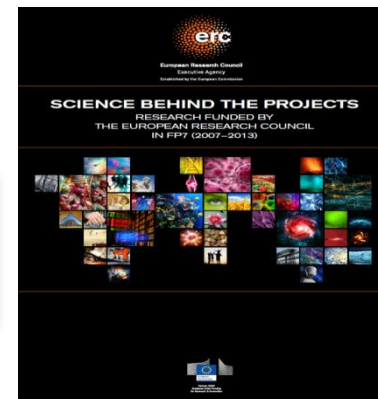
Lord Chris PATTEN OF BARNES, former EU Commissioner for External Relations (2014)

More Information

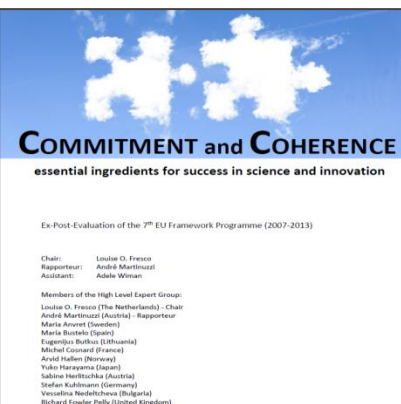


ERC funding activities 2007 – 2013

Science Behind The Projects



Ex-post evaluation of FP7



https://erc.europa.eu/sites/default/files/publication/files/ERC_funding_activities_2007_2013.pdf
https://erc.europa.eu/sites/default/files/publication/files/ERC_Science_behind_the_projects_FP7-2007-2013.pdf
https://ec.europa.eu/research/evaluations/index_en.cfm

Thank you for your attention



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Key figures

7,000

top researchers funded

50,000

researchers & other professionals
hired in ERC teams

with **€12 billion**



Breakthroughs

73%

of completed projects
led to breakthroughs/major
advances



Scientific impact

> 5,500

articles among
1% most cited
scientific journals



Open to the World

9

international initiatives
for non-EU talent
to join ERC teams



Prestigious prizes, e.g.

6

Nobel
Prizes

5

Wolf
Prizes

4

Fields
Medals



ERC as model

15

EU countries set up
ERC-like structures/funding
schemes