

Some Comments on Overcoming the Gap between New and Old Member States in the EU Framework Programme

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Abstract: *The New Member States (NMS) started to massively participate in the EU Framework Programmes (FP) for research and innovation in 1999 when the fifth FP was launched. However, despite of this long-term experience their participation in the FP remains continuously low: in the current HORIZON 2020 (H2020) programme they receive some 4.4% of the totally distributed financial support.*

The article shows that the financial support which the EU Member states receive from the European Commission (EC) for their participation in the EU FP is highly correlated with both their EU membership fees and Gross Expenditures for Research and Development (GERD). Thus, increasing participation of the NMS in the FP can be hardly achieved without increasing their EU membership fees, which depend on their economic performance, and their GERDs. However, the GERD dynamic of the NMS is usually slow and its increased level might bring an effect only after some time lag. The elevation of the NMS participation can be also achieved by implementing measures on both sides, the EC and the NMS, aimed at intensifying their collaboration with the excellent European institutions already in project proposals preparation.

Key words: EU Framework Programme · Research and Development Funding · Participation Success Rate

JEL Classification: O30 · I10 · Y10

5 Introduction

The Interim evaluation of HORIZON 2020 (European Commission, 2017, page 91) characterizes the low participation of the NMS by the following statistical numbers, which pertain to the period 2014 – 2016: “Participants from NMS represent 8.5 % of the participations in Horizon 2020 and receive 4.4 % of the overall funding, which is slightly more than under FP 7 (4,2%)”. If we take into consideration that the NMS have some 20% of the EU28 population, then we easily grasp, that their participation in the FPs has fallen short of their expectations.

However, the trap of low participation might be even more problematic when considering the socio-economic impact of the FP. Let us first recall that the budget of the former FP7 programme was EUR 54 billion and the European Commission estimates its longer-term impact by the following prospect: “on the average, the GDP gain (due to FP7) is estimated to amount to EUR 22,4 billion (in 2014 prices) per year during the period 2007 – 2023. Thus over the period of 17 years, the total GDP gain is EUR 380 billion: each EUR of FP7 direct budget brought an estimated increase in GDP of about EUR 9.” – see (European Commission, 2017, page 230). Similarly, the current H2020 programme, the budget of which amounts to EUR 77 billion, is characterised by the following forecast: “over the period 2014 – 2030 the GDP gain (due to H2020) is estimated between EUR 400 and EUR 600 billion, each EUR of HORIZON 2020 investment brings a GDP increase between EUR 6 and 8.5”, (European Commission, 2016, page 181). When considering these huge prospects one would expect that the countries will discuss how to maximize their gain resulting from participation of their teams in the FP. However, the current discussion is more frequently focused on the distribution of the FP budget than on sharing the economic assets resulting from the realised projects. Namely, many member states request that distribution of the FP budget should follow the “juste retour” principle (fair reward), i.e. the member states expect that the total support which their teams contract from the FP budget will correspond to the member state contribution to the FP budget (i.e. the aliquot part of the EU membership fee).

6 Methods

The article shows that the financial support which the EU Member states receive from the European Commission (EC) for their participation in the EU FP is highly correlated with both their EU membership fees and Gross Expenditures for Research and Development (GERD). The analysis and synthesis of the European Commission's previous findings has been used in the research.

7 Results

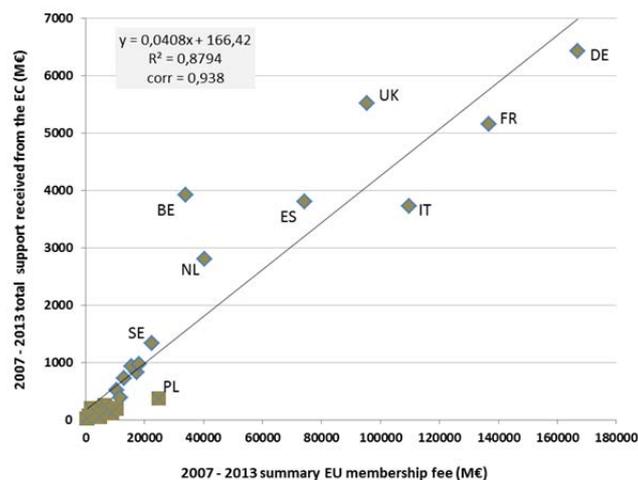
7.1 Increasing the participation in the FP via collaboration with the excellent European institutions

Dependence of the total member state support received to participate in FP7 on the summary EU membership fee in years 2007 – 2013 is visualized in figure 1. This data is extracted from the “Budget in figures” web page (European Commission, 2016). The regression line explains 88 % of the variation of the distributed FP7 budget received by the country (as indicated by the R2 coefficient) Thus the EU membership fee is an acceptable predictor of the support the member states receive from the FP7 budget. The NMS are in the cluster in the left lower corner in the graph, they all are below the regression line. Remark that the low level of the NMS membership fees corresponds to the level of their respective GDP.

Hence we can conclude that allocation of the FP7 support to the EU member states satisfies statistically (i.e. with individual deviations) the juste retour principle.

Needless to emphasize that successful country participation in the highly competitive environment of the FP assumes high quality thus high investment into national R&D&I system. However, there are great differences among the member states regarding investments into their R&D&I systems. For instance, the GERDs of Nordic states are for a long time close (or even above) 3% of their respective GDP while the GERDs of some NMS are constantly below 1.5% of the respective GDP. Thus, it is clear that the member states have different potential to effectively participate in the excellence driven FP. This also indicates that the juste retour is ill-considered principle which should be rather abolished than required. The relevant question thus concerns to the relationship between the received support and the level of the GERD.

Figure 1 The dependence of member state support received from the FP7 budget on its EU memberships fee



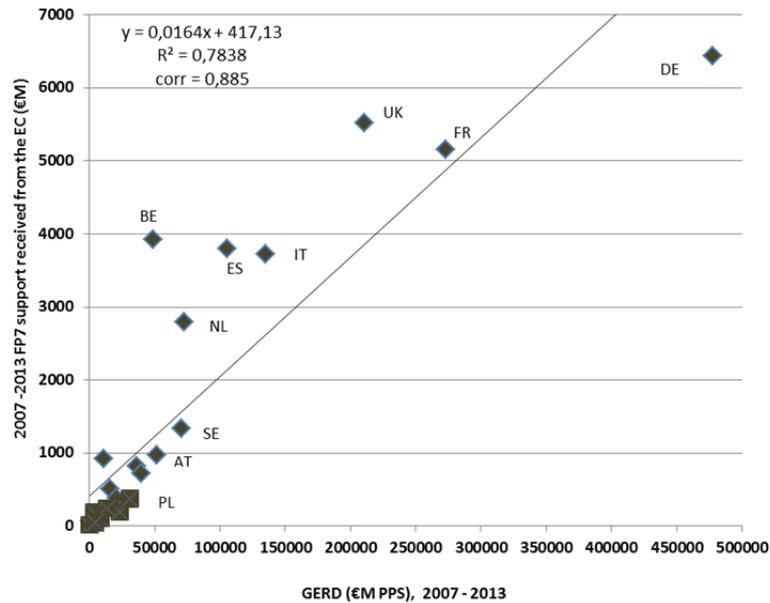
Source: European Commission (2016)

Note: The diamonds indicate the Old Member States, squares indicate the NMS

The scatter plot in figure 2 shows that the total FP7 support received by the member states is very highly correlated with their GERD totally invested in the period 2007 – 2013. The GERD explains some 78% of the variation of the distributed FP7 budget received by the country (as indicated by the R2 coefficient). Thus we could say that the country support from the FP7 depends linearly on the country GERD, in other words we can conclude that the FP7 budget was distributed efficiently (in the sense that “the value of support that the country received from FP7 is proportional to the country GERD”). The value 0,0164 of the slope coefficient of the regression line indicates that one million EUR invested into GERD generates the country potential to receive support EUR 16 400 from the FP7 budget.

However, the countries are more or less deviated from the indicated linear regression, i.e. the slope coefficient of the regression line is a characteristics of the whole FP7 but not of the individual countries. Thus we shall consider the ratio as one of the most important indicators characterizing the efficiency of the country participation in the FP. We shall calculate ratio (1) for the EU27 in the FP7 and also in the first three years (2014 – 2016) of the H2020 programme.

Figure 2 The dependence of member state support received from the FP7 budget on its GERD

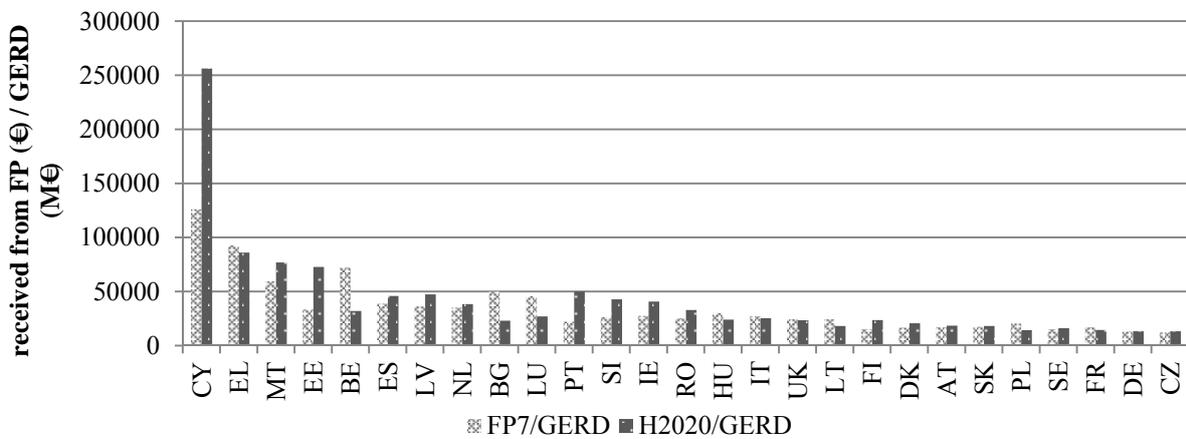


Source: Received from the FP7 / GERD (European Commission, 2016)

Note: The diamonds indicate the Old Member States, squares indicate the NMS

In figure 3 the member states are ranked according the sum of coefficients (1) for FP7 and H2020. We immediately see that the Czech Republic gained per 1M€ GERD the smallest support from the both FP7 and H2020.

Figure 3 Ratio “received € from FP (FP7 and/or H2020) per M€ of GERD”



Source: Own computation for FP7

Note: for H2020 data are taken from the Interim evaluation of H2020 report

The two main reasons for the last position of the CZ in the graph in figure 3 are:

- the CZ institutions participate in preparation of only small number of project proposals per 1000 FTE of the research capacity.
- The CZ GERD is quite high due to high (structural funds) investment into building new research infrastructures. (GERD per capita amounted (in Power Purchasing Standard) to € 390 in 2013 or € 429 in 2015, which are the second highest values among the NMS).

Among the NMS the Czech republic had in the FP7 the smallest number of participations in preparing project proposals per 1 M€ GERD (Frank, & Albrecht, 2017). The low activity of the CZ teams in the proposal preparation is a chronic problem of the CZ R&D&I, it was detected already in FP6, continued in FP7 and does not improve in the current H2020. This indicates a failure of the Czech R&D&I system. Namely, we have shown in (Vanecek, Pecha, & Albrecht, 2017), that scientific articles resulting from the FP projects are more than twice frequently cited than other

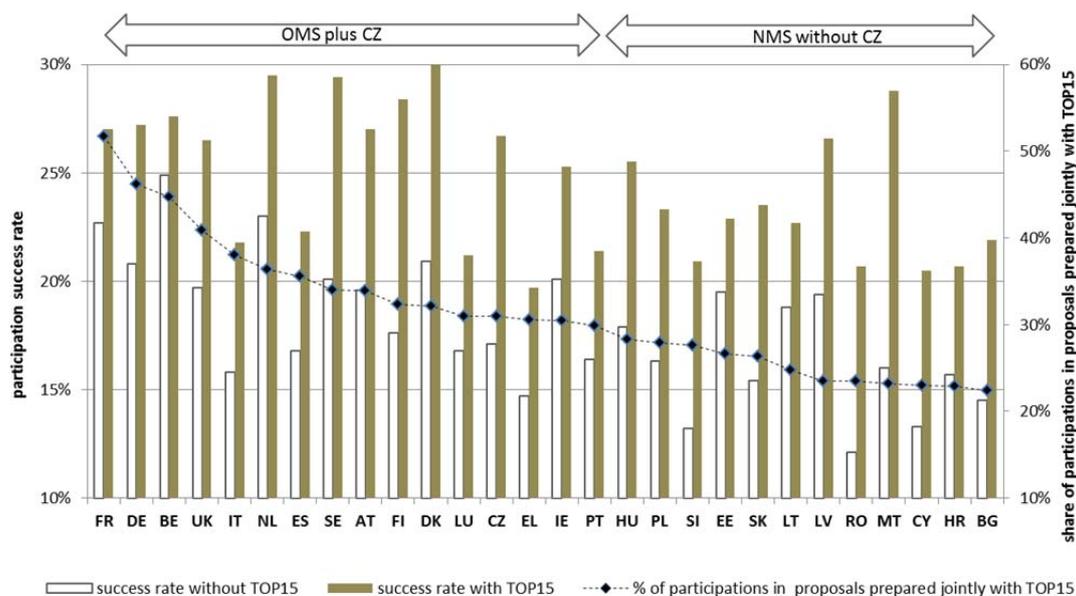
articles with Czech co-authorship. The Czech Republic should not neglect this effect, which measurably elevates the recognition of national institutions by scientific community.

7.2 Increasing the participation in the FP via collaboration with the excellent European institutions

We know from regression in figure 2 that increasing GERD might increase the country potential to gain higher support from the FP. The GERD dynamics is rather slow particularly in most NMS and simultaneously it is not clear how long the national R&D system must run with higher GERD to arrive at higher participation in the very competitive environment of the FP. Likely quicker effect might be achieved by increasing the success rate of project proposals.

Although there are thousands of participants in every FP, there is also a small group of institutions that participate in a very substantial part of the FP projects. They can be found among the institutions to which the EC allocated the highest support. Let TOPN denotes the group of the N highly supported institutions that participate in projects to which the EC allocated 51% of the distributed support. We have shown in (Albrecht, & Frank, 2017) that there were 15 institutions in the FP7, i.e. TOP15⁹⁷, which participated in the FP7 projects to which the EC allocated 51% of the totally distributed support. Preparing project proposals in collaboration with TOP15 considerably increases the participation success rate. In the column graph in figure 4 every member state is characterized by two participation success rates: in proposals prepared without collaboration with the teams from TOP15 and in proposals prepared jointly with some team of the TOP15 institutions. It is evident that preparing project proposals in collaboration with the TOP15 teams increases considerably the participation success rate of teams from any member state. The increase is almost 8% with the NMS (from 15.6% to 23.5%) and 6% with the OMS (from 19.3% to 25.6%). However, collaboration with TOP15 teams in proposals preparation not only considerably increases the participation success rate but also contributes to closing the success rate gap between NMS and OMS.

Figure 4 FP7 success rates of the EU member states in projects



Source: European Commission (2017)

Note: Projects prepared without collaboration with TOP15 institutions – white columns - and in projects prepared in collaboration with TOP15 institutions – grey columns. The countries are ranked according to the percentage of participation jointly with TOP15 institutions - point graph with scale on the right vertical axis.

In figure 4 the countries are ranked according to the percentage of proposals that were prepared in collaboration with the TOP15. This percentage is, of course, highest in countries, which the TOP15 institutions are located in. For the “no TOP15 countries” the percentage ranges from 20 to 40%. In spite of this narrow range the percentage almost precisely discriminates between the NMS and OMS: except for the Czech Republic the other NMS have the percentage below 30% while OMS are above this value. Consequently both the EC and the NMS should consider implementing suitable

⁹⁷ TOP15 of the FP7 are: Centre National de la Recherche Scientifique, Fraunhofer Gesellschaft, Oxford University, Cambridge University, Commissariat a l Energie Atomique, MaxPlanck Gesellschaft, University College London, Eidgenössische Technische Hochschule Zürich, Imperial College of Science, Technology and medicine, Ecole Polytechnique Federale de Lausanne, Institute National de la Recherche Medicale, Katholieke Universiteit Leuven, Agencia Estatal Consejo, Superior de Investigaciones Cientificas, University of Edinburgh, Consiglio Nazionale delle Ricerche.

measure to increase the NMS collaboration in preparing the FP (collaborative) projects. Increasing the participation success rate via intensifying collaboration with TOP15 might quickly lead to enhancing the participation in the FP.

The position of the Czech Rep in the graph in figure 4 indicates the that the Czech teams are able slightly more than other NMS contact teams from the excellent European institutions and prepare project proposals jointly with them, which might be read as a sign of the quality of the Czech research.

When implementing the same method of detection TOPN institutions in the first three years of H2020 data, we arrive at the conclusion that there are 20 institutions participating in H2020 projects to which the EC allocated 51% of the hitherto distributed support. There is a great overlap of FP7 TOP15 and H2020 TOP20, for details see (Albrecht, & Frank, 2017).

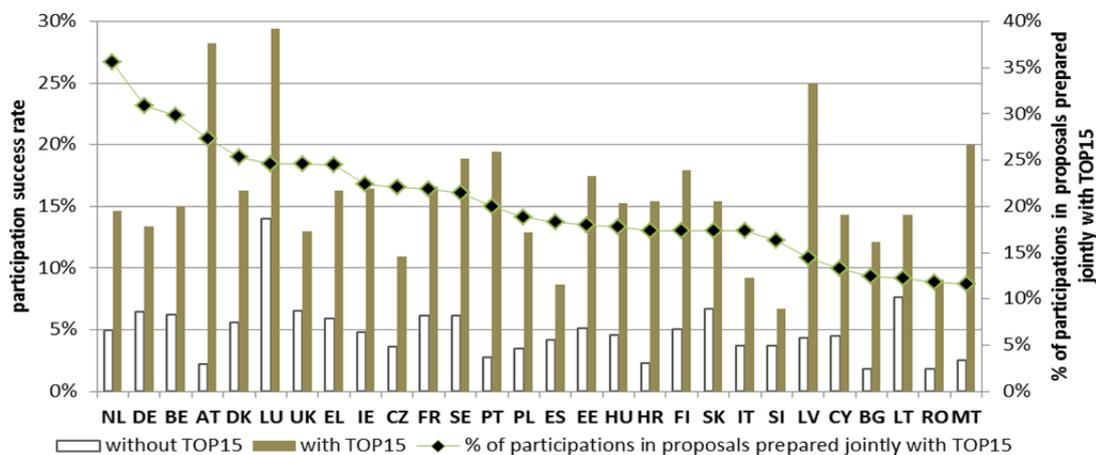
Table 1 TOP15 institutions that participate in the projects of the H2020 societal challenge SOCIETY to which the EC allocated 51% of the distributed support in the period 2014 – 2016

TOP15 in the SOCIETY social challenge of the H2020, 2014 - 2016	Country	Participations
FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E. V.	DE	85
KATHOLIEKE UNIVERSITEIT LEUVEN	BE	71
ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	IT	55
TECHNISCHE UNIVERSITEIT DELFT	NL	42
UNIVERSITEIT UTRECHT	NL	40
THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF OXFORD	UK	39
UNIVERSITETET I OSLO	NO	38
THE UNIVERSITY OF MANCHESTER	UK	37
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	EL	36
DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV	DE	18
OESTERREICHISCHE FORSCHUNGSFOERDERUNGSGESELLSCHAFT MBH	AT	11
JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION	EU	6
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT	EU	6
DUEDIL LIMITED	UK	2
WITHLOCALS BV	EU	1

Source: Albrecht, V., & Frank, D. (2017)

Note that preparing project proposals in collaboration with TOP15 increases the participation success rate more than 4times in nine member states (AT, EL, IE, PT, PL, HR, LV, BG MT). The average participation success rate of the OMS has grown from 5% in proposals prepared without collaboration with TOP15 to 14.1% in proposals prepared jointly with TOP15. With the NMS the average participation success rate has grown from 4.7% to 14.0%.

Figure 5 H2020 success rates of the EU member states in the societal challenge SOCIETY



Source: European Commission (2017)

Note: White columns display success rate in projects prepared without collaboration with TOP15 institutions, grey columns then in projects prepared jointly with TOP15 institutions. The countries are ranked according to the percentage of project proposals jointly prepared with TOP15 institutions - point graph with scale on the right vertical axis.

The participation success rate of CZ teams is one of the lowest among the EU28, it is only 3.7% (in proposals prepared without collaboration with TOP15) and 10.9% in proposals prepared jointly with TOP15. The Czech republic has again among the NMS the highest portion of project proposals prepared jointly with TOP15 institutions, however, it has also very low participation success rate, which is has not been increased either by the collaboration with the TOP15 institutions. The low participation success rate indicates low competitiveness of the Czech research teams in the research focused on social sciences.

8 Conclusions

The low participation of the NMS in the EU framework programme is a stiff problem persisting since the FP6. The EC introduced in the current H2020 the priority “Spreading excellence and widening participation”. With the budget totaling to 1% of the total H2020 budget this priority can effectively increase the research competitiveness of some institutions in the low performing countries; however, it can hardly elevate the hitherto low level of the research systems in 13 NMS with almost 100 million populations.

Some discussions and even published communications recommend that the NMS should improve their research administration structures, particularly the system of the National Contact Points for the FP (see e.g. Schuch, 2014). Unlike of these communications we argue that the participation in the FP is ruled by statistical laws which make a strong coupling between country participation on the one side and its economic performance and investments into research and development on the other side. Hence, increasing the GDP and GERD will increase the country potential to more successfully participate in the FP.

We have demonstrated by a simple statistical analysis that preparing project proposals in collaboration with the excellent European institutions considerably increases the participation success rate of the NMS, thus widens the NMS participation in the FP projects. The excellent European institutions research practice influencing the research practices of the NMS might also have the effect of spreading excellence, which certainly will not be as strong as that in the above mentioned priority, however, it might be evoked in hundreds of FP projects. The NMS should thus organize events (e.g. workshops, webinars etc.) aimed at increasing the collaboration with the excellent institutions in project preparation. Simultaneously the EC can modify the project proposal evaluation to strengthen the excellence of the consortia submitting the project proposals while simultaneously increasing involvement of the NMS teams.

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