

Opponent review on the Final Report of the International Audit of Research, Development and Innovation in the Czech Republic

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MINISTERSTVO ŠKOLSTVÍ,
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OP Vzdělávání
pro konkurenceschopnost

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

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It has been a great pleasure for me to act as one of the opponents of the Reports resulting from the "Audit" project. I enjoyed the opportunity to see the work of the international team in progress and to read already the preliminary results and learn quite a lot of interesting information. For me, as a researcher, it was a great enjoyment to follow the researcher's approach to study the complicated landscape of the Czech R&D, to scientifically dissect its parts and to put them through rigorous scrutiny. It was also a good source of inspiration for me as a member of the R&D&I Council: lots of information can serve as arguments in discussions and disputes on the R&D topics.

But when asked to write my opponent reviews, I tried to view the Reports also through the eyes of a politician. I am happy enough not to be one, but one of the main tasks of the Report will be to serve politicians to make qualified and informed decisions. Although most politicians would be happy to do just popular things (like increasing the R&D budget, abolishing the hated "Methodology", decreasing taxes, supporting excellent researchers, etc.), quite often they are forced to do just the opposite- like cutting budgets, closing projects or institutes, increasing taxes, dividing a limited amount of public money among several "most important" institutions, or dismissing people out of their offices. Especially for making unpopular decisions in the R&D field, the politicians would need very strong and rigorous arguments: whenever they would make a mistake in reasoning why they do the unpopular measure, for sure their extremely intelligent opponents would enjoy the opportunity of making complete fools of them. But even if their decision would be popular in the R&D community (like increasing the R&D budget), their arguments must be waterproof anyway, since the consequences might be unpopular for someone else (like increasing taxes or decreasing budget elsewhere). It would not be enough just to say "look, the Technopolis experts say in their wonderful Report that we should do this": the politicians pursuing different interests will probably have different reports and expert studies at hand saying exactly the opposite. Therefore, whenever a recommendation is given to a politician (and there are lots of recommendations for political decisions in the Report), it should have a simple structure: "you have such and such choices. If you decide for this one, the consequences will most likely be these, the evidence for that is here. If you decide for the alternative, a very probable consequence is this, and here is the evidence. The uncertainty of our prognosis is such and such and the reason for it is this and that." Straight and plain. I think this was the main purpose for starting the Audit.

The Report represents an immense amount of work so it is quite natural if some small mistakes occur scattered through the documents. However, since the Report will serve also as a basis for unpopular decisions, the authors should try to avoid any errors, inconsistencies or omissions as much as possible. It is clear that any mistake would serve the opponents for showing the Report to be less trustworthy. The authors have probably noticed that the research community is quite polarized here in many aspects: basic vs. applied, university vs. Academy, private sector vs. public, etc. Therefore, whenever the authors write a statement that would be unpopular in some part of the community, they must be sure that any signs suggesting that their arguments are not perfectly founded, or that they listened to one group more than to the other, could serve as an occasion for claiming that the Report might be unbalanced or biased. It is clear that I also come from certain background (basic research, university, natural sciences - physics, public funding) that influences my opinions that might sometimes be different from the opinions presented in the Report. The difference in

opinions is perfectly fine and I also have no problem with the criticism, sometimes quite sharp, that concerns those parts of the R&D system to which I am attached most: I am sure that taking seriously all the criticism and objections can help improving the situation here. At the same time, I also use some critical expressions in writing this review: any time I find something suspicious, claims that lack a waterproof argument, or some evident omissions, I express it here openly and perhaps not using a very diplomatic language. I hope the authors of the Report will not take it personally and understand that I am doing so trying to get as useful results out of the project as possible.

I tried to look at the project from three different perspectives. My own - as a researcher and also an R&D administrator as well. I tried to see it also as through eyes of a politician, to whom the Report should be addressed. The third perspective would be as viewed by Mike, Lucy, Toralf and Romana, i.e., my friends, relatives and my wife here, in Germany, Spain and Sweden, who paid for this project from their heavy taxes, not living from the state budget themselves. For example, just asking what would be their opinion about another collection of statistical data, similar to what we have seen several times before, but still without a unique conclusion what should be done based on that knowledge. I believe that the Report is very useful and worth of spending public money, but when reading some parts of it I had to think quite hard how to explain the above mentioned people that their money were used in the most efficient way.

Notes on the Synthesis Report

Sec. 2: It is a very interesting introduction to the Innovation Systems, with theory, examples of different countries, and lots of footnotes with references. I would love to go through the details, if I have more time. It is clear that the authors enjoy doing their job in researching the R&D systems in various countries (and I hope they had some fun and excitement in doing that here, too). That's nice, and as a researcher I liked this part very much and would be glad to have some academic discussions on the topic with them. Just in p. 5: I cannot read the footnotes 13, 14, 15, is there something wrong with the document or is it just my computer?

p. 29: *"...situation in 2012 where the institutes of the Academy will get - at best - half as much budget as the Higher Education Institutions."* I think this statement is wrong. From the available data (see also the note below), the institutional budget 2012 of the Academy ("Research Intentions" + "Research Institution Development" + "Costs of Activities" + "Support of Activities") will be about 85 % of the institutional budget of the universities (MYES budget "Research Intentions" + "Research Institution Development") in the for the Academy less favorable variant, and 97 % in the more favorable variant.

p. 30, Fig. 9: the data for 2012 are desperately obsolete. It is a puzzle for me why the authors used as a source a budget proposal for 2010 when updated view on 2012 is a part of the 2011 budget (approved last year, available at <http://www.vyzkum.cz/FrontClanek.aspx?idsekce=580838>) and the Government is now dealing with the 2012 proposal (available at

<http://www.vyzkum.cz/FrontClanek.aspx?idsekce=551861>). The authors would see that the budget proposal 2012 for the Academy is 35 % of the institutional funds in variant A and 33 % in variant B, i.e., substantially different from the 23 % shown in Fig. 9. Similarly, the 2012 proposal for the Ministry of Education is 52 % in variant A and 55 % in variant B, and not the 60 % shown in Fig. 9. The base is 12,834, and not 11,342. The data presented in Fig. 9

correspond to the situation before the protests of the Academy in 2009 made the Prime Minister Fischer and his Government to make shifts in the budget proposals. The authors should know that the Academy budget is still a very sensitive topic here so they should be rather careful in publishing data that might cause panic in some readers. Similarly, the discussion mentioning the 2012 budget in pp. 29-31 seems to be completely obsolete. I wonder whether all the conclusions drawn from the discussed data remain untouched or should be updated as well?

p. 33: I do not agree with the claim of the authors saying about the private research organizations that their sector *"is functionally misclassified - it should be considered as part of the research and higher education sector"*. It would follow that the public money which goes to these private companies (and through them to their owners) should be treated as equivalent to the public money going to schools and to the public research organizations. I think that public money going to a daughter company of a private company is more similar to the public money going to the mother company itself rather than going to a school or to a public research organization, irrespective of the fact that the daughter company was years ago an organization owned by the state. Although I do not claim that my opinion is generally accepted, it is nevertheless shared by more people (mostly from the public sector, of course). Therefore, the authors should present more detailed arguments that would convince me that the statement in the Report is correct. Note that this point is also important for the question of allocation of institutional funds and who should be eligible for them (see also the discussion of Sec. 8 of Annex 3 below).

p. 38: I would appreciate a more detailed explanation of the table in Fig. 15. What is the meaning of the highlighted items (Škoda, Komerční banka and Zentiva in 2008 and 2007)? Why do the years go backwards? Why is "České dráhy" with just 0.0 among the "largest R&D spenders"?

p. 41: *"We analyzed the total output of 85,572 indexed publications from the CR in the period 1993-2000."* I guess the period was 1993-2009. The *"getting getter"* on the same page should be *"getting better"*.

p. 42: *"The proportion of publications related to physics and chemistry has declined over the years."* What conclusion should I take from this statement? Is it good (our research portfolio is becoming more "normal" as the productivity of other disciplines increases) or bad (as the physics and chemistry are losing)? Should any consequences follow?

p. 42: *"Impact factors have increased particularly strongly in physics and materials science and in clinical medicine."* Where do I see the data? I have found no Annex to the Final Report with a bibliometry showing this.

p. 45: *"Small group size also means that there is not the flexibility required for people to be internationally mobile. Stays abroad are mostly restricted to a couple of weeks and at best months, limiting the opportunities for learning. More international scholarships are needed together with more serious human resource planning and mobility has to be rewarded in appraisal and career development schemes."* I consider the low international mobility a problem, which, in my opinion (shared with quite a few of my colleagues) perhaps almost has to do with a part of the Czech identity - the reluctance to travel and work abroad. Even with using both positive and negative motivations, it's hard to persuade quite a lot of our students to go for such an experience. It seems to me that the offer of international scholarships (in my research field) is bigger than the demand, so the remedy might be

somewhere else than what the authors suggest. I would appreciate if they elaborate more on this topic.

p. 47: *"ASCR institutes are much less likely than Universities to have international members on their advisory boards. On the other hand, the use of international peer reviewers in periodic reviews of ASCR institutes appears to be increasingly the norm."* It would be useful to mention, for comparison, what proportion of the institute directors are foreigners in the MPG (Germany), heads of the departments at German universities, and what is the situation in the Czech Republic (ASCR and universities). Is there any recommendation in this direction for the Czech Republic (e.g., target values and possible measures to reach them)?

p. 48: *"Worryingly, in terms of broader internationalisation, there is very poor participation in the FP schemes that allow for extra-European collaboration, such as INCO and SIC A. In terms of purely monetary return on investment, the Czech Republic does not quite get a 100% 'retour'."* This is a real, and a well-known problem. Would the authors agree that a possible way to solve it would be to motivate participation by a formula-based part of institutional money allocated to organizations successful in getting the FP funds?

pp. 51-52, on the low researcher mobility: I wonder why the Report does not comment on the preparation of the new Law on Foreigners that should bring our legislation to be consistent with the Council Directive 2005/71/EC "on a specific procedure for admitting third-country nationals for the purposes of scientific research". Simplifying the admission of extraeuropean research workers is one of the announced measures of the Reform of the R&D&I System (8.2.4) which should have been put under scrutiny in this Report. I would expect more comments here on, e.g., why it took so long to start these changes in the legislation, what were the most important legal obstacles that hindered the mobility, whether the proposed legislation is likely to solve the main problems, or whether there are some suggestions to modify the proposal. I think, this is exactly what the politicians need if they are to make a qualified decision. Or have the authors simply not heard about that legislation procedure?

p. 54: I do not understand the statement *"The Evaluation Methodology for institutional funding is not fit for purpose and **its use has been put on hold.**"* Do the authors use the phrase "put something on hold" in the meaning "to postpone something; to stop the progress of something" that I found in a dictionary, or in some else? Does it mean that the authors think that using of the Evaluation Methodology for institutional funding has been stopped??? Why? Have they really studied the situation here? Do they know how the 2012 R&D budget has been proposed and what the 2013 budget procedure will most likely look like?

p. 56, on the R&D&I Council: *"It currently has 16 members"* (the same statement occurs in Annex 2, p. 60). Right now, when writing this review, it officially has 17 members (see <http://www.vyzkum.cz/FrontMedailonek.aspx?idsekce=662&kod=RADA>), the same situation was true at the time when this Report was submitted. The number 17 as the number of the members is given by the law 130/2002, §35, see

http://portal.gov.cz/wps/portal/_s.155/701/.cmd/ad/.c/313/.ce/10821/.p/8411/_s.155/701?

PC_8411_number1=130/2002&PC_8411_p=35&PC_8411_l=130/2002&PC_8411_ps=50#10821. The authors might know however (and comment) that 3 of the members resigned several months ago. Nevertheless, since the membership can only be ended by the resolution of the

Government, and the Government has not dealt with that yet, they are still formally members of the Council.

p. 57: *"In contrast to the common impression among policy-makers, our in-depth analysis showed a good coherence between the strategies at the different R&D&I governance levels - both in terms of systemic and thematic priorities."* Could the authors give some more detail on the "common impression among policy-makers", perhaps give some reference?

p. 58: *"We also note an apparently difficult collaboration between the Expert Committees that act as advisory bodies to the Council and the Council itself; there are clear signs of dissatisfaction and frustration - on both sides."* It would be useful to elaborate a bit more on this. When looking to Annex 2 for details, it seems that this conclusion is drawn mostly (with one exception) from the minutes of the previous Council and the previous Expert Committees, i.e., those before their complete renewal in spring 2010, therefore obsolete and irrelevant now. I wonder whether the authors noticed any change. My personal experience, both as a member of the Council and as a member of the KHV Committee is as follows: I do feel frustration from such collaboration, the reason is that whereas some members work really hard, devoting lots of time and effort to the mission of the committees, contributing with proposals and trying to solve problems, some members just appear at every other meeting to sip a coffee and have a chat with the colleagues. Could the authors add some more details from their own research?

p. 59: *"The Science Foundation is efficient and effective and maintains a very traditional approach to its 'research council' function. [...] Our only concern was that the strict and traditional exclusion of the staff from decision-making processes could lead to conservative decisions, with innovative or inter-disciplinary proposals running the risk of 'falling between stools'. In this connection, we note that a number of other research councils - most notably the US National Science Foundation - allow programme officers greater opportunities to help identify funding opportunities for such proposals and also often to solicit proposals in areas of especial research interest, without at the same time over-ruling the academic committees."* What is the recommendation? Should some of the 33 staff members get the authority to identify funding opportunities for interdisciplinary proposals? As far as I know, in GACR no one of the staff members is in a position equivalent (or similar) to the programme officer of the NSF or other research councils. If I understand it correctly, the duties of the "programme officers" are fulfilled by members of the Presidium. Would the authors recommend some different distribution of responsibilities?

p. 62: *"Thus the EM drives a Performance-Based Research Funding system (PBRF) where the outputs of the previous five years work drive next year's institutional funding. The intention was to transition the basis of institutional funding to this arithmetically based system over a three-year period. The **final cutover was interrupted**, owing to dissatisfaction with the scheme."* I do not understand the last sentence - what was interrupted? As far as I know, the transition is running as planned, with the 2010 institutional budget based from 1/3 on the PBRF, this year budget based from 2/3 on the PBRF, and the institutional budget proposal for 2012 is based almost completely on the PBRF (there is an exception for the Research Intentions that started in 2007 and will phase out till 2013, these however represent a very small minority of the budget). Have the authors not known that???

p. 65: *"The R&DI Council should launch an explicit discussion on trust within the research and innovation community, with the aim of establishing consensus on its important and on culturally and socially acceptable ways to increase it."* This is a nice, general

recommendation. Probably some more hints on how to launch such a discussion on trust would be useful. I wonder whether the authors are aware of the "round table" discussions organized by the former Prime Minister Fischer in 2009/2010. Should the discussion be sort of a continuation of those round table discussions? Can some of the conclusions be taken as the starting point?

Of course, there is no problem with launching a new discussion. However, from what I have learned by reading the minutes of the Round Table discussions, as well as from my own experience from the R&D&I Council, the problem is somehow different. Almost everybody feels that the research system is too fragmented here, with more than 50 Academy institutes, over 25 public universities (almost each of which wants to be the "research" one), as well as plenty of various "sectoral" public and private research organizations and schools, each of which would be happy to get some contributions from the R&D budget as well. Probably quite a number of people feel that a less fragmented research landscape would be more efficient. But, quite naturally, nobody wants to voluntarily leave his or her comfort zone and initiate the changes, and so he/she just defends the part of the system in which he/she feels at home. The research community is waiting for the decision of the politicians so that they can react and find a new equilibrium. The politicians (who mostly do not understand the issue) wait for the research community to find the consensus. The politicians probably also wait for the advices from this Audit. The Report says that we should launch a discussion. Wonderful.

p. 65: "As far as possible, state expenditures on R&D&I should continue to increase during the next few years, so as to move at least to the average European level." Yes, these are nice words and I can subscribe them. But, to be of any use, the recommendation should be quite concrete. "As far as possible" can mean anything, especially if the Government priority is to avoid debts.

In particular: what is the opinion of the authors on the goal of the Government to reach 1 % GDP from public sources to R&D by 2020 (Govt. resolution No 434 from June 7, 2010, regarding the national goals of the strategy Europe 2020)? Is this goal realistic? What would be the best strategy to reach this goal? A simple guess might be that each year the GBAORD should increase by an equal amount to smoothly ramp up the public R&D expenses: so if the 2010 GBAORD was about 26 billion CZK and the GDP approx. 3.6 trillion CZK, there should be about 1 billion CZK annual growth of the GBAORD, provided the GDP is fixed (or more, if the GDP grows, as everybody wishes). However, the GBAORD is (almost) frozen since the crisis. So it might be, that the first couple of years the Government will try to freeze the expenses to avoid the debt trap of the Greek style, and just in the last years of the decade they might want to rapidly increase the R&D expenses to reach the 1 % GDP goal. However, it seems to me that this is not a very reasonable strategy since abrupt changes (either direction) in the R&D budget can do more harm than good, and smooth, stable growth might be more efficient. What is the opinion of the authors of the study? Should the Government be advised to abandon the 1 % GDP goal if the 1 billion annual growth is impossible today? Or should we insist that such an R&D expense growth is absolutely necessary, even at the risk of possible budgetary instabilities? Or is the strategy "wait now, rapid growth later" a good one?

Why was this very important question not discussed in the analysis? Have the authors even heard about that Government resolution? Or have they not considered it important? Why has the project team not pushed the authors to elaborate on these topics?

p. 65, about the privatized TRO: *"The R&D&I Council should launch a study to investigate the potential for giving these organisations a more powerful role in policy delivery."* I wonder why such a study was not a part of the project (task l, "The level of research and development institutions", and task m, "The relation between research and application spheres, barriers of cooperation and, on the other hand, instruments supporting such cooperation, motivation towards target behaviour, and knowledge transfer"). Was the budget of the project not big enough to launch such a study, if the authors believe it would be useful?

p. 65, about the Methodology: *"...it has had a number of negative effects on the NRIS, including making institutional funding as well as targeted funding short term and therefore a poor basis for planning; inhibiting strategic investments in capacity building..."*. Although the criticism of the Methodology is in many aspect true, I do not completely agree with the general statement about the "inhibiting strategic investments in capacity building" since I know of at least a few teams who have invested (and still do invest) into their research capacities, trusting in their abilities to produce excellent results with the help of these capacities, which would, simply speaking, help them to produce more Jim points (for papers in high-impact journals) and thus make money for further development. These cases should not simply be ignored. Moreover, I have pointed out several objections to other claims about the Methodology already in my previous reviews (from August 22, 2010, and from February 28, 2011) but again, I see that the authors have not dealt with them. Why?

p. 65: *"The Evaluation Methodology should be replaced by a system that combines the use of indicators, peer review and an element of prospective thinking. This can be implemented in conjunction with performance contracts but the whole process needs to remain transparent."*

Yes, the Evaluation Methodology system will be replaced, most probably with a system that will be the result of the project to be launched by the MYES. The authors may know that in March the R&D&I Council passed "Long-term principles of evaluation". These principles are rather general, assuming that they will be specified in dependence on the results of the new MYES project, as well as based on the results of this Audit. Could the authors comment on these Principles, and possibly give some specific recommendations to modify them?

p. 65: *"Especially in a small country, it is dangerous to fragment the research effort."* Yes, I agree. But I would expect much more elaboration on this question. Is not the research effort fragmented here too much? Why do we get no hints to defragmentation (just the broad *"A key issue is to defragment the research fabric by creating larger and more interconnected groups"*)? **I would** expect that the report would give answers to questions like these: is the present number of universities that want to be "research" just fine, or should it be smaller or bigger? Is the number of research institutions (both Academy and else) just adequate for the size of the Czech Republic? E.g., compared to the MPG in Germany (about one institute per million inhabitants, budget about 0,5 % of the German GDP), is the Academy just of the right size? Is there any particular reason why the research should not be concentrated into a few research universities, where one gets the real benefit from the synergy between research and education? Or are the reasons mainly just historical and psychological?

p. 66: "The Academy and MEYS should explore opportunities to increase the benefits of closer cooperation between the Academy and University sectors." This is a very general, nice recommendation that is completely useless if various actors interpret it in different ways and no closer specification is given. Yes, the Academy and the universities cooperate whenever both sides benefit from such a cooperation. But since people do not want to leave their comfort zones, one could hardly expect any spontaneous "reorganization" mentioned in the sentence just above this recommendation. But I think it was the task of this project to make concrete recommendations. Either "a much more efficient system could be created if most of the Academy institutions are integrated into several (few) research schools". Or "we do not recommend such an integration because of such and such reasons". Or something else, but concrete. If it is not here, I am missing it.

p. 66: "It is important that the coming thematic prioritisation exercise explicitly link research and industrial priorities, so that there is substantial research (and higher education) activity in areas of present and future industrial relevance while at the same time supporting a degree of basic and applied research across a wide front." I wonder whether the authors are aware of the work of the team lead by prof. Haňka that should result in the new National Priorities of Oriented Research and whether they want to comment on it. Any practical, concrete recommendations would be welcomed. Otherwise, we have just another, very general statement, with which everybody would, what else, agree.

Notes on Annex 1

p. 5: "In order to further facilitate knowledge driven growth, we recommend to exempt public R&D expenditures from public budget cuts and to further increase the level of public R&D investments." O.K., but as in my previous note to the recommendation on p. 65 of the Synthesis Report: concrete numbers should be provided and the Govt. resolution No 434 from June 7, 2010 should be mentioned or commented.

p. 6: "...we recommend introducing measures which seek to increase the level of R&D financed by Business Enterprises for the Higher Education Sector. Types of measures may include incentives for Higher Education Organisations (i.e. formulae based funding systems which take into account private R&D financing) and individuals (boni for acquisition of private R&D funds), and a wide array of programmatic measures which are outlined in Annex E on Science-Industry Linkages." I wonder why the tax deductions for research purchased by companies from universities and research organizations are not mentioned here. So far, such tax deductions have only been possible for the "in house" research done by the companies. Broadening of the tax deductions to cover also purchased research was planned in the Reform (see measure 6.3. "Indirect support of R&D&I"), but have not been implemented yet. However, the Ministry of Finance is now working on a new tax law which should enable such deductions. At this stage, there has been some debate, e.g., whether also private research organizations should be eligible, or only the universities and public organizations. I have also heard some sceptic remarks about the efficiency of the tax deductions. Opinion of the authors of the Report, as well as concrete recommendations, would be very useful. Why do we have none here?

p. 6: "...the Academy receives very considerable amounts of R&D income via licences, which account for 13% of total research income or 46 million EUR." The Report could mention that it concerns just a single institute (UOCHB) which is responsible for more than 95 % of this amount. It is a bit strange to generalize this singularity to the whole Academy and even to the whole Government sector without saying this. What would be the picture of the sectors without this singularity?

p. 6: " We therefore recommend increasing the level of R&D financing in the humanities and the social sciences, as these fields also need to catch-up in terms of scientific quality..." Since results of the international evaluation can serve as one of the sources for proposing the R&D budget, it can happen that the R&D&I Council will follow this recommendation. However, it would be very helpful if the authors give some more detailed information regarding the target values, implementation methods, and also reasons for such measures. As far as I understand, this recommendation is mostly based on comparing the GBAORD field structure in the Czech Republic and in other countries; because the EU27 SSH average is higher than the Czech one, we should try to approach the "normal" values. Does it mean that the candidates which should cover the expenses are those fields whose GBAORD share is higher in the Czech Republic than in EU27? Or should also the research output quality and quantity be taken into account? How? The Report provides us basically with statistics of the WOS publications (parameter P) and normalized citation rates (CPP/FCSm). Could these numbers be somehow used to decide whose shares to increase and whose decrease? In which way? Should the successful fields be given more to stimulate the positive specialization, or rather the weak ones so that they can catch-up as well? The most straightforward way how to follow this recommendation in the shortest time would be to change the shares allocated to individual fields for institutional funding by the Methodology (which will with some modifications probably be used for the next few years before the newly developed allocation system is launched). Even though this might be relatively simple, I would be very careful with this approach: as pointed out many times, the Methodology works especially badly in the SSH fields where the bad incentives are especially pronounced. The new version of the Methodology 2012 which might be approved by the Government this fall tries to fix some of the worst faults, but it is still not clear whether it will be approved and if so, whether the situation for SSH would be much better. Therefore, it might be better rather to increase the SSH share in the project funding - making the corresponding allocations in GACR, TACR and the Ministry of Culture. Since the SSH fields are rather diverse, it would also be helpful if the authors have any detailed suggestions which particular fields of SSH should benefit most from the increase. The strong ones or the weak ones? Or any research branch in particular? Or any particular institution?

p. 7: "...we further recommend to put more attention to engineering R&D within the Higher Education Sector." If I understand it correctly, "more attention" should not be interpreted as "more money" (since according to Fig. 21 on p. 44, the finance going to engineering from the GUF is already high enough and in the logic of the preceding recommendation, one should increase the budget to those fields whose budgets are below average). Is that correct? Could the authors elaborate more on the "more attention"? It seems to me that the sentence "it may therefore be a field which is in particular apt for joint endeavours with the public sector in terms of new research endeavours and education schemes for young researchers" is still a bit too vague.

p. 7: I just want to express my surprise that according to the authors we should spend more public money for research in the field of "financial intermediation". Could the authors elaborate a bit more on this?

p. 8: "At present 54% of public R&D funds are distributed via project financing mechanisms. Institutional funding accounts for 46% of total public R&D expenditures and is mainly geared towards the Higher Education Sector and the Government Sector." The figures are wrong. An exactly opposite ratio is given in Sec. 3.3.3 on p. 33: "In 2008 about 54% of total R&D expenditures are distributed via institutional funding mechanisms and 46% via project funding mechanisms in the Czech Republic." Moreover, if this is just a misprint and the opposite ratio is what the authors meant, they should not say "at present" if their data are related to 2008.

"This means in particular that public R&D investments for the Higher Education Sector and the Government Sector show too little focus on the field of Engineering, which is of particular relevance for R&D activities of the Czech Manufacturing Sector." I do not understand how the authors came to this conclusion. Merging the data from tab. 7 on p. 59 and tab. 8 on p. 62, one can find that the field of "Engineering and technology" gets 22 % of the sum of the GUF and the Government sector, whereas in the EU countries this number is 23 %. This is well within the year to year statistical fluctuations (just look at the Eurostat data from previous years), so the Czech proportion of Engineering is virtually indistinguishable from the European average. Moreover, if we accept the thesis of the authors that the private research organizations "should be considered as part of the research and higher education sector" (see Sec. 3.5 of the Synthesis Report) and consider that the Czech Republic is above average in SEO 07 "Industrial production and technology", we can ask whether the corresponding numbers would then occur as "Engineering and technology" of the Government Sector and GUF. What would then be the conclusion about the "focus on Engineering"? Generally, it seems to me that the cited statement is unfounded by the statistics and especially the claim that the HES shows too little focus on Engineering (please, see Fig. 21 on p. 44) sounds very strange.

p. 22: "Unfortunately, official R&D statistics does not provide a repartition of the financing flows to different single institutes of the Government Sector, so we cannot comment whether this share of financing stems from the activities of one single institute. However, the Annual Report of the Academy of Sciences 2009 (ASCR 2010) reveals, that sales of licences alone account for 1,131.9 million CZK (approximately 46.1 million EUR) of total own research, development and innovation resources of the Academy, which means that within the Government Sector the Academy has the largest." It should be no problem also to check that UOCHB had 1,339.9 mil. CZK income from selling services in 2010, and 1,126.9 mil. CZK in 2009 (see

<http://www.uochb.cz/web/structure/573.html>) which suggests that what has been attributed here to the Government Sector is just due to a single institute. I wonder why the authors have not mentioned this simple fact although I was asking for that already in my previous review.

p. 28, Fig. 9: What is the reason for time running backward in the graph?

p. 32, the Grupp formula: I guess a subscript i is missing in one X_{ki} in the numerator. I wonder why they use the hyperbolic tangent and logarithm when a simple expression is $\tanh \ln z = 1 - 2/(1+z^2)$ (I think prof. Musilová has pointed that at the last meeting). Grupp has a university degree in physics and math so using $\tanh$ or $\ln$ may be quite natural for him, but the definition of the $\tanh$ function might not be so obvious for the general audience to which this Report is addressed. On the other hand, taking a square of a quantity or its reciprocal value is something that anybody with a high school understands. I think unless we need to

look amazingly scientific to make impression on the readers, we can use plain words and simple formulas.

p. 33: *"A strong negative specialization compared with the EU-27 can be seen in the objective-fields Education, Culture, Political and Social Systems, and Exploration and Exploitation of Space."* Why Defence is not mentioned? According to the figure it has even stronger negative specialization. The authors may also comment how comes that Fig. 12 shows a very strong "General advancement of knowledge, other than GUF" (which is basically the Academy) and a weak GUF (which are basically the universities) whereas in the Synthesis Report in Fig. 9 they demonstrate how the Academy gets much less money than the universities.

p. 33: *"In 2008 about 54% of total R&D expenditures are distributed via institutional funding mechanisms and 46% via project funding mechanisms in the Czech Republic."* I wonder why 2008 is mentioned when more recent data is available. If the authors want to support their thesis about the trend of decreasing institutional funding they might mention that the recent study of the Czech Statistical Office "Government Budget Appropriations or Outlays for R&D (GB AORD) in the Czech Republic in 2009" (<http://www.brno.czso.cz/csu/2010edicniplan.nsf/engpubl/9611-10->) presents data showing 51 % institutional and 49 % project funding in 2009. If they want to show the governmental proposal, they would go to <http://www.vyzkum.cz/FrontClanek.aspx?idsekce=504990> showing 56 % institutional and 44 % project funding for 2009. And if they want to provide us with a useful lecture on statistics, they would explain us the difference.

p. 39, Fig. 17: It should be explicitly specified whether the graph contains also the student-money or only the research money. If the former alternative holds, the "institutional funding" should be broken into the teaching money and the research money. If the latter alternative is true, the figure should not be called "income distribution..." but "research income distribution..."

pp. 59, 62: Both tables 7 and 8 should contain the data either with the % symbol or without it.

Notes on Annex 2

p. 6 on the R&D&I Council: *"...currently counts 16 members"*. The number is 17, see the previous notes.

In Annex 2 a different division of the institutional and targeted funding is used than in Annex 1 (so different proportions occur there). It should be explained why and which division is more relevant.

pp. 60-62: The numbers of members of the Council and of the Committees are wrong or obsolete: *"The Board of the R&D&I Council is composed of 3 members, one of them acting as First Deputy-Chairman."* According to the law, the Board is composed of the Chairperson and three deputy chairpersons, i.e., it has 4 members. Presently the First Deputy-Chairperson is a woman, not a Chairman. The number of members is 17, not 16. *"The "Commission for Evaluation of Research Institutions and Completed Programmes" was established late 2007,*

replacing an interdepartmental working group that addressed the development of an evaluation methodology in 2006 and 2007. It has 9 to 14 members..." According to the valid rules, it has 9 to 15 members. The present KHV has 11 members which were elected in 2010. *"The Commission on Bioethics has 13 to 16 members; its Chair is a member of the R&D&I Council."* According to the valid rules, it has 9 to 15 members. Presently it has 13 members. *"Committees have 5-12 members, with the exception of the Technical Sciences one that has 7 to 15 members."* According to the valid rules, they have 7-12 members, with the exception of the Commission on non-life sciences and engineering that has 9-15 members.

I am rather dissatisfied with the part dealing with how projects are evaluated by different Ministries, saying that basically everything is OK just with the exception of the Ministry of Health. As far as I can judge, it happens at various other Ministries, that although formally there is no problem, a really dubious project is funded, or a rather nonstandard situation occurs. Although I have explicitly pointed one example in my review to the First Interim Report, it went unnoticed. Other examples are sometimes discussed at the R&D&I Council. I guess, some system changes are necessary if one really wants to avoid similar situations. An investigative work of the international team exposing those situations would be extremely helpful. If that is not possible, it would at least help if the Report does not say everything is OK except for the Ministry of Health, which would just contribute to petrifying the situation.

Notes on Annex 3

p. 3: *"...complete reports, including important clarifications in terms of instruments and methodologies used for this analysis as well as data tables, can be found in the appendix of this report."* I have found no such appendix in this Report. Upon asking for it, I was told that all the data are in Annex 2 of the First Interim Report and in Annex 8 of the Second Interim Report. Therefore when checking the discussed results, I used data from these annexes.

In several places of the Report a very vague conclusion appears, saying the while *"remarkable improvement in the quality of the scientific publication output"* can be observed, *"the Czech Republic still has a long way to go"*, even though *"it is bridging the gap, especially in terms of output development."* I believe that, since the Report will be used by politicians to make decisions and to formulate strategic goals, much more concrete statements are needed. In particular, one should express, what target values can we assume and in what time can we reach them, provided the trends are constant. One could also express the views what measures could lead to reaching the goals faster and what measures would inhibit that. I tried to make this exercise just on the available data from Annex 8 to the Second Interim Report and from Annex 2 to the First Interim Report, Appendix C. Note also, that I have asked for a better specification of how long way we have to go and when can we bridge the gap already in my review to the First Interim Report a year ago, however, to no avail. Therefore, I tried to do some simple estimates by myself.

The annual number of publications (parameter P) per million inhabitants in 2009 were about 826 in the Czech Republic, 1373 in Austria, 2022 in Denmark, 1874 in Finland, 1075 in Germany, 585 in Hungary, 1811 in Netherlands, 1639 in Slovenia, and 2115 in Sweden (I got these values by averaging the 3 years 2007-09, taking into account the trends; data from First

Interim Report Annex 2, Appendix C). I have calculated the average annual growth rate (AAGR) for P for each country: it is 6.91 % for the Czech Republic, 6.00 % for Austria, 4.02 % for Denmark, 4.05 % for Finland, 3.84 % for Germany, 4.58 % for Hungary, 4.33 % for the Netherlands, 11.44 % for Slovenia, and 3.25 % for Sweden. So, if these trends are fixed, we could reach Germany in about 10 years, Sweden in about 27 years, Finland in about 30 years, Denmark and the Netherlands in about 33 years, Austria in about 60 years, and, of course, we never catch Slovenia. Obviously, one must discuss the caveat, that these estimates are based on the assumption of constant annual growth rate which is unlikely to hold, but one should mention what changes can we expect: will P per capita saturate for each country at some value? Or is it more likely that in countries with performance based research funding systems the growth will rather accelerate (Denmark, Sweden)? And, an obvious question arises: what is behind those amazing results of Slovenia?

Another interesting picture can be seen if we calculate the AAGR for various Czech institutions (data from Annex 8 to the Second Interim Report, Table 6). We get 4.93 % for the Academy of Sciences, 9.80 % for the Charles University (UK), 6.13 % for the Institute of Physics AVČR, 12.05 % for the Masaryk University, 12.10 % for ČVUT, 7.16 % for UOCHB AVČR, 19.32 % for JU (South Bohemian University), or 3.34 % Institute of Chemical Process Fundamentals. We can then speculate when the Czech Republic would catch the benchmark countries provided its AAGR is equal to that of these institutions. It seems that with the growth rate of production of the Academy of Sciences we could reach Germany in 26 years and Sweden in 59 years. For other countries the time scale is so long that the speculation probably does not have much sense. With the growth rate of production of the Charles University, 5 years would be needed to reach Germany, in 15 years we would reach Austria, in 16 years Finland, Netherlands and Sweden, and in 17 years Denmark. Of course, a similar exercise can be done with other institutions as well, but since these two are the main players in the Czech research field, already these figures could give some clue to the strategic decisions of the politicians: should we support more the good old Academy to help her with catching up, or should we rather bet on the faster growing productivity of the university sector?

An obvious objection to the above estimates is that they are based on simple counting papers (parameter P) and do not consider quality. There could be debates about what indicator should be used such that both quality and quantity are covered. Out of the parameters we have in various parts of the Reports, a possible choice could be the product of indicators P and CPP/FCSm, i.e., number of papers times their field normalized citation rate, which is related to the total number of citations ($C\text{-}sc = P * CPP$) weighted with the field normalization factor (i.e., roughly a normalized number of citations). Since the Academy has generally CPP/FCSm higher than most universities, the numbers would look more favorable for the Academy: in 2009 the product $P * CPP / FCSm$ is 2894 for the Academy and 2169 for the Charles University (in 2009 CPP/FCSm was higher for UK than for AVCR, but in the previous years the AVCR had CPP/FCSm more often higher than the UK), in 2008 it is 2850 for the Academy and 1966 for UK. However, also the AAGR for this parameter is faster for UK, 11.87 % than for the Academy, 7.47 %. Thus, if the trends are fixed, the Charles University will overtake the whole Academy in 7 to 10 years. The numbers are interesting also in comparison with the institutional research budget of these organizations: in 2009 it was about 5 billion for the Academy and about 1.5 billion for UK (which also received some 2.5 billion CZK for teaching about 50 thousand students). Of course, these numbers are very approximate and one could argue which items of the total budgets should be taken into account and which should not, but it would be interesting to hear more opinion about the efficiency of public money spent in these two types of institutions.

Since the authors say on p. 1 *"...the improvement of the quality of research in the Czech Republic is of course closely interlinked with the evaluation of research,"* they might comment about the different rates of quality improvement in the two sectors (Government and HES) and the possible relation to the evaluation used in these two sectors.

In Sec. 3.1.2. the authors say that the *"Research Intentions scheme, launched in 1998, is generally perceived to have had some very positive attributes,"* mentioning only some of the criticism (long time for which the programmes are locked, and not particularly objective evaluation: almost every Research Intention being either "excellent" or "above average"). But there are more things to be criticized: the Research Intentions divided the research staff of almost each university into those "on board" (being members of the Research Intention team) and those "left behind" (not having the Research Intention). Even if someone's research results were excellent, it was impossible to become a member of the Research Intention plan if the university did not have a Research Plan in the particular field. This was perceived as very unfair by many university researchers who now perceive the present result-based system as much more fair. Although I have criticized in my comments on the 2nd Interim Report not mentioning this aspect, it is still missing here. Why? How should the Report in such a case be treated as balanced? Another aspect of the Research Intention Scheme that deserves criticism and is not mentioned in the Report (why?!) is "gaming" of some team leaders: if they overestimated their necessary expenses and won the Research Intention, they would have a much easier life for many years than those who plan realistically. No wonder that at the universities lots of the criticism of the performance based funding system stem just from members of the overestimated Research Intention teams whose budgets now drop to more realistic values.

p. 11, Footnote 5: *"In our experience, it is advisable not to publish review reports in order to guarantee the quality of the review reports. In other words, reviewers do not normally give frank feedback when they know that the reports are going to be published. Also, in the Czech circumstances, where the evaluation of research is highly politicized, the publication of review reports of specific research institutes would have deter them from participating even more than was already the case."* This is probably true, on the other hand, how could one make sure that the process is transparent when the results are not to be published?

p. 12: *"In this context, it is also worth developing more relationships between Academy researchers and universities, for example by means of joint positions at the Academy and in a university similar to the situation in Germany where many researchers at Max Planck Institutes hold a formal (zero-salary) professor position at a nearby university."* What do the authors think about the possibility of joint positions of professors holding positions at an Academy institute as well as at one or several universities (non-zero salary)? Have they ever heard about such a case? How common do they think this case is in the Czech Republic?

p. 13: *"Although the committee has not studied the details of the 'coffee mill', all research groups underlined that there should be more attention paid to the relation between the number of points obtained for a certain output and the effort required to achieve this output. Improvements suggested are taking the quality of papers into account (e.g. by higher rating of high-impact journals; taking citation scores into account; by assessing the quality of industrial models, prototypes, software, etc.; and by assessing the value of a patent (in one way or another)."* Although the 'coffee mill' scheme will most probably be abandoned in few years, before developing new evaluation and money allocation systems it will have to be

used in some (although modified) way. For this reason, I appreciate that the Report does not only say that it is bad, but also suggests some ways of improvement. I believe any good hints will be taken into account.

p. 14: *"In order to spread knowledge on importance and impact of scientific research, outreach events should be developed for a broader public, including children and opinion leaders."* Yes, I completely agree with this general statement. I just wonder whether the authors have heard about our activities - like the "Children University", "Night of the Scientists", "Jarmark", "Adventurous Science" and many other popularization activities the scientists organize here. Of course, there is never enough of them, and it is always plenty of things that can be improved. It would be interesting and important to hear some feedback on these activities, but this paragraph sounds as if the authors were not aware of any of them.

p. 21: *"The implementation of 'research schools' could be such an opportunity and a giant step in the training of young researchers in the Czech Republic."* On p. 27 the authors repeat this suggestion, adding that *"The problems are less that of insufficient or poor policy making, rather than a lack of imagination and entrepreneurship."* There is some debate about how to diversify the university sector, quite often meaning that there should be a few "research schools" whereas the other schools should be focused on teaching and other activities (see, e.g., various versions of the materials for the preparation of a new Law on Tertiary Education). Nobody however knows how the diversification process should exactly be implemented. Perhaps the "research schools" mentioned in this paragraph are not exactly the same to what is meant in the debate here, but it would anyway be very interesting if the authors elaborate more on their concept. It would also be very useful if they contribute with their hints to the debate on the new Law on Tertiary Education.

p. 55: *"While 77% of respondents from universities agreed 'to a large or very large extent' that as a result of the Evaluation Methodology their organizations place more value on publications in international high-impact journals, the corresponding figures for other research organizations is 64% and for Academy institutes is 51%."* Can the authors comment on whether there might be some connection with the different annual growth rate of productivity (measured by the number of papers, parameter P) in the Academy and universities, as discussed above?

Sec. 8, "Recommendations for allocating institutional funding and evaluating research":

I liked this part most of the whole Report and consider it very useful. However, I have several questions and remarks that should be clarified before the new system can be implemented:

1. Who should qualify for the institutional funding? Presently there are almost 200 eligible organizations, and there are even more organizations that just want to be eligible and do everything to become members of the club. Actually, one of the main objections of the Academy towards the "coffee mill" system is just that any organization that produces enough points is eligible for the institutional funding, thus decreasing the budget of the others. Should anybody who has once received the "coffee mill" money be treated equally

when introducing the performance contract system? Or should this number be somehow reduced? Or should more organizations get the opportunity to qualify? Frankly, I expected that the Audit would give us answers to these questions and am rather disappointed that it does not. If I could express my opinion (which will not be liked by many people), I think it would be enough to have here from 5 to 10 research universities and from 5 to 10 other, big research institutes which would conduct either research of such an excellent quality that could not be done at our universities, or highly specialized, sectoral research that would be impractical to do at the universities. Any comments and suggestions are welcomed.

2. How to distribute the institutional funds among the providers? If the number of the research organizations stays high and various Ministries supervise different organizations, while the total research budget is fixed, it will necessarily result in a tug of war between the Ministries, each claiming that its organizations are the most useful and deserve the biggest share for the contract funds. To prove that, they would allow their organizations to expand and increase their demands. Actually, this was probably the main reasons for launching the "coffee mill" system which should originally distribute the money among the Ministries (not among the organizations themselves) according to how efficient they are in producing useful results.
3. Even when the above mentioned problems are solved somehow, and contracts will be going to be negotiated, there is still the principal problem of budget uncertainty. It will be very hard to persuade the politicians to make another part of the state budget long-term mandatory and thus out of their reach. They just love to play the game with various shifts in the budget such that they can come in the last minute as heroes claiming "I have saved the billion for [science, schools, culture, Academy, ...]". Otherwise, the funds which could be subjected to the long-term contracts will be very limited and therefore the organizations will be very unhappy from the results of the negotiations. The main purpose of the system change - the long-time stability and strategic planning - would remain illusory. Therefore, if the plan should succeed, one must focus on how to persuade the politicians to agree with

that for them unpopular step. This is another reason why the Report must be written in a perfect politician-friendly and usable way.

Some more specific remarks:

p. 137: *"Hence, the number of PhD students who complete their degree in time could be included in a funding formula."* I do not agree, since this would for sure lead to lowering of standards, even the "international supervisor" suggested a few pages later would not help too much. Either there would be a very liberal approach that, e.g., any friend from Slovakia would qualify as the "international supervisor" and the winners would be those who are able to print more PhD diplomas. Or there might be a very restrictive system of authorization who can supervise a PhD student and who cannot, which would lead to rigidity and alliances of institutions dominating the field, not allowing strangers to enter. Moreover, number of awarded degrees is already a (minor) part of the fund-allocation formula used to distribute the "teaching money" among the universities (I wonder whether the authors of the Report are aware of that or whether they would like to comment).

Unless the authors bring much more convincing arguments, I consider counting papers in high-impact journals as a better indicator than counting awarded PhDs (at least for natural sciences).

p. 137: *"Hence, an indicator for the Academy's formula budget might be: number of co-supervised PhD students."* This is a very vague suggestions, and again, I think it would suffer from similar drawbacks as counting awarded PhDs.

p. 137: *"The research institutes will need to be subdivided, as they have different roles and missions, and for each of these sub-divisions there should be a specific formula. There could for example be a specific set of indicators for applied public research institutes which conduct research whose main beneficiaries are the public sector and/or specific user groups, many of whom do not normally commission research of their own (e.g. farmers or road users)."* I would be really happy to know by which parameter one should measure the performance of an institute specialized in research for road users. And what if, e.g., some university is able to produce the research results for farmers or for road users faster and cheaper than the specialized institution?

To be honest, I do not agree with the idea that there are "different roles and missions" to be played by different kinds of research institutions. I believe that almost any role that is played by a research organization as defined in the Community Framework (primary goal to conduct R&D, disseminate results by teaching, publication or technology transfer, all profits reinvest in these activities, no preferential access to results by entities exerting influence on them) can be played by a research university with the additional advantage of synergy between teaching and research. There might be exceptions, but exceptional. I may be wrong, but if so, I would like to see here good arguments demonstrating that.

p. 138: *"'internationalization indicator ' could be used (in addition to international competitive funding)."* I completely agree, however, it may be tricky to find a suitable indicator that would stimulate the desired behaviour and not the "perverse" one.

p. 138: *"We do not recommend using indicators in the formula that count research outputs, publications (like in Norway) or citations (like in Flanders) because they cannot do justice to the different disciplines."* It is strange on one hand to say that we should not count publications and in the same time measure the Czech science output by the parameter P, with stressing several times, that we still have a "long way to go".

p. 140: *"The 'historical' allocation of institutional funding will give the Czech system the predictability it needs and the opportunity to establish formula-based systems for the universities, the Academy of Science, and different types of research institutes."* This basically closes door to new organizations that have no history, and "history" becomes a precious resource. This would be good if there is a consensus that the structure of our research organizations is just fine and there is no problem if we petrify it in this way. Such a consensus is not here (and I personally am not convinced that we have an optimal structure of research organizations).

p. 141: *"However, all these systems have built in dampening factors or upper/lower limit for budget fluctuations. We strongly recommend the Czech system to implement similar systems."* Just to inform: the new Methodology proposal for 2012 to be submitted to the Government contains a dampening mechanism making sure that no institution would have a year-to year drop bigger than 10%.

p. 141: *"Alternately, only a formula budget consisting of a very simple set of indicators, e.g. external funding, can be used to allocate institutional; this is for example the way it is handled in the German Fraunhofer institutes."* The authors might have heard about a part of the university budget called "specific university research" that couple of years ago was distributed by means of a formula counting professors, students, awarded degrees and - most importantly - external funding having the biggest weight. I would love to hear the opinion of the authors on the old "specific university research" formula, that used some geometrical averaging to be more scientific, and some history averaging to ensure continuity. Maybe we should simply wipe the dust and use it again? Just note that recently the external funding (i.e., promise based) part in the "specific university research" formula has been replaced with the "coffee mill" points (i.e., results).

Other remarks to Annex 3:

When writing my review on the First Interim Report, I asked for a comparison of the ratio of inputs (money or human resources) and outputs (e.g., publications) in different countries to have some comparison of efficiency with the benchmark countries. In response, I was told that *"a comparison between input and output data can only be accomplished in the subsequent analysis. As costs of a researcher depend largely upon costs for salary and equipment the value of such a cost/paper in international comparison does not make lot of sense."* Nevertheless, since I believe that such a comparison still can be done and can be interesting, I just divided the GBAORD (Annex 1 of the Final Report, Table 3, pp. 30-31) with the number of papers in 2009 (parameter P, Annex 2 of the First Interim Report, Appendix C). The number roughly says how much public money nationwide is necessary to produce a scientific paper. The numbers are as follows (in thousands EUR): Austria 190, Czech Republic 105, Denmark 193, Finland 191, Germany 229, Hungary 74, Netherlands 145, Slovenia 82, Sweden 133. It is interesting that the ratio between the largest and smallest values (Germany to Hungary) is only a factor of 3. Austria, Denmark and Finland are remarkably close to each other, within 2 % (however, such a small difference is probably just an accident, taking into account the year-to-year fluctuations of the input data) which suggests

that they can have similar structure of the research. The large value for Germany might be connected to that fact that big, rich countries can invest into a really expensive research. The post-communist countries have the papers cheaper, simply because their scientists are paid much less than in the rich countries. The numbers thus suggest that the life of a scientist in Hungary might be really tough, even compared to the Czech Republic. And again, one can notice a remarkable efficiency of Slovenia, suggesting that one can look for inspiration there. Also Sweden seems to be rather efficient, taking into account that it is a rich country with expensive labor.

I am missing in Annex 3 conclusions that can be drawn from the publication and citation statistics we get in Annex 8 of the Second Interim Report. I would expect that based on the numbers of different institutes, research fields and comparison with similar statistics from other countries we should get information, e.g., that such and such research field in the Czech Republic is doing relatively well whereas another field is poor in international comparison. Or that such and such institution can be treated as "above average" in its publication performance in a given field whereas another institution is below standards. Otherwise - what is the point in having all the data of Annex 8 of the Second Interim Report?

Notes on Annex 4

As far as I can judge (but I am no IPR expert), all the remarks, examples and recommendations are relevant. I can only express a wish that the suggestions will be implemented successfully.

Notes on Annex 5

Again, this is not my specialization. I can just repeat some of my questions from commenting the Synthesis Report: in the Recommendations we hear about the necessity of priorities. I wonder whether the authors have any comments on the process of formulation of National Priorities of Oriented Research by the team of prof. Haňka. Also, the authors recommend *"introducing tax incentive for enterprises on R&D cooperation with research organizations (discussion has already started)."* I would appreciate more concrete comments: what do they think about the legislation that is being prepared? Generally, the recommendations seem to me too general (just repeating that there is no one-fits-all model).

Notes on Annexes 6a and 6b

I have found there nothing controversial, the description of the situation more or less corresponds to what one would expect (if you collaborate internationally, you are more likely to be cited, etc.). I wonder whether there could be a more general recommendation than the sentence *"As part of any strategy making process, we recommend that Czech policy makers consider seriously the benefits in terms of increased international cooperation that could come from opening up national research programmes and organizations and from removing possible barriers for foreign partners and individual research to work with Czech partners or to locate in the Czech Republic."* Why does this part not deal with concrete questions, e.g., how should be changed the Law on Foreigners to be in line with the Council Directive 2005/71/EC and to enable better mobility of international researchers, etc.? I am also not sure what conclusion should we draw from the descriptive statements in Annex 6b

saying that A collaborates more with B and less with C, etc. Should any political decisions follow from that? If yes, what are the recommendations? If not, what is the point in making such descriptions?

In Fig. 7 of Annex 6b I could not find the explanation of the five lines that are close to the bottom (perhaps just my computer does not read correctly the file, but if it is missing, the authors may like to fix it for the definite version).

Notes on Annex 7

It is a very interesting, extensive study. As a researcher I would love to read it in depth. With the limited time I had for reviewing the Report I was only able to read very briefly through it, but I have read quite interesting things there and hope when I have time to come back, I would read more.

The other point concerns the recommendations for policy-makers. As far as I can judge, they are all uncontroversial, and very general. Nobody would protest against recommendations for support of *"inter-sectoral mobility, especially mobility between research institutions and the private and public sectors,"* support of *"activities aimed at popularising R&D and its benefit to society,"* etc. But if the main goal of the Audit is to serve for informed decisions to make changes in the right directions, it might not be the best strategy to pile up all the good suggestions that can be invented. I think a hierarchy of recommendations with stressing the really acute measures could be more useful. In this sense, I also think that a 23-page Executive summary is a bit too long if the main purpose of an executive summary is to give a policy-maker a short information about the options he/she has and about the consequences that would most probably follow from his/her decisions.

Overall notes on the Report

I have tried to check all the tasks of the project. I would not say that the task *"Evaluation of R&D carried out in all types of institutions (higher education institutions, public research institutions, research institutes) which are eligible applicants for support provided from public funds. An analysis of their level when compared with developed European institutions in terms of financial demands, quality and quantity of achieved results and the effectiveness of their use, and with regard to funds drawn on European funds and other international cooperation funds. Comparison of such evaluation with the results of the evaluation will be made in accordance with the guidelines of the CRD"* has been fulfilled. Under such a comparison I would understand showing how similar or different the evaluation result of a given institution is under these two approaches. In other words, if I saw such a comparison, I would learn that whereas the Methodology says that institution A is very efficient (many output points made from little input money), the international team found that it is actually rather poor. Vice versa, whereas institution B looks rather inefficient measured by the Methodology, the team has shown that it is actually excellent. I do not see such a comparison in the Report.

Even though the authors of the Report suggest a different institutional funding scheme, the law that is valid at present says that the money is to be allocated according to the evaluation of results achieved by the institutions. When proposing the budget, results of the international evaluation can also be taken into account. If my interpretation of the law is correct, if the Report says that while these institutes are excellent whereas those are poor

under international standards, such an information can influence the budget allocation. Although in principle one could try to distil information like this from the bibliometric data, explicit expressions in the Report of where individual organizations stand in international comparison would be much more helpful.

I really wonder why so many informations that would easily be available from the R&D&I Council are ignored or unused here (wrong data, not mentioning new legislation under preparation, etc.). I have explicitly asked at the Secretariat of the R&D&I Council whether they could provide up-to-date materials to the Audit team. I got the answer that the Secretariat offered that to them already in a letter from the beginning of 2010, and that there has been no answer. I would like to know whether it is true and if so, why the offer has not been answered.

I am not happy that most of my notes and questions from my previous reviews remained unanswered. I hope it is not necessary to copy/paste them here and would appreciate if the authors deal with them now.

Conclusion

As mentioned in the beginning, I tried to view the Report from three different perspectives.

From the perspective of a researcher, I love it. There is a huge amount of interesting information and data in which I can dig. There are many general and vague suggestions out of which it is always possible to pick those that support my point of view. If somebody is of a different opinion and points to different arguments from the Report, it might be not so difficult to find weak points and inconsistencies to enable the debate going on. The academic discussion would be a great enjoyment.

The authors are lucky that I am not a politician, since as such I would simply reject the Report. Were I politician, I would need reports that would inform me what options I have, what consequences can be expected to follow, and on what evidence the conclusions are based. Instead, I get the good old suggestions that the R&D budget should, if possible, increase, wrapped in some very scientific hyperbolic tangent.

Trying to see it through the eyes of Mike, Lucy, Toralf and Romana (the folks among those who paid for that), I would be probably confused why it was necessary to sponsor studies counting parameters that nobody uses for making any conclusion (except of saying that we have a long way to go). But since they are already used to sponsor growing grass on European fields that nobody uses, they would probably swallow it, believing that now they helped the nice scientists to solve some fundamental problem.

In conclusion, I believe that the Report would benefit from a revision.

Olomouc, September 6

Tomáš Opatrný