

Reports of the working groups

Observations	Recommendations
Group "Spades"	
Moderator: Gerard Cornet. Reporter: Matthew Maniscalco. Other participants: Henri Wijnants, Michael Wise, Bocian Dariusz, Eric van Kooij, Sue-Yen Tjong Tjin Tai	
Limited engagement of researchers with societal and industrial context	Systematic appeal to researchers' self-interest, along the following lines: To get funding (to fulfil obligation of receiving public money and inform/motivate the public to get more)
Limited engagement of researchers with societal and industrial context	<p>Various solution lines</p> <ol style="list-style-type: none"> 1. Funding Driven: Make financing partly dependent on social/innovation/collaboration results. Require scientists to go to industry (instead of building things outside their expertise "in their basement"); 1) Funding agencies can give scientists In Kind Contributions of industrial contracts, instead of cash, 2) Proposals can be required to contain Scientists/Industry/NGO's/TO2 Organizations 2. Networking: Create a network (e.g. Pan-European ILO NET) to help scientists connect to industry suppliers. Have more matchmaking sessions, like the event in Brussels in which these notes were taken. Cross Fertilization – Exchange Program, by firstly Cross-placement: Allow (young) scientists and industry professionals to spend time working at each other's facilities, secondly for example through Internships for scientists in industry, and paid study leave for young industry at science institutes 3. Other: Give tax breaks to industry to encourage the outreach and risk-taking to work with scientists/researchers Give outreach teaching workshops to researchers/scientists, to train them how to connect to industry/societal actors
Fragmented government strategies, insufficient knowledge at government level.	<p>Align and educate government agencies Create a shared vision on BS, innovation and societal challenges, amongst government agencies involved in big science. At the same time educate government officials e.g. based on an innovation chain approach. Align funding sources along the chain</p>
Information flow between science and industry	<p>Improve information flow through:</p> <ol style="list-style-type: none"> 1. Pan-European ILO-net (see earlier) 2. Guide for finding solutions and suppliers 3. Common online forum for suppliers and BS programs for matchmaking
Access to funding by BS for SME.	Require industry grant funding (SME!) for a small percentage of large budget programs (Reference: U.S. SBIR (Small Business Innovative Research) Grant program
Risks of investing in BS projects for industry are high	<p>Industry Facilitation by Government</p> <ul style="list-style-type: none"> • Make it safe and feasible for industry to bear the risks and financing burdens of taking on Big Science contracts • Provide low-cost government financing for Big Science contract backing (e.g. to help cover extensive bank guarantee requirements) • Provide reasonable government risk insurance, so companies can take the risk to invest in innovation for Big Science, without possibly losing everything if solutions prove more difficult than expected.
Personal comment by Matthew	N.B. I have personally seen several NL companies avoid taking on Big Science innovation projects because of these two factors – MPM

Group “Clubs”	
Moderator: Hans van Dijk. Reporters: Michiel van den Hout and Christian Dierick. Other participants: Patricia Vogel, Alan Silverman, Markus Nordberg, Rob Klöpping	
Engagement of scientist with societal and industrial challenges is low	<p>Provide incentives the scientist to contribute to societal and industrial challenges through</p> <ul style="list-style-type: none"> • Career perspective • Financial incentives • Recognition / status <p>Organizational approach</p> <ul style="list-style-type: none"> • Grow a cultural environment in which not only the science defines the measure of your success • Introduce scientist into the industry collaboration at an early stage
We need a different type of scientist	Select and hire scientist not only with attention to scientific process, but also with attention to skills in the field of communication, collaboration and societal awareness
BS institutes and programs tend to focus on control (elaborate and detailed specifications, detailed selection procedures)	<p>Here we identified several transition lines, that may be represented as follows</p> <ol style="list-style-type: none"> 1. From specification towards road mapping 2. Control towards vision 3. Product centred towards technology centred 4. How towards what <p>Involve industry at an early stage. Often industrial parties are better equipped to devise optimal technical solutions for many types of technical challenges</p>
<p>The following observation was made in this group.</p> <p>Why should the scientist be interested in societal or industrial applications? The point being that it should be the other way around. The scientist should not be the responsible party to disseminate interesting results from the scientific process.</p> <p>This question was not decided on.</p>	

Group "Diamonds"	
Moderator: Jan Visser. Reporter: Patrick Schelvis. Other participants: Arthur van der Meer, Katinka Stenbjörn, Wilfried Boland, Rob de Lang, Paolo Acunzo.	
BS organisations are not very SME-friendly	Big Science Organisations could behave /organise themselves more SME friendly by using same / unified terminology in e.g. Technology Roadmaps and Procurement documents, or organise more tenders especially for small SME's. actively looking for specialized
	SME's, networking etc.
<p>The following challenges were identified in this group</p> <ol style="list-style-type: none"> 1. Challenges and solutions: SME's and Big Science Organisations-(BSO) 2. SME's experience a high threshold in bidding on Big Science tenders. The costs/investments are relatively high to the size of the company and the chances of success are not high enough to earn a return on investment over a series of tender bids. E.g. a bid costs on average 20K, with 10% chance of winning, you need at least a margin of 200k in the winning bid to break even. Let alone a profit. 3. And there are other obstacles in e.g. finance (warrantee, guarantee systems) 4. Average SME's are too small to act alone. For a successful tender bid a consortium is needed. 5. The building of consortia needs time, skills, a prime/leader and costs money. And in small countries 'primes' and consortia-skills are scarce. (NOTE: Primes can also be knowledge institutions) 6. One solution could be to build consortia that last for a longer period and that can react / interact on a Technology Roadmap from a Big Science Organisation. 7. Companies and BSO need a database of skills/competences to plot against each other (SMEs) and technology Roadmaps (BSO's). Databases should be EU wide. Could be part of new draft ILO call in Horizon 2020 Work programme 2018-2002 Research Infra. 8. Too few primes in small countries/economies could be solved by looking for partners cross border or maybe EU-wide. And from LT-cooperation could grow new primes. 9. Big Science Organisations need healthy competition between all sorts/types of companies. (competition which is now not as obvious as it seems) 	

Group "Hearts"	
Moderator: Eric Boom. Reporter: Marco Klitsie. Other participants: Leonardo Biagioni, Javier Echavarri, Arnold Verbeek, Toon Verhoeven	
Industrial involvement in Big Science requires a substantial and long term commitment and has a high entry barrier	
Building a strong network with the procurement agency and (potential) partners is essential. This is difficult to realize for SMEs	Collaborate with (stronger) partners or try to acquire subcontracts. Use ILO-Network to improve marketing intelligence
Contractuals and risks are often cumbersome	Request agency to simplify and mitigate these for smaller contracts aimed at SMEs
Contract size is often too high and risky for SMEs to handle	Request agency to split contracts up to a manageable level (without increasing the management load too much for the agency)
Midsized companies (50-100 M€ turnover) are doing well in the Big Science market	
Early industrial involvement in specific developments is essential for success in the production phase	Laboratories/technology institutes should involve industry at earliest possible phase
Many SMEs become interested and active only after tender issue	Prepare properly on forthcoming tenders. This involves preparatory R&D, consortium building, etc.
(Bank) guarantees are often required for a longer period during project execution. This is mostly caused by European rules but precludes the smaller/weaker SMEs from participation	<ul style="list-style-type: none"> • Share burden with financially strong partners • Negotiate acceptable payment plan • Use national and European facilities to mitigate financial burden
Awareness of cultural aspects of both partner industries and procurement agencies is important. These aspects often determine how risks are managed and projects are approached	Be aware! E.g. don't use a risk-avoiding "German" approach for a proposal to a "Mediterranean" procurement organization
Big Science agencies have a (often long-term) interest in making suppliers successful	Be aware! This also can counteract risk avoidance
High-wage northern versus low-wage southern countries does often not play the dominant role in winning contracts for complex and high-tech components (for which available technologies are scarce)	

<p>In several countries Big Science is a shared and strategic commitment of different stakeholders (industry, government, science institutes) which stimulates commercial and scientific success. Often grants and other facilities can be used by industries to prepare</p>	<p>Make strategic choices at country-level and collaborate between stakeholders (industry, institutes and politics/decision makers). Provide the lobby needed as well as the (R&D/prototyping, financial support) facilities needed to support this commitment.</p>
<p>Several financial options are also available at European level (such as contingency loans) to mitigate financial risks</p>	<p>Ref. : "Access to finance for Research and Technology Organisations (RTOs) and their academic and industrial partners", Final Report prepared for the EC, DG Research and Innovation (March 2017) On: www.eib.org/infocentre/publications</p>
<p>With regard to Big Science, awareness, visibility and adequate cultural aspects are more favorable in some countries, which is a discriminating factor for success</p>	