Key areas in Research and Innovation to foster R&I in Europe

A position paper addressing the next EU Framework Programme for Research and Innovation (FP9) of the Innovationsallianz Baden-Württemberg

Summary

The Innovationsallianz Baden-Württemberg[1] (innBW) comprises 9 independent RTOs with 13 institutes, more than 1,150 FTE staff and 140 M€ turnover. It works across sectors, active in health and care; energy, environmental technology and resource efficiency; sustainable mobility; and information and communication technologies, and provides research and innovation for and with industry, mainly SMEs. The network with its industrially orientated infrastructure facilities offers services including pilot lines, test beds and innovation hubs with a focus to deploy newest technologies in industry, especially SMEs.

Almost 10 years of experience as a network with upfront RTD infrastructures are a strong background to develop recommendations for the upcoming framework programme for Research and Innovation, which are presented herein.

Funding frameworks recommendations

- Emphasis on 2 stage proposals, with at least 30 % chance for funding in 2nd stage
- More Innovation Actions and cascade funding to foster technology deployment
- New instruments to support highly ranked but not funded proposals
- More instruments across all sectors to foster exploitation of results
- Further reduction of administrative burdens through flat rates
- Better alignment of overhead costs funding to real costs (e.g. for infrastructures)

Topics and sector recommendations

- Key enabling technologies for manufacturing remains a priority
- Missions and challenges to be developed around
    - Health (functional medicine, biochemical and physical data monitoring, regenerative medicine)
    - Energy (renewables, storage and power efficiency)
    - Digitisation of industry (Artificial intelligence, smart micro-controlling, security)

The innBW with its network of experts and a key competence in pan-European services to SMEs is interested in an active participation shaping the upcoming framework programmes. Get in contact through:

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[1] This label can be translated as „Alliance for Innovation in Baden-Württemberg“. See: http://www.innbw.de/

Position Paper of the Innovationsallianz Baden-Württemberg

The Innovationsallianz Baden-Württemberg (innBW, see also www.innbw.de)

Baden-Württemberg is a strong research site with a well-developed infrastructure. Roughly a third of R&D within Germany takes place in Baden-Württemberg[2], translating into an R&D intensity of 4.9%[3], which is higher than both, the Germany overall rate of 2.9% and also the EU target of 3%. This is based on the high number of industrial organisations, in particular SMEs embedded in more than 200 clusters and networks.

Key enabling technologies play a major role due to their long-term effects in many disciplines and sectors of the economy and society, and together with the wide scientific and technological expertise of universities, RTO and industry, Baden-Württemberg generates innovations and solutions for the grand challenges of the EU society.

We, the "Innovationsallianz Baden-Württemberg" (innBW), are a strong alliance of 9 independent RTOs comprising 13 institutes, more than 1,150 FTE staff and 140 M€ turnover. We are active in health and care; energy, environmental technology and resource efficiency; sustainable mobility; and information and communication technologies.

The innBW institutes offer applied research for industry, especially regional SMEs, and therefore represent an important link between science and industry. In 2017 our turnover in 4,500 industrial projects (47% from SMEs) counted 48 M€, and we cooperated with 1,845 enterprises in 553 public-funded projects[4]. Our main guiding principles are excellent research and innovation as well as transfer of findings from basic research to industrial practice until market-ready solutions leading to societal benefit, enabled with our cutting-edge equipment and laboratories. The focus is on people, whether as customer, as employee or as citizen.

As such, innBW is a good practice of a cross-sectoral network of industrially orientated infrastructures, including pilot lines, test beds and innovation hubs with a focus to deploy technologies in industry, especially SME.

Our framework recommendations

The work of the 13 innBW institutes is based to a significant degree on regional, national and European funding. From our experience from most different funding programs and formats, our main recommendations for the next EU framework programme are:

- The positive effects of two-stage applications should be fostered to avoid oversubscription and the related waste of personnel and financial resources.
- The possibilities offered by the instrument Innovation Action, and especially using Cascaded Funding should be strengthened and extended to as many calls as possible. First experiences in H2020 provided evidence that those instruments are very efficient and SME-friendly.
- Funding rates used in FP7, especially those for indirect costs, more fairly reflected different accounting principles.

Besides further means for a lean programme management, we recommend to strengthen support for highly ranked (but not funded) proposals as well as for follow-ups of successful projects. And in

[2] https://www.statistik-bw.de/Presse/Pressemitteilungen/2015335
[3] https://www.baden-wuerttemberg.de/de/service/alle-meldungen/meldung/pid/ausgaben-fuer-forschung-und-entwicklung-im-land-auf-rekordniveau/
[4] Presentation innBW Landtag BW 21.2.2018

order to bridge the gap between basic research towards societal solutions we see innovation in key enabling technologies, together with SME industry, as a main driver for the future EU.

Thematic excellence

Next to these recommendations, innBW wants to emphasise the particular importance of several areas of research, with high relevance for the future European technological leadership ensuring and improving our life: health, energy and digitisation of industry, with the following details:

A) Health

Ageing EU society and the future EU economic effort for chronical diseases request for a paradigm change. Current symptomatic treatments have to be replaced by curation and prevention. Objective is to be healthy and mobile throughout the whole live, and therefore innBW suggest the following:

- Functionalised medical devices
  Medical devices are no longer just replacing a lost function or providing simple functions like fixation or protection but are functionalized to communicate with the tissue, to react on defined healing conditions (e.g. deliver a drug at an assigned event, place and time) etc.
- Monitoring using biochemical and physical sensors for diagnostics and treatment
  Devices will use control loop systems in treatments, already established in Diabetes. Biochemical and physical sensors, and related algorithms inform surgeons about the healing status even inside a patient. Thus personalized application of drugs or treatments will be enabled.
- Regenerative medicine
  The support of natural regeneration instead of replacement of tissues and organs increasingly becomes reality. New ways to direct or manipulate stem cells are supporting this trend. Better understanding of regeneration processes will be prerequisite for progress in this field.

B) Energy

Sustainable energy harvesting, storage, transport, conversation and consumption as well as smart control are crucial to reach global climate protection targets. The innBW sees following main areas:

- Renewable energy
  In order to increase efficiency, an increased focus should be put on thin film technologies like CIGS and thin film tandem solar cells as well as on the development of corresponding industrial production processes for photovoltaics.
- „Power to Materials": Energy storage and electromobility
  New battery technologies, and hydrogen or synfuels technologies based on renewable electricity are required to meet the challenge of decarbonizing the transportation sector. Innovation includes R&D in materials, manufacturing and service processes, as well as recycling concepts.
- Power efficiency
  Intelligent 3D surfaces, made of thin film technologies combined with intelligent light-weight materials – complemented by smart embedded systems - will reduce energy consumption of moved and heated/cooled objects, such as cars, machines or buildings.

C) Digitisation of industry and production

On the way to digital transformation of services and products of the EU, the innBW sees important innovation in intelligent (micro-)-sensors and actuators and control algorithms, thus enabling to connect the digital world with physical objects of daily use in CPS and IoT. This includes:

- Intelligent micro-control systems
  Multi-functional micro-sensor systems have to be realised with various mechanisms (physical, electronical, chemical) on or in various substrates (rigid, film&foil, fibre&textiles). Smart actuators will use special hardware and software (such as semiconductor materials and technologies for high-frequency applications, on multiple substrates, and for photonics) as well as concepts inspired by nature. Embedded, decentralized save and secure control algorithms, making use of Artificial Intelligence, in particular machine learning, and Big Data are necessary.
- Digital production systems
  With respect to future EU work places, the innBW recommends to focus on resilient structures and secure IT tools for the management and organization of a digitized production in organizational networks. This includes digital production technologies for individualized products down to lot size 1 such as Additive Manufacturing as well as digital learning at the work place, and also the integration of EU citizens in order to become co-creators or prosumers.

Closing remarks

The innBW is committed to play a proactive role in addressing the challenges Europe is facing, by providing applied R&D for the benefit of people and economy. Framework conditions in FP9 should allow science, research and innovative enterprises an optimum cooperation and development prospects. The innBW has a strength to integrate SME- industrial partners in innovation processes. To foster this, FP9 should offer quick, flexible, and high-quality value-creation.

Leading edge technologies need to be developed to high technological readiness level and optimised for practical application in close vicinity to the related markets. Related research work should be addressed by FP9 as well as development platforms and innovation activities bridging from R&D to market introduction to overcome the financial gap usually called “Valley of Death”.

In a nutshell, our strength for a future EU society lies in biological, digital and industrial enablers for health, energy and production. The upcoming EU framework programme has to reflect such game-changing areas and create best fitting instruments for a sustainable deployment of knowledge in European Industry.

Communication and contact

We will deliver this position statement to scientific, societal and political stakeholders with interest to support Baden-Württemberg as a strong research and industrial site in Europe from April 2018. This document will be also available on the homepage of the innBW.

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