



# Evaluation of the Research, Technological Development and Innovation Support Measures of the Operational Programme ERDF Thuringia 2014–2020

Executive Summary



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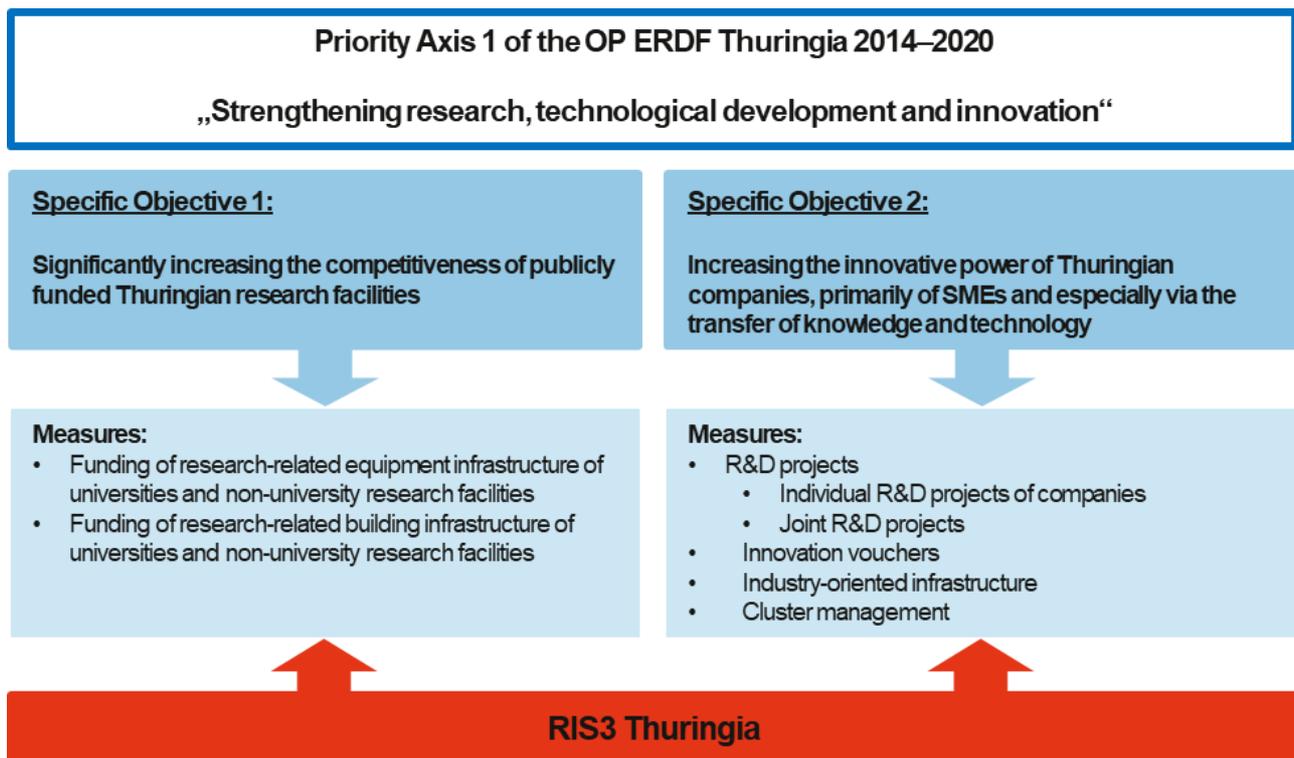
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## Executive Summary

### Subject and Purpose of the Evaluation

In order to foster competitiveness and to secure long-term economic growth, the State of Thuringia aims to improve its innovative capacity. For this purpose, measures to support research, technological development and innovation both within publicly funded research institutions and businesses are supported through its Operational Programme (OP) for the European Fund for Regional Development (ERDF) in the funding period 2014–2020. These measures are implemented as part of the Regional Strategy for Research and Innovation for Smart Specialisation (RIS3) of the State of Thuringia (see Fig. 1).



**Fig. 1: Evaluated measures within Priority Axis 1 of the OP ERDF Thuringia 2014–2020**

Illustration by Ramboll Management Consulting.

The purpose of this evaluation was to assess the impact of the measures implemented under the Specific Objectives 1 and 2 of the OP ERDF Thuringia 2014–2020 – within the framework RIS3. In addition, and in view of the upcoming funding period 2021–2027, optimisation potentials with regard to the measures themselves as well as the RIS3 should be identified. For these purposes, the evaluation design encompassed an analysis of the relevance, the implementation and the impacts of the measures within the RIS3 framework.

### Methodology and Evaluation Design

In the relevance analysis, the evaluation assessed the conceptual and strategic orientation of the RIS3 Thuringia as well as the overall fit of the investigated measures' conditions to the needs of their target groups. In the implementation analysis, the evaluation looked at output and financial indicators, target group reach, the processes concerning application for, granting and administrating funding and finally the processes and structures related to the

RIS3. The theory-based impact assessment was based on individual intervention logics for both Specific Objectives of Priority Axis 1. At the start of the evaluation, these intervention logics were validated with a project group comprised of representatives of the TMWWDG (TMWWDG – Thuringian Ministry for Economic Affairs, Science and Digital Society) and the TAB (TAB – Thuringia Reconstruction Bank). It focused both on the level of the individual measures and the level of the RIS3.

The implementation of the evaluation design comprised the following steps:



Conception phase:

Theory-of-change workshop  
Refinement of the evaluation concept  
Development of research design and tools



Status review:

Analysis of documents and literature  
Analysis of secondary statistical data  
Analysis of financial, output and impact indicators



Survey phase:

Expert interviews  
Case studies  
Online surveys and in-depth interviews  
Workshop on RIS3 processes with ThCM (ThCM – Thuringian Cluster Management)



Synthesis and analysis:

Internal synthesis workshops  
Workshop with the project group  
Deduction of recommendations and drafting of final report

### Key Results: Relevance Analysis

*In the relevance analysis, the evaluation assessed the conceptual and strategic orientation of the RIS3 Thuringia as well as the overall fit of the investigated measures' conditions to the needs of their target groups.*

Thuringia's businesses and research institutions are vastly affected by megatrends such as sustainability and the turnaround within the energy sector, digitalisation and structural change. Furthermore, an increasing shortage of skilled labour, demographic change, globalisation and the current SARS-CoV-2 pandemic pose substantial challenges.

Outstanding strengths of Thuringia's economy are optics and photonics, medical technologies and the automotive sector. During the past years, especially the life sciences, which include medical technologies, have experienced a substantial increase in importance and visibility. Dynamic developments can also be observed in microelectronics, information technologies and energy storage systems. The Thuringian research institutions' strengths mirror the strengths of the economy well.

The economic and scientific strengths of Thuringia are well reflected in the Specialisation Fields and the Cross-sectoral Field of the RIS3. Also, the abovementioned megatrends and challenges can be addressed within the fields of the RIS3. Current fields of innovation derived from the economic and scientific strengths of Thuringia on the one hand and megatrends and challenges on the other hand can and are addressed by content-related adjustments within the RIS3 fields. The overall conceptual priorities of the RIS3 can hence still be considered appropriate and up to date. In the future, both the degree of specialisation within fields of the RIS3 as well as that of cross-links between fields should and will be increased. Potentials for the optimisation of the strategic set-up of the RIS3 can be seen in strengthening cross-field activities, of interdisciplinary cooperation between different industries and fields of research and in the further intensified targeting of SMEs.

The main constraint for company side to apply for funding through the evaluated is high bureaucratic burden. Further low-threshold possibilities for the funding of R&D-projects, especially for small companies, should thus be considered.

All in all, the funding conditions of the six investigated measures under Special Objectives 1 and 2 of Priority Axis 1 of the OP ERDF Thuringia are in line with the support needs of Thuringian companies and research institutions.

The measure Funding of Research-related Equipment Infrastructure is relevant and appropriate to secure and increase the capabilities as well as the national as well as international competitiveness of research institutions in Thuringia. Also, the measure Funding of Research-related Building Infrastructure is relevant and appropriate to secure and increase the competitiveness of research institutions in Thuringia. Furthermore, it can help to foster knowledge and technology transfer. Optimisation potentials reside in a more explicit and noticeable communication of possible synergies with other support measures and of the possibility to fund equipment infrastructure for complex research projects in consortiums of more than one research institution.

The measures under Specific Objective 2 are relevant and appropriate to increase innovation activities of companies, primarily in SMEs and especially via knowledge and technology transfer. Both companies and research institutions are by and large satisfied with the funding conditions of the measures. Optimisation potentials reside in a more explicit and noticeable communication of the possibilities for cost-neutral extensions and in the reduction of bureaucratic burden via the introduction of lump-sums to cover project related amortisation and equipment costs. Furthermore, the size of grant of the measure Innovation Voucher C could be reviewed, as currently, costs for patent applications are frequently significantly higher than the funding.

The measure Industry-oriented Infrastructure is relevant and appropriate to support the transfer of knowledge, research and technology in Thuringia. Overall, its conditions match the demands for support expressed by companies and research facilities. Again, for this measure, synergies with other funding could be communicated more noticeable. Furthermore, barriers with respect to using the infrastructures in Innovation Centres and Industry-oriented Research Facilities – which receive funding for non-economic activities exclusively

– for economic activities also should be examined in detail. In order to secure the high-quality of services and infrastructures provided by Innovation Centres, further investment in these services and infrastructure in the next funding period should be considered, if it turns out that the centres – despite the need to come up with respective concepts – cannot fully sustain themselves.

### Key Results: Implementation Analysis

*In the implementation analysis, the evaluation looked at output and financial indicators, target group reach, the processes concerning application for, granting and administering of funding and finally the processes and structures related to the RIS3.*

During the evaluation period spanning from 01/01/2014 to 09/30/2019, a total of 603 projects receive or have received funding through the investigated measures. With these projects, over 80 percent of the public funds intended for the measures have already been allocated. Furthermore, in the meantime (i. e. after the evaluation period) additional support has been granted and now, (almost) all the public funds available are allocated. For the measure Funding of Research-related Building Infrastructure the actual outflow of funds has been slowest relative to the other measures. This is mainly due to long project durations. At 60 percent of allocated public funds, the actual outflow is highest in the measures Funding of Research-related Equipment Infrastructure, Funding of Individual R&D Projects of Companies and Innovation Vouchers.

Based on planned numbers of the projects granted during the evaluation period, the target values of the output indicators of the investigated measures for the year 2023 have already (almost) been reached or even been exceeded. This is especially true, if one does also take into account one additional large project in the measure Founding of Research-related Building Infrastructure that has been granted after this period. If all granted projects are successfully completed, there should be a high level of target achievement at the end of the funding period overall.

So far, around half of the Thuringian universities and half of the non-university research facilities in the Free State received funding through the measure Research-related Equipment Infrastructure. Applications for funding were submitted by a significantly higher number of institutions. But mainly due to limited financial resources, not all could be granted. The measure Funding of Research-related Building Infrastructures is clearly concentrated on the state's universities – in accordance with its strategic orientation. It reached around 50 percent of these. When it comes to the measures R&D Projects and Innovation Vouchers, small companies are the largest group of recipients. 2.5 percent of small businesses in Thuringia received funding. The measure Joint R&D Projects is also very popular with large Thuringian companies: 11.6 percent of them received funding in this measure. Regarding the strategic goal of promoting innovation activities especially of SMEs, an extended reach out to small and micro enterprises seems to be an important challenge for the measures under Specific Objective 2.

The measure Industry-oriented Infrastructure reached almost all Industry-oriented Research Facilities and Innovation Centres. The measure Rent (exclusive of heating and other additional costs) Exemption is currently not requested by all operators of Thuringian Technology, Start-up and Application Centres. This is mainly due to the fact that this measure is closely linked to GRW funding (GRW – Common Task "Improvement of the Regional Economic Structure").

In the period under investigation, grants exhibit a clear regional focus on the research hotspots Jena and Ilmenau as well as Weimar. Nonetheless, projects can be found in all other parts of Thuringia, too.

Information about the investigated funding opportunities is predominantly spread by word of mouth: Companies, universities and non-university research institution point each other to opportunities. Afterwards, they turn to online content of the TAB to get further information. One optimisation potential would be to increasingly make use of multipliers such as chambers of commerce and crafts, technology and start-up centres as well as industry networks and associations (also relying on a stronger networking function of the ThCM) to address the target groups of the measures and especially small and micro enterprises.

By and large, the administrative processes of the measures – and especially the quality of support offered by the TAB – receive very favourable ratings by both beneficiaries and experts. The main potentials for improvement identified: is a further simplification of application and handling documents (the low-threshold measure Innovation Vouchers performs significantly better with respect to this aspect than the more complex measures R&D Projects and the infrastructure-related measures). Furthermore, there is a perceivable desire to reduce of processing times. Particularly in the investment-intensive infrastructure-related measures, beneficiaries ask for quicker pay-outs. The continuous improvement of the electronic systems used for the administration of funding is also encouraged. A positive side effect of a simplification and streamlining of administrative processes could be that it could free up resources at the TAB. These could then be used to offer additional conceptual support during the project implementation phase (e. g. pointing to available public and private funding opportunities for the market introduction of R&D results).

The structures and processes of the RIS3 Thuringia are currently updated. To the evaluators the planned adjustments appear conclusive and are pointing into the right direction: The strengthening of the strategic function of the RIS3 working groups (amongst others to strengthen cross-connections between the RIS3 fields) and an intensified use of small, regionally distributed, innovative and interdisciplinary formats, which focus on the promising fields of innovation seems highly purposeful.

The ThCM has an important role in the strategic development of efficient, innovative clusters and the networking between innovation stakeholders in Thuringia. It also makes significant contributions to the successful implementation of the RIS3. In the future, the ThCM should above all expand its function as a networker for innovation stakeholders as a broker for the transfer of knowledge between research institutions and companies and as a facilitator for

the involvement of multipliers such as chambers and business-related associations to increase the reach out to the target group of small and micro enterprises.

### Key results: impact analysis

*In the impact analysis, the evaluation examined the contribution of the investigated measures to Specific Objective 1 (“Significantly increase the competitiveness of publicly funded research institutions in Thuringia” and Specific Objective 2 (“Foster innovations in the economy – primarily in SMEs and in especially via the transfer of knowledge and technology”). In addition, effects regarding the objectives of the RIS3 and beyond were identified and analysed.*

The measures Funding of Research-related Equipment Infrastructure and Funding of Research-related Building Infrastructure under Specific Objective 1 have helped to improve research conditions at universities and non-university research facilities. The number of scientists working in improved research infrastructures has increased significantly.

Furthermore, especially the measure Funding of Research-related Building Infrastructure, has had positive effects on the acquisition of additional third-party funds and of highly qualified scientific staff. In some cases, these effects can also be confirmed for the measure Funding of Research-related Equipment Infrastructure.

Both measures contributed to intensified networking with other institutions, increased scientific output (e. g. publications) and the establishment of centres of excellence. Especially the measure Funding of Research-related Building Infrastructure also contributed to the sharpening of the research profiles and the development of unique selling points at the supported institutions – and thereby increasing their national and international visibility and competitiveness. Finally, both measures impacted the transfer of scientific knowledge into the regional economy. First and foremost, this transfer takes place in the form of follow-up projects with regional companies. These projects stimulate additional corporate investments and the development of innovative and competitive products. Furthermore, knowledge transfer into the economy also takes place via network activities and licensing.

The measures under Specific Objective 2 contribute significantly to fostering innovations in the economic sector – above all in SMEs and in particular via the transfer of knowledge and technology. Both the measure R&D Projects and the measure Innovation Vouchers stimulated additional corporate R&D investments. Likely also due to these positive effects, in Thuringia the R&D intensity of the private sector (R&D expenditures in percent of gross domestic product) increased since 2013.

The measures R&D Projects and Innovation vouchers have a substantial positive effect on the innovation behaviour of the supported companies. This is especially visible in sustainable increases in R&D and innovation activities. Additionally, both the quality and the intensity of knowledge and technology transfer with research institutions are increased. Entrances into interregional and/or transnational R&D alliances are facilitated for a fifth of the companies supported by the measure Joint R&D Projects.

The research institutions supported by this measure also report positive effects of funding on the intensity of cooperation and the quality of knowledge transfer – both vis a vis companies and other research institutions. Furthermore, funding contributed positively to the qualification of young scientists, scientific output (e. g. publications) and the initiation of follow-up projects.

The funding by the measures under Specific Objective 2 enables companies to execute complex R&D projects, which result in innovative products as well as (to a smaller extent) innovative services and processes. As a result of specific funding via the measure Innovation Vouchers, applications for national/EU R&D programmes were submitted, property rights were registered, R&D results were converted into innovative products, processes and services with the help of service providers from the creative industry and business and innovation processes were improved with through processual and organisational innovations.

Companies, which have completed their supported projects and were able to transfer the results of the projects into products, processes and services report substantial increases in their competitiveness and sales. Additional private and public investments are also reported. Furthermore, the funding enabled the companies to secure existing jobs and to create new jobs for high-skilled personnel.

The Innovation Centres established through funding by the measure Industry-oriented Infrastructure cooperate intensively with regional companies and thereby, help these companies to develop tailored solutions for current and future challenges. Furthermore, the concentration of competencies in the Centres increases the efficiency and international visibility of the scientific work of the involved institutions and enables them to pick up new research topics and to develop unique selling points. Thereby, the funding also contributes to the further development and profiling of the RIS3 fields. Because of the funding, the Centres were able to acquire additional third-party funds for collaborative projects with companies and were also able to recruit new staff.

The funding of R&D projects and investments in Industry-oriented Research Facilities increases the efficiency, competitiveness and visibility of the research of the supported facilities. Furthermore, the funding, helps to foster the knowledge, research and technology transfer between the facilities and companies. For the supported facilities, the funding was the basis for joint projects with and for scientific publications. For the companies they cooperate with it means better access to new knowledge tailored to their needs, which enables them to implement complex R&D projects. In the future, the supported facilities also plan to offer tailor-made services for companies.

The measure Rent (exclusive of heating and other additional costs) Exemption helps to improve the situation of start-ups and young innovative companies by removing (financial) barriers for starting and developing a business. In addition, it contributes to fostering the transfer of knowledge amongst start-ups and young companies in the Technology, Start-up and Application Centres as well as between those companies and research facilities in closer proximity to the centres. The companies' expectations with regard to the effects of the funding were often exceeded, as in addition to an affordable rent, they also received

other support (e. g. help to write their business plan or with bureaucratic procedures, networking).

Finally the investigated measures under Specific Objectives 1 and 2 of the OP ERDF Thuringia 2014–2020 also contributed positively to the aims of the RIS3: They helped to further converge the share of the Thuringian R&D intensity to the national average and to further increase the volume of third-party funds per researcher in Thuringian research institutions. Patent and start-up activity in high-tech sectors exhibit a stable development. However, at first sight Thuringia's position in the Regional Innovation Scoreboard of the European Commission has not improved. While it was an “Innovation Leader” in 2014, since 2016 it is considered “Strong Innovator” only. This said, some of the indicators which form the basis of the scoreboard have developed very positive in Thuringia. Furthermore, the methodology of the scoreboard repeatedly changed slightly over time. This limits the comparison of results of different years.

One of the main factors limiting the impact of the measures implemented under Specific Objectives 1 and 2 of the OP ERDF Thuringia 2014—2020 is the state's small-scale business sector. In addition, a “lack of entrepreneurship” was identified as another factor. Thus, the overall strengthening of an innovative and entrepreneurial spirit in Thuringia should also be addressed. Since this is beyond the reach of the investigated measures, it would need to be addressed at a higher level and to include different political and societal stakeholders. Currently most powerful influencing factor on the impact of funding is the SARS-CoV-2 pandemic, which poses major challenges to economies and societies worldwide. Its effects on the innovation activities of Thuringian companies, but also the R&D activities of research institutions, remain to be seen.

## Recommendations

### Continuing and improving the measures

Due to their substantial positive impacts and contributions, the investigated measures should be continued in the upcoming funding period 2021–2027. If the measures were continued, the possible adjustments and optimisation potentials laid out below should be considered.

A vibrant innovation system, effective networks between its stakeholders and a high propensity to innovate in the business sector are crucial factors influencing the possible impact of the investigated measures. A mindset for innovation and entrepreneurship can only be strengthened via an interplay of stakeholders and a holistic approach that covers research funding, innovation funding and general business development funding along the entire innovation process. Strengthening interdisciplinary cooperation between sectors of the economy as well as between science and businesses would on the one hand improve the market orientation of the RIS3 and on the other hand promote a broad understanding of innovations. Currently, process and organisational innovations do not have a prominent place in the investigated measures. However – against the background of knowledge-based structural

change and transformation processes in numerous industries due to digitalisation, decarbonisation and demographic change – in the foreseeable future the relevance of non-technical innovations will increase. One approach to foster this kind of innovations could be to examine if they can also be addressed more strongly in other measures than the Innovation vouchers.

**Strengthening Thuringia's innovation system; promoting interdisciplinary cooperation & a broad understanding of innovations**

**Increasing the outreach to SMEs and micro enterprises**

Winning SMEs and micro enterprises – which comprise a high share of Thuringia's economic sector – for the investigated measures poses substantial challenges. To better reach out to this target group should be increased by further intensifying the communication efforts via multipliers working closely with companies (e. g. chambers of trade and crafts, municipal business development agencies, industry networks and associations). In addition, opportunities to bolster low-threshold and low-bureaucracy offers for SMEs and micro enterprises should be examined.

The ThCM plays a key role in the coordination multipliers reaching out to target groups and the design of targeted communication and marketing activities as well as in fostering strategic networks and trust among the stakeholders of Thuringia's innovation system. In the future, especially ThCM's networking activities should be further strengthened. In addition, an even closer cooperation between ThCM and TAB is recommended to reach out to relevant target groups.

**Strengthening the ThCM's networking function**

**RIS3-fields: Increasing specialisation and cross-linkages**

The ongoing process of sharpening the profiles of the Specialisation Fields should be forced. Specialisations within the fields as well as conceptual linkages between the fields should be strongly promoted. Cross-sectional topics such as digitisation and sustainability should be strengthened across fields.

The structures and processes of the RIS3 Thuringia are currently undergoing an update. The intended adjustments appear conclusive and appropriate. With a stronger focus on sector-specific topics within the RIS3 fields, the working groups will increasingly assume a more strategic role. The conceptual work to e. g. initiate projects will increasingly be delegated from the working groups to smaller formats (e. g. the already established forums). Presumably, this will also increase the market orientation of the RIS3 structures. The forums

should be further developed as regionally diverse, innovative and interdisciplinary formats, which focus on relevant innovation fields.

**Developing and adjusting  
RIS3 structures and  
processes**

**Ongoingly improving and  
simplifying processes**

As bureaucratic burden is one of the major obstacles to applying for funding, the ongoing improvement, simplification and acceleration of administrative processes, including the user-friendliness and accessibility of employed digital solutions should remain high priority tasks for the

TMWWDG and the TAB. For the measure R&D Projects, lump-sums to cover project related amortisation and equipment costs could be introduced to reduce bureaucratic burden. Leaner administrative processes could free up resources that could then be used for transfer-oriented accompanying support during project implementation.

**Identifying and  
communicating synergies**

With respect to all investigated measures, identifying and communicating synergies with other regional, national and international funding and financing opportunities along the innovation process is a promising approach to increase transparency as well as the effectiveness of and satisfaction with the measures. Specifically, public and private follow-up financing options and possible interplays between the measures of Priority Axis 1 should be highlighted. This approach would require a more intensive accompanying support of projects during implementation.

**Communicating the option  
of joint projects in the  
measure Research-related  
Equipment Infrastructure**

Currently, research institutions can already jointly apply for funding through the measure Research-related Equipment Infrastructure for complex research questions. Yet, this option seemingly is not well known or not applied. Thus, wherever joint applications appear appropriate, communication of the option should be intensified.

**Examining obstacles to  
the use of available op-  
tions for economic  
activities**

At the moment, Innovation Centres and Industry-oriented Research Facilities receive funding for non-economic activities only, as the aid intensities for economic activities are not sufficient to finance the needed equipment infrastructure. From the point of view of the centres and facilities, this significantly hampers their impact. Options for limited economic activities are available, even if funding is granted for non-economic activities only. However, right now these options are not being used. Hence, an in-depth examination of the underlying obstacles is recommended.

### Future budgeting

Should sufficient additional financial resources be available for the funding of research institutions in the upcoming funding period and should the framework conditions should allow it, the combined funding research-related equipment infrastructure and scientific R&D projects (including personnel) could be considered. The relevant regulation would already allow this extension. However, it would be necessary (in addition to sufficient funds) to adjust the funding objects in the new OP. In addition, a clear distinction from the measure Funding of R&D Personnel would have to be ensured. In a similar approach, for the measure Funding of Research-related Building Infrastructure, it could be considered whether and to what extent necessary construction works in connection with the procurement of large equipment and/or planning and coordination efforts by universities could be made eligible for funding. In order to secure the high-quality of services and infrastructures provided by Innovation Centres, further investment in these services and infrastructure in the next funding period should be considered, if it turns out that the centres – despite the need to come up with respective concepts – cannot fully sustain themselves.

The possible grant size of the Innovation Voucher C has been identified as strikingly low compared to market prices around patent applications. For the upcoming funding period, reviewing and, if necessary, adjusting the conditions and financial resources for the measure, is recommended.

### Increasing the grant size for patent applications

