

02/2019

Daniel Buhr, Nikolas Dietzel, Stewart Gold, Harald Kohler

SHAPING DIGITALISATION IN GERMANY

More social innovation needed

Friedrich-Ebert-Stiftung

The Friedrich-Ebert-Stiftung (FES) is the oldest political foundation in Germany with a rich tradition dating back to its foundation in 1925. Today, it remains loyal to the legacy of its namesake and campaigns for the core ideas and values of social democracy: freedom, justice and solidarity. It has a close connection to social democracy and free trade unions.

FES promotes the advancement of social democracy, in particular by:

- political educational work to strengthen civil society;
- think tanks;
- international cooperation with our international network of offices in more than 100 countries;
- support for talented young people;
- maintaining the collective memory of social democracy with archives, libraries and more.

Division for Economic and Social Policy

The Division for Economic and Social Policy of the Friedrich-Ebert-Stiftung advises and informs politics and society in Germany about important current issues and policy making concerning social, economic and environmental developments.

WISO Diskurs

WISO Diskurs are detailed analyses examining political issues and questions, containing sound policy recommendations and contributing to scientifically based policy consultation.

Authors

Prof. Dr. Daniel Buhr is the head of the Steinbeis Transfer Centre for Social and Technological Innovation and Adjunct Professor at the Institute for Political Science of the Eberhard Karls University Tübingen.

Nikolas Dietzel, M.A., is a political scientist and research fellow at the Interdisciplinary Centre for Health Technology Assessment and Public Health (IZPH) at the Friedrich-Alexander-University Erlangen-Nuremberg.

Stewart Gold, M.A., is a political scientist and research fellow at the Eberhard Karls University Tübingen.

Dr. Harald Kohler, Dipl. Verw. Wiss and Assessor of the Civil Service, is a research fellow at the Institute for Political Science of the Eberhard Karls University Tübingen.

The authors would like to warmly thank Dr. Philipp Fink, Heinrich Tiemann and the "Sustainable Structural Policy" working group of the Friedrich-Ebert-Stiftung for their helpful suggestions.

Person responsible in the FES for this publication

Dr. Philipp Fink heads the fields of Climate, Environment, Energy and Structural Policy in the Division for Economic and Social Policy.

Daniel Buhr, Nikolas Dietzel, Stewart Gold, Harald Kohler

SHAPING DIGITALISATION IN GERMANY

More social innovation needed

2	PREFACE
3	SUMMARY
5	1 INTRODUCTION
6	2 INNOVATIONS – MORE THAN TECHNOLOGY
7	2.1 Innovation policy
7	2.2 Procedure for reviewing innovation funding
9	3 FEDERAL INNOVATION FUNDING
9	3.1 The innovation profile of the Federal Government
9	3.2 The focus of federal innovation funding
11	3.3 Expenditures on innovation funding
13	4 SELECTED STATES
13	4.1 Baden-Württemberg
16	4.2 Bavaria
18	4.3 Berlin
20	4.4 North Rhine-Westphalia
22	4.5 Rhineland-Palatinate
24	4.6 Saxony
26	5 A DIFFUSE PICTURE OF INNOVATION FUNDING
26	5.1 Funding levels and means
26	5.2 Funding focus: Research or infrastructure
27	5.3 Large variations in funding spending
29	6 INNOVATION POLICY RECOMMENDATIONS: DIFFERENT, MORE AND BETTER
29	6.1 Different
30	6.2 More
30	6.3 Better
32	Index of figures and tables
33	Index of abbreviations
33	References

PREFACE

German lawmakers must choose to either shape digitalisation for the benefit of society or else abandon it to the forces of the market. It is undisputed that we find ourselves in a time of sweeping transformation. Technical progress is creating fantastic opportunities, but brings with it high risks.

New digital applications connect us and transform our daily lives. For technical advancements to serve society the concept of innovation should not be limited to technical innovation. Innovation policy should not just aim to fund the development of new products and technologies which can be measured annually by the number of patents awarded. Patent statistics alone provide no information on whether and how the new possibilities have reached the market and improved the lives of consumers.

Therefore, alongside the funding of technology, it is also important to ask how digitalisation can serve society, for example through telemedicine, care robots (Ambient Assisted Living) or e-government. These are just a few examples of how digitalisation can function as social innovation.

What are the Federal Government and the German states doing to pursue this approach? Daniel Buhr's team explored this question. They shed light on the sometimes stark differences between federal and state-level funding efforts. Who places emphasis on upgrading networks? Who funds more research? And how much importance is placed upon social innovation? The study also makes recommendations on how Germany's innovation policies can be changed, improved and augmented. The focus should be on people and not on technology. The Federal Government already invests 4.4 billion euros in innovation funding but only a fraction of it goes towards researching social innovation. Most of it goes towards the development of products and technologies as part of a high-tech strategy, or into the financing of infrastructure such as the expansion of broadband access. Apart from a few exceptions, we found a similar picture in all of the German states we examined.

A supply-focused innovation policy neglects central questions: What are the actual needs of consumers? How do they use new technologies? And how do these technologies influence our society? Only when this step has been taken will digitalisation lead to a transformation in social areas such as politics, art and science, and be able to lead to social innovations. To successfully shape digitalisation, consumers also need to be supported.

DR. PHILIPP FINK

Division for Economic and Social Policy
Friedrich-Ebert-Stiftung

SUMMARY

Without innovations we will not be able to master the big societal challenges of our time. Climate change, growing resource scarcity, the global and national distribution of work, education, nutrition and healthcare – we need solutions that will improve the lives of billions of people around the world. Also in Germany. Here, as in many other countries, political leaders developing solution strategies have, for many decades, concentrated on the development of technological progress. In Germany, too, many billions of euros of tax money are spent, year after year, on the development of technology at colleges and universities, research institutes and in private enterprise. With considerable success, if the impressive patent statistics are anything to go by. However, a patent is merely the legal protection of an invention. What these technical developments actually mean for people, how the “internet of things”, “block-chain”, “smart grids”, artificial intelligence” and “3-D printing” will change our daily lives and work, was largely ignored by the innovation policy of the past. This is a mistake. The success of a technical innovation is measured only by its degree of market penetration. Therefore, the demand side, meaning the end users, plays a decisive role in the innovation process. It is people who help determine the success of an innovation – and not merely the supply side in itself. Every new development raises fundamental questions: Where do the needs and requirements lie? How are new technologies used? What new services and skills are required? How will our behaviour be altered by digitalisation and how will this impact processes, organisations, structures and systems? A forward-thinking innovation policy must keep all of this in view.

The following study shows, however, that such an approach is reflected only to a very small degree in German federal and state budgets. What our investigations into budgets show is that the states differ not only in terms of the amount of spending, but also in the application of budgetary expenditures. Therefore, the innovation expenditures in the states we examined as well as the Federal Government show two areas of focus in the three defined categories—social innovation funding, digitalisation and digital infrastructure, research and innovation funding. While some of the states (e.g. Bavaria and Baden-Württemberg) implement their digital innovation policy primarily by developing a (fast) network over the

greatest possible area, other states (e.g. North Rhine-Westphalia, Berlin, Saxony) as well as the Federal Government pursue a broader approach to funding. Finally, though, a convincing systemic understanding of innovation policy with a mission-oriented coordination of the policy area can be identified neither at the federal level nor in the states. On the contrary: the development of expenditures points to a trend that once again results in greater funding for technically oriented innovations. On average, barely ten percent of the analysed budgets went towards the funding of social innovation.

1

INTRODUCTION

Innovations are created by and for people. Therefore, the social dimension should be an essential consideration in the formation of innovation and value creation processes, especially in times of transformation, because digitalisation—with its triad of automation, interconnection and decentralisation—is already changing our economy and work lives today and will continue to do so massively in the coming years. Nobody can predict the shape of things to come, especially when this technical transformation is taking place concurrently to other big societal challenges such as demographic change, globalisation and, finally, the finite nature of our resources. In light of these developments, innovation policy in Germany is no longer adequate and should be reoriented. Since innovations are made for people, one must, in light of all of the societal upheavals and challenges, also pose the question of their use to society. Innovations are the decisive drivers of progress towards a sustainable economy and a just society. Considering the enormity of this task, state innovation policy has in the past been too narrowly focused and played too passive a role. It was driven too much by technology. It was too fragmented and it was too geared towards supply. This should be changed.

For this to occur requires, first of all, an understanding that encompasses both technical and non-technical innovations, including social and society-serving innovations. A social innovation is a targeted reconfiguration of social practices with the goal of better solving problems or better meeting needs than is possible through established practices (Howaldt et al. 2008: 65), and that is “therefore worth copying and institutionalising” (Zapf 1989; 177). Social innovations can hereby contribute to social progress. In addition, social innovations have an influence on whether a technical invention becomes a broader innovation, and over which paths and channels it spreads (diffuses) and which effects unfold in the process. An innovation must always include both: invention and diffusion. It is about a new idea, a new product, a new process, a new service – and how it spreads from one person to another, how it becomes established and spreads on the market. Social innovations are, on the one hand, practices for overcoming societal challenges which are adopted and used by affected people, groups and organisations. On the other hand, they support the diffusion and spread of many technical developments.

Beginning with an expanded and redefined idea of innovation, we will try in this study to take stock of innovation policy in Germany, to identify specific needs in terms of funding and actions, and to draw conclusions about social progress – through the task of creating a new social innovation policy. We will look at Germany's federal innovation funding (BMW, BMAS, BMVI, BMSFJ and BMBF), but also analyse the innovation policy programmes and measures of selected German states (Baden-Württemberg, Bavaria, Berlin, North Rhine-Westphalia, Rhineland-Palatinate and Saxony). It is clear to us that a budgetary analysis does not suffice to make a complete evaluation of the direction of innovation policy. It is, however, an important indicator which helps better identify the priorities as well as differences among Germany's innovation policies – and, where necessary, act accordingly.

2

INNOVATION – MORE THAN TECHNOLOGY

The etymology of the word innovation (“new, renew, change”) points to one of its basic characteristics. However, the invention of something new alone does not result in innovation. According to Schumpeter (1939), also required is implementation, followed by market penetration or its institutionalisation in society (diffusion) (cf. Buhr 2010; Hochgerner 2013). This perspective demonstrates that we are talking about a developmental process, which only ends once the innovation as such has been completed. The course of this process is not inevitably linear. To the contrary, in its most common form, the innovation process takes rather a discontinuous course.

Beyond technical inventions and innovations (e.g. the steam engine, telephone, nuclear energy, computer, solar panels, nanotechnology) that have dominated both innovation research and innovation policy over the past decades, one finds the field of social innovations. According to Zapf, these are “new material and social technologies that help us meet our needs and better solve our social problems” (Zapf 1994: 28). Similarly, Howaldt defines social innovation as “an (...) intentional, goal-oriented recombination or reconfiguration of social practices originating from certain actors or constellations of actors within certain areas of activity or social contexts with the goal of solving problems or meeting needs more effectively than is possible on the basis of established practices” (Howaldt et al. 2011: 224). Social innovations are society-changing elements or altered relational developments based on new and/or transformed rules, structures, actions or institutions, which we find in both the economy and the sciences as well as in politics, art and culture.

This dichotomous contrast between technical and social (societal) innovations suggests a precise delineation between the two worlds, which does not exist in reality. Theoretical analysis, which serves the improved operationalisation of research, is to blame for this delineation. It helps distinguish between cause, source and consequence or unintended occurrences. In real life (temporal) differentiation is often very difficult. Both types of innovation (cf. Figure 1) can influence one another. This leads to a number of enmeshments between social and technical innovations and results in innovations in different fields or systems whose reciprocal influence and entanglement as well as the inherent logic of innovation form

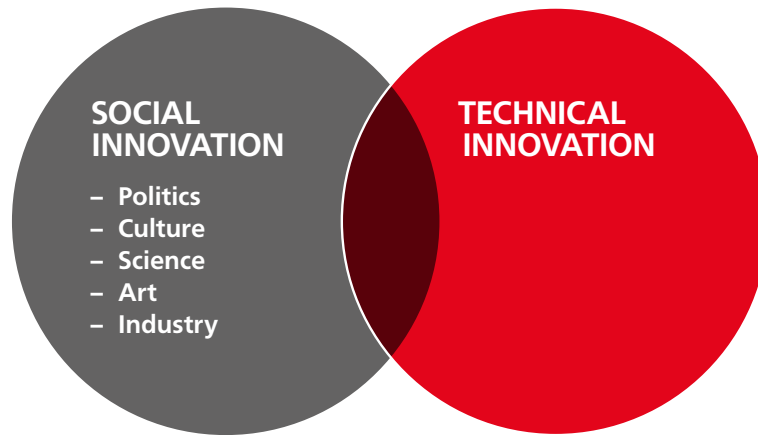
a network of institutions and actors which we can describe as an innovation system. This is a social system made up of institutions and actors as well as their relationships to one another. Social factors play a central role in the creation of innovations because innovation processes are not propelled by some kind of immanent technological “logic”, but through the interaction of social actors (Buhr 2010:40).

It follows that social innovations aid the diffusion and spread of many technical developments. An example of this is Johannes Gutenberg's printing press. In the 15th Century Gutenberg developed the first printing process using moveable type in Europe. Individual letters, punctuation marks and frequently used combinations were put together to form a text. In order to produce identical letters, Gutenberg invented the manual casting device. He also developed a printing press that enabled fast, consistent printing. In themselves, these are principally technical inventions. But they were only able to spread thanks to a social innovation: literacy in the population which formed the foundation of humanism and the Age of Enlightenment.

Yet more lies behind the concept of social innovation than the description of intended societal change. As Zapf established in his definition, it is also about the improvement of what already exists. This normative approach can be found in the work of numerous authors (e.g. Moulaert et al. 2013) and distances itself from the objectivistic, descriptive school, represented, for example, by Howaldt/Schwarz (2016). The normative interpretation expands the catalogue of criteria by adding the factor of improvement of existing rules and institutions. From the cited description we can derive the following definition for the purposes of our investigation:

Social innovations are social practices and procedures, which are applied or deployed by actors or constellations of actors who have institutionalised an altered or new set of rules on the basis of broad acceptance, and whose aim is to better solve existing problems compared to previous approaches. The course of this development can be discontinuous and non-linear. So, what does this mean for the political funding of innovations by federal and state governments? Where can we see indications of the funding of social innovations? How can innovation policy be improved, resulting in both technical and social progress?

Figure 1
Worlds of innovation – the world of technical innovation vs. the world of social innovation



Source: own research.

Table 1
Four types of innovation policy

	Modern claim	Postmodern claim
Narrow concept of innovation	Improved competitiveness by strengthening the supply side	Ecological industrial policy
Broad concept of innovation	Improved competitiveness by strengthening the supply and demand sides	Inclusive growth as a mission

Source: own research.

2.1 INNOVATION POLICY

Ideally, we can distinguish four types of innovation policy (Buhr 2014). The variance between types results from the fact that they are either based upon a narrow or broad understanding of innovation and the aims they pursue, respectively. Do they follow purely economic interests (logic of competition) or do they strive for societal, social improvements? As illustrated in Figure 1, a narrow conception of innovation only takes technical advances into account and is limited to certain actors or industries. By contrast, one also finds a far broader conception of innovation that also includes organisational and societal – and therefore social – innovations and stands to serve the overall aims of society – in this case, inclusive growth. Policies are coordinated, follow a clear strategy and are driven by a sense of mission. They fund policies on both the supply and demand side.

It is therefore necessary to build up innovation systems that facilitate close cooperation between industry, academia, government and civil society (the Quadruple Helix) in order to include the potential users of innovations (e.g. employees, family caregivers, patients, consumers) early in development, but also to support their potential as innovators (e.g. for new

business models, services, processes). Innovation systems that pursue the ideal of the Quadruple Helix produce innovation through the active cooperation of academia, industry, government and civil society.

Here, political actors on the supranational, national and regional levels (Quadruple Helix systems) are faced with an important task. State innovation policies play a decisive role in both solving and preventing the societal problems that result from economic and social change (Alaja et al. 2016). When it comes to solving big societal challenges such as climate change, growing inequality, demographic change or digitalisation, state actors are faced with crucial tasks in the area of innovation policy (Mazzucato 2015).

2.2 METHOD FOR COMPILING INFORMATION ON INNOVATION FUNDING

While research and development policy in the Federal Government and in the states is a more or less clearly defined policy area and information and expenditures can be found in Federal Research Reports (cf. BMBF 2014), it remains a challenge to compile detailed information and budgetary

data on innovation funding and innovation policy. Especially when one begins with a broad idea of innovation which includes not only technical but also social innovations. Accordingly, innovation funding covers a wide field of activity, meaning a broad range of impacted policy areas, ranging from labour market policy, educational policy, health policy, social policy, structural and economic policy to cultural, research and science policy. Gathering budgetary information on innovation funding is therefore both laborious and a balancing act, because the content of programmes and budgets must be assessed and compiled with respect to their innovations and their financing.

Compiling information on the contents and the budgetary data of innovation funding of the Federal Government and the six selected states (Baden-Württemberg, Bavaria, Berlin, North Rhine-Westphalia, Rhineland-Palatinate and Saxony) was performed as a comprehensive research project on funding. The starting point for research into state funding is the funding database of the Federal Ministry for Economic Affairs and Energy (BMWi) and the funding programmes contained therein as well as the websites of the respective funding programmes of the responsible federal and state ministries. When looking at federal policy, the analysis of innovation funding included not just the Economics Ministry and the Federal Ministry for Education and Research (BMBF), but also the Ministries for Labour and Social Affairs (BMAS), Transport and Infrastructure (BMVI), and Family Affairs, Senior Citizens, Women and Youth (BMSFJ).

The funding programmes and measures related to research and technology were categorised into three overarching funding categories: digitalisation and digital infrastructure; social innovation funding; research and innovation funding. The first category included funding programmes that exhibited a digital component, such as ICT projects and broadband expansion. Funding measures in the areas of work, training, education, health and care were added to the second category, for example, health research, the worker qualification offensive or the "Human-Technology-Interaction" framework programme. The third category contains heterogeneous funding programmes and measures, e.g. from the fields of technology, industry (especially in relation to SMEs), research at universities and colleges, energy research, climate and environmental protection, security, transport and the bio-economy.

In a further step, we attempted to assign the budgetary data and the financing (income) of the examined funding programmes and measures to the respective budgets of the Federal Government and the six selected states for the period 2012 to 2017. Within the context of this research project, this was not possible in the case of all funding programmes and measures. This resulted in a certain variance in the respective expenditures and appropriations on the federal level and for the selected states.

3

FEDERAL INNOVATION FUNDING

Table 2
Innovation profile of the Federal Government

Innovation fields	Digital and digital infrastructure, research and innovation funding	
Portion of expenditures on innovation funding 2015 in % of total (actual) budgetary expenditures	1.41	
Innovation index 2010/2016 and ranking in Europe*	2010	2016
	30.3 [-]	48.4 [-]
Gross domestic product in current prices per inhabitant 2015	37,128 Euro	

* Innovation index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Economic total accounts of the states" 2017 and own calculations.

3.1 INNOVATION PROFILE OF THE FEDERAL GOVERNMENT

Since the first High-tech Strategy, respective Federal Governments have pursued the aim of a coordinated innovation policy, which is also oriented towards benefiting society. In the new High-tech Strategy, four pillars were named (e.g. better transfer, stronger dialogue) as well as a series of future priorities, which should be brought closer together in future. This broader aim for innovation funding can, in part, be found in the budget, where one finds programmes for the promotion of social innovations financed by the European Social Fund (e.g. "The future of work"). However, one sees that the budgetary resources spent on promoting social innovation have generally been shrinking for years compared to total expenditures.

3.2 THE FEDERAL GOVERNMENT'S INNOVATION FUNDING AREAS

Healthy living, the innovative workplace, intelligent mobility, civil security, digital business and society, sustainable business and energy are the current thematic focal points of the

High-tech Strategy that has existed since 2006. These points focus on (big) societal challenges and make up the central areas of federal innovation funding. (cf. Wissenschaftsrat 2015 and BMBG 2016)

3.2.1 DIGITALISATION AND DIGITAL INFRASTRUCTURE

The central element of the Federal Government's High-tech Strategy is digitalisation, which extends into various fields. The funding of digitalisation and improvement of digital infrastructure is focused primarily on the nationwide installation of broadband and the development of innovative information and communication technologies (ICT), which include a multitude of different technologies. Consequently, the funding of digital technologies is similarly broad, e.g. innovative services using smart data and cloud solutions, big data lighthouse projects, or product solutions such as the smart home, in the energy sector with electromobility and smart energy or IT security and data protection in the framework of the "Self-sufficient and secure in the digital world" programme. Besides innovative start-ups and business creation, funding goes to automation and networking in traffic and in public transport.

Furthermore, numerous programmes are tailored towards the field of “digitalisation and industry”. Additional areas of funding include digitalisation and production and the working processes of small and medium-sized enterprises (SMEs), digital innovation in medium-sized companies and IT security in industry.

3.2.2. SOCIAL INNOVATION FUNDING

In the fields of health and medicine, social innovations are funded via various framework programmes. Here, most funding takes place as part of the framework programme for health research, that supports research on widespread diseases, infectious diseases, but also research that takes into consideration treatment, prevention and nutrition as well as the economic aspects of the health economy and contextual conditions such as demographic change, living conditions in industrial societies etc. Besides being a funding programme for the development of innovative concepts to encourage the participation of older people in social and working life, the framework programme “People-Technology-Interaction” extends the promotion of health to all areas of life, through inclusion in the world of work. The goal of the programme is to better enable mobility and a self-sufficient life for older people and to make progress in medical technology. The “Care innovations 2020” initiative is focused on efforts to sustainably tackle current and future challenges in the care sector. For example, there are trials on adopting medical technology as care technology and linking it to the relevant research fields – e.g. the development of technical assistance systems for care and treatment at home, mobility and activation training devices, or autonomous systems and robotics in care and treatment. Furthermore, medical technology is supported by additional funding programmes that address patient treatment, digitalisation in medicine as well as material innovations. (cf. BMBF 2015: 19).

The “IngenieurNachwuchs” (“Young engineering talents”) programme funds the creation of young, research-focused engineering-science teams, the development of individual research profiles, the improvement of research competencies as well as the interlinking of science and industry. “Erfolg mit MINT – Neue Chance für Frauen” (Success with MINT – New opportunities for women) supports equal opportunity for women in education and research in science and technical professions.

In the framework of its umbrella programme “Innovation für Produktion, Dienstleistung und Arbeit von morgen” (“Innovation for the production, services and work of tomorrow”), the BMBF’s “Future of work” research programme, which was launched in September 2014, supports applicable solutions that maintain and develop value creation and jobs in Germany, that design work to be economically and socially viable and develop production and service processes efficiently and in an environmentally-friendly way. The programme explicitly supports social innovations, in that social practices become a reference point of the funding. The funding programme of the Federal Ministry for Education and Research is implemented in close consultation with the Federal Ministry for Labour and Social Affairs as well as the social partners. The programme runs for seven years and has been funded with ap-

prox. one billion euros from the budget of the European Social Fund. (cf. BMBF 2016:44).

3.2.3 RESEARCH UND INNOVATION FUNDING

At the centre of federal research and innovation funding lies the funding of the innovation capability of universities and technical colleges. In cooperation with businesses, support is given to the transfer of knowledge and technology which promotes the development of innovative products and services. Start-up businesses that grow out of the results of research as well as research-related qualifications and training play a central role in the funding programme.

A large-scale civil security research programme with a duration of five years supports the fields of urban security, the security of infrastructure and industry, protection and rescue of people, protection from dangerous materials, epidemics and pandemics as well as IT security research.

Within the framework of the Federal Government’s High-tech Strategy, funding also goes to various innovative technologies – with various funding priorities. Alongside the development of information and communication technologies as a central motor of innovation in the high-tech field with many types of application including auto-mobility, mobility, mechanical engineering etc., two framework programmes fund technology in the fields of microelectronics and materials research. While microelectronics is considered to be a key technology for countless products, production processes and services, the “Vom Material zur Innovation” (“From material to innovation”) programme funds material innovations in fields such as energy technology, mobility and transport.

The funding of innovation in the area of small and medium-sized enterprises (SMEs) comprises a broad range of measures. With many instances of start-up financing and venture capital subsidies, funding goes to support the creation of young innovative companies through programmes such as INVEST and EXIT that fund knowledge-based start-ups at universities with, for example, founder stipends, the development of founder centres and the transfer of research, or the High-Tech Gründerfonds (HTGF) (“High-tech founder fund”). Three additional programmes round out the funding commitment in this area:

1. The funding initiative “Innovationsforen Mittelstand” (“SME innovation forum”) tries to develop lasting innovation partnerships through the creation and expansion of interdisciplinary regional and supra-regional networks, in order to create better conditions for SMEs to pursue innovation activities and develop new business models.
2. Under the banner “Innovativer Mittelstand” (“Innovative SMEs”), a series of funding measures can be found that address the funding of SMEs in specific areas and industries. These include the programmes “KMU-NetC” (strategic R&D groups in regional networks and clusters) and the “KMU-innovativ” fund which focuses on biotechnology/BioChance, electronic systems/electro-mobility, ICT/vehicle technology/logistics/energy management/loading concepts, materials research, medical technology, production research, research in civil security, resource efficiency, climate protection and photonics.

3. Through nationwide programmes for SMEs and research institutions that are open to all technologies and industries such as the “Zentrales Innovationsprogramm Mittelstand” (ZIM, “Central SME innovation programme”), co-operations and groups are supported—within the framework of market-oriented research and development projects— in a national and international context.

Beyond that, in the framework of innovation funding, funds go to maritime systems, marine technology, shipping technology and, via the “INNO-KOM” programme, external not-for-profit industrial research institutions in economically underdeveloped regions and pre-competitive research projects that are funded by Cooperative Industrial Research (IGF).

The national “BioÖkonomie 2030” (“BioEconomy 2030”) research strategy and complementary funding programmes were initiated with the objectives of securing food supply worldwide, making agricultural policy more sustainable to produce healthy and safe food, to be able to use renewable resources in industry and develop biomass-based energy sources. Accompanying the implementation of this strategy is the funding of innovative research subjects and technologies in bioscience, the creation of new products as well as the transformation of the resource base and customised bio-based ingredients.

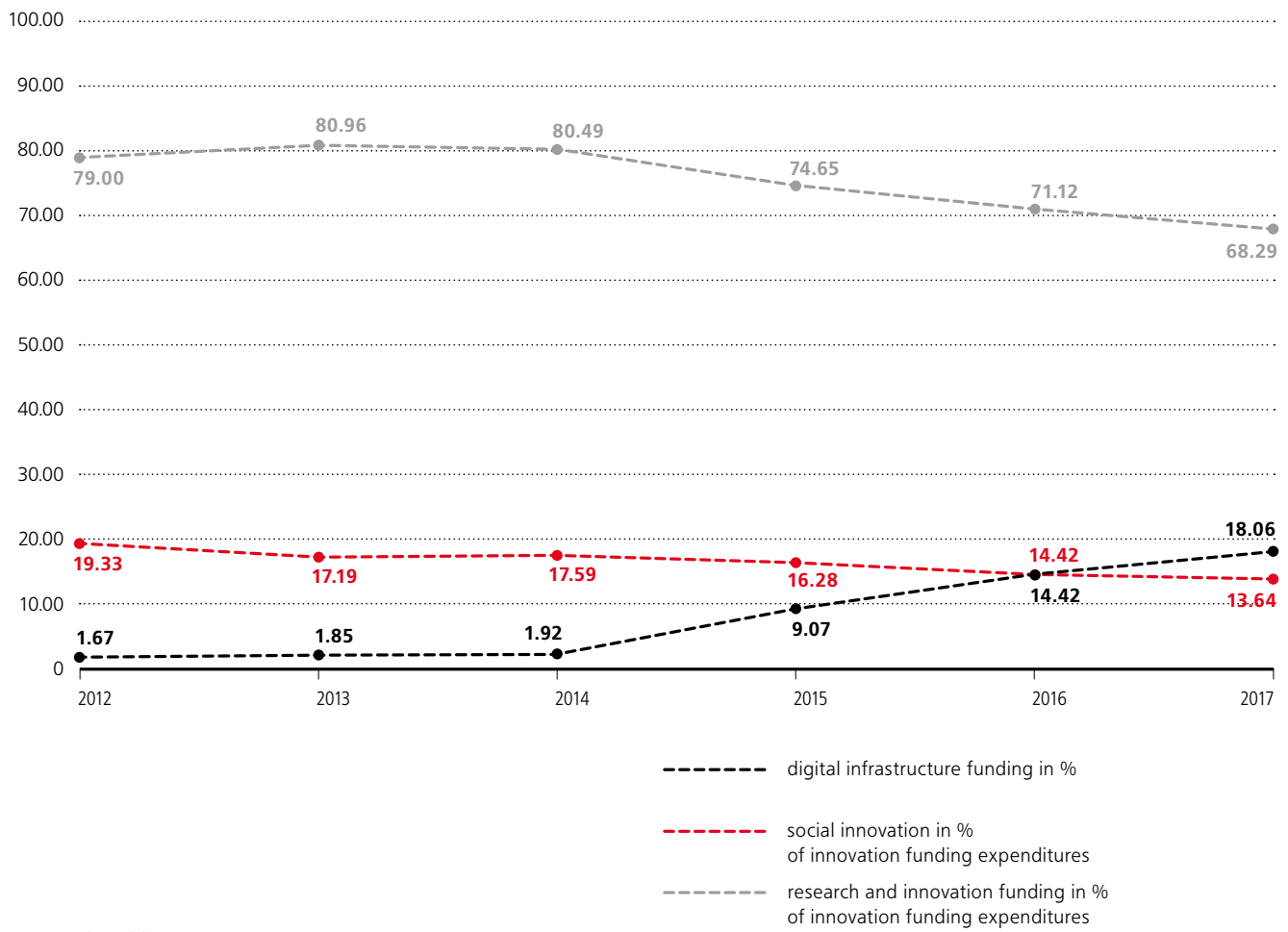
A segment of funding is dedicated to the fields of energy and environment. The comprehensive framework programme for the “National Innovation Programme for Hydrogen and Fuel Cells” funds the development and market preparation of internationally competitive hydrogen and fuel cell technology. Complementing that are funds for fuel-cell based power-heat co-generation plants. As an additional energy source, biomass usage lies at the centre of research and innovation funding. The “CLIENT II” programme funds both national projects and international partnerships, which apply to both that energy field as well as climate protection. Numerous funding programmes are aimed towards climate protection. Aside from transformative projects for climate-neutral building stock, the “National Climate Protection Initiative” framework programme promotes innovative technologies for resource efficiency as well as possible ways to reduce plastic in the environment.

Federal Government. Although this funding for social innovation is proportionately shrinking, thanks to the co-financing of the “Future of Work” programme by the European Social Fund, it has remained at a relatively high level (see Figure 2).

3.3 EXPENDITURES ON INNOVATION FUNDING

Research and innovation funding constitutes the Federal Government's central funding focus, with high proportions of the identified total innovation expenditures going towards that area, in part more than 80 percent in the years 2012 to 2017. While it was shown that a proportionally smaller share of expenditures was going towards research and innovation funding, the proportion of innovation funding for digitalisation and digital infrastructure grew significantly. The cause for this is the growth of spending on the expansion of broadband. By looking at the “Future of Work” programme which is co-financed by the European Social Fund, and additional programmes in, for example, the health sector, one can also determine the scope of funding of social innovation by the

Figure 2
Federal Government: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding as % of innovation funding expenditures



Source: own data and diagram.

4

SELECTED STATES

4.1 BADEN-WÜRTTEMBERG

4.1.1 INNOVATION PROFILE

Traditionally, Baden-Württemberg has pursued a frugal innovation policy and has for many years relied primarily upon the success of its cluster policy. The state occupied the top place on the Innovation Index in 2010 and 2016. The strengthening of regional growth centres has, with an eye on digitalisation, led to a certain imbalance when it comes to the provision of fast internet connections. Therefore, there has recently been a strong shift of budgetary expenditures towards the “development of digital infrastructure”. In 2017, around 72 percent of funds went towards this aim. The budgets did not contain funding for social innovations.

4.1.2 INNOVATION FUNDING PRIORITIES

Although, at just 0.07 percent (2015) of the budget, budgetary expenditures for innovation funding remain at an extremely

low level, the innovation potential of the state is very high when compared to other European regions. The Innovation Index of the State Statistical Office, which is compiled in a two-year cycle for regions and states, shows that despite a slightly declining index score from 2010 to 2016, the state takes first place in Europe, making it the “most innovative region in Europe”. The cause for this is the high level of private spending on research and development (R&D) by large, well-known corporations (e.g. Bosch, ZF, Mercedes-Benz, Porsche, TRUMPF, FESTO, SAP) as well as many small and medium-sized companies, in fields such as mechanical engineering, pharmaceuticals and medical technology. Following the recommendation of a group of experts summoned by the State Minister for Science, the research and science policy of the state orients itself around the “Grand Challenges” defined in the EU “Horizon 2020” research framework programme. One of the central facets of the recommendations being implemented is the creation of living labs assigned with the task of scientifically encouraging and accompanying transformational processes towards sustainable development. (cf. Wissenschaftsrat 2015: 13).

Table 3
The innovation profile of Baden-Württemberg

Innovation funding priorities	Digitalisation and digital infrastructure	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	0.07	
Innovation index 2010/2016 and European ranking*	2010	2016
	71.7 [1]	69.5 [1]
Gross domestic product in current prices per inhabitant in 2015	42,623 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.

Source: Baden-Württemberg Statistical Office 2016, “Volkswirtschaftliche Gesamtrechnungen der Länder” working group 2017 and own calculations.

Digitalisation and digital infrastructure

At the centre of the innovation funding of the state lies the expansion of digital infrastructure. This is also documented in ancillary agreements to the coalition agreement between Bündnis 90/Die Grünen (Greens) and the CDU Baden-Württemberg for the years 2016 to 2021. This sees a one-off digitalisation package worth 325 million euros exempt from budgetary restrictions in the legislative period, 150 million euros of which is intended for broadband expansion, 10 million euros for Industry 4.0 and 40 million euros for a Cyber Valley (cf. Ancillary Agreements 2015). Therein, the funding of digitalisation and digital infrastructure of the state is centred around comprehensive broadband access. Additionally, other digital activities such as “Lernfabriken 4.0” (“Learning factories 4.0”) at 16 vocational schools across the state are funded by the Ministry for Economy, Labour and Housing, whereby the trainees and participants are brought up to speed in continuing education courses on digital production (Smart Factory). In its structure and its equipment, the Lernfabrik 4.0 resembles a laboratory for industrial automation solutions, in which the foundations for application-driven processes of production control systems can be learned (cf. Baden-Württemberg Ministry for Economy and Housing n.d.).

Social innovation funding

With “Innovationsprogramm Pflege 2016” (“Nursing care innovation programme 2016”) one finds an approach to funding social innovation in the field of health and medicine. The funding programme aims to strengthen familial care arrangements in order to facilitate a self-sufficient life in the lived surroundings of persons in need of care. Beyond that, innovative measures for women in rural areas e.g. through provision of start capital for business ideas, are supported within the framework of the action and development plan “Ländlicher Raum Baden-Württemberg”, which is financed partially by the European Agricultural Fund for Rural Development (EAFRD). The “Pro Beruf” and “AVdual” funding programmes in the field of professional training comprise further aspects of innovative social funding. Both programmes support the direct transition from school into vocational training through practical instruction and trial employment for youth in inter-company training centres, dualisation of learning facilities (school and internships in industry) as well as individual support of youth according to a unique pedagogical-didactic concept and all-day school. Other pilot schemes such as the reorganisation of the transition from school to a profession receive funding through these programmes, for example, for the establishment of regional transition management to coordinate the activities and actors locally and for regional project management.

Research and innovation funding

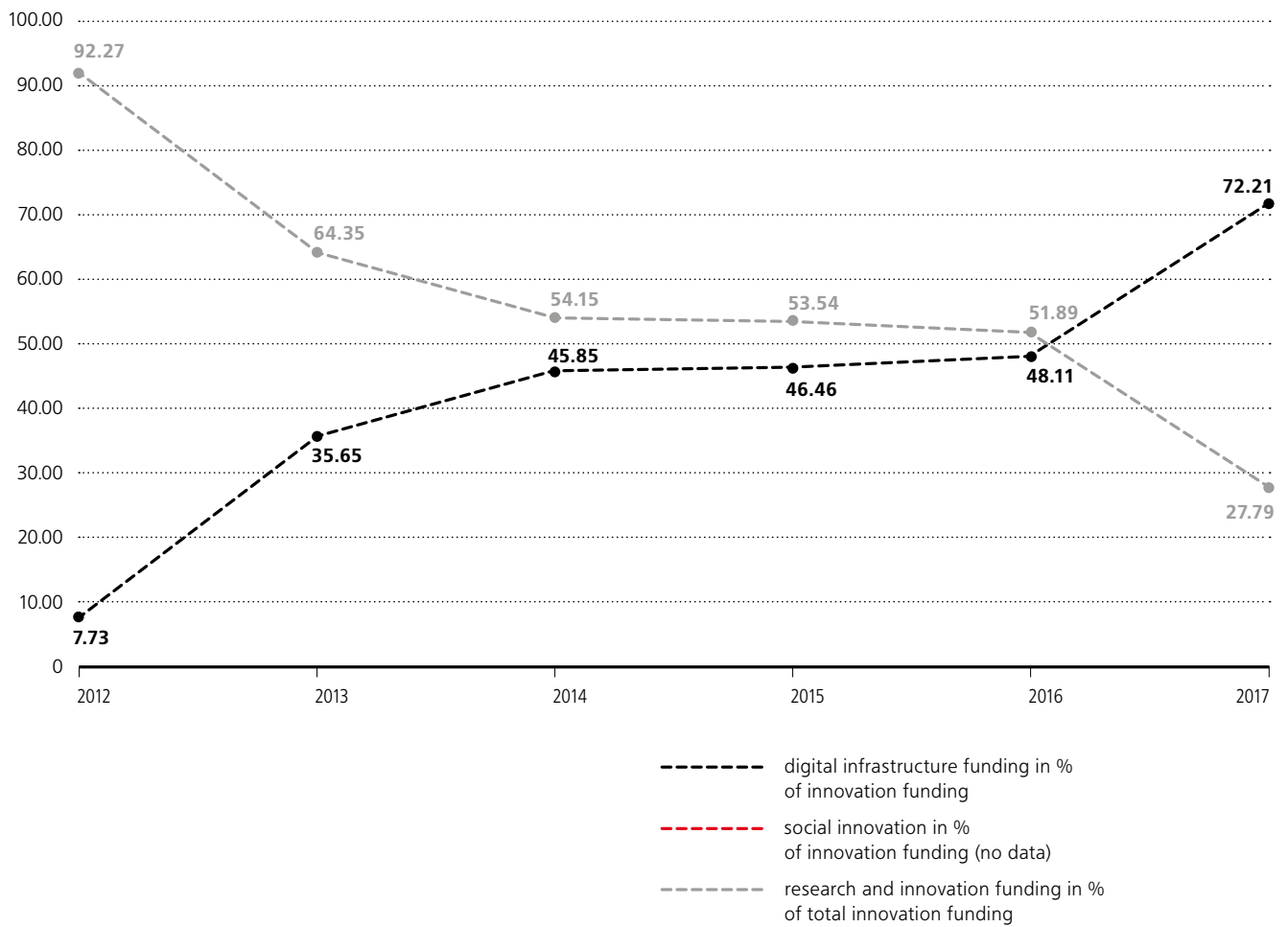
Within Baden-Württemberg's funding programme for technology and innovation for SMEs one finds the various funding areas of an established cluster policy that has been successful for many years, for example the funding of internationalisation of clusters and networks. A further international orientation can be found in the programme “Cooperation/European Inno-

vation Partnership (EIP)”, that promotes the networking of actors in business, science, consulting, marketing, groups and associations, and public institutions in agriculture and the food sector. Besides the funding of new businesses that have grown out of universities and research institutes, funding also goes towards SMEs in the form of innovation vouchers for the planning, development and realisation of new products, production processes and services in different industries (high-tech, creative industries etc.). The funding of Smart Grids (intelligent power grids) as well as demonstration projects for rational energy use comprise an additional field of funding focused on developing the use of renewable energy to achieve efficient energy consumption and storage.

4.1.3 EXPENDITURES ON INNOVATION FUNDING

Since the formation of the new Green-CDU state government in 2016, digitalisation and digital infrastructure have accounted for more than 70 percent of the state's innovation funding. By contrast, spending in the area of research and innovation funding is declining rapidly. In 2017 it comprised just 30 percent of the total (see Figure 3). The reason for this drastic proportional decline is, however, the fact that the respective expenditures could not be identified in the state budgetary plans for the by all means existent social innovation funding programmes and generally small-scale programmes and approaches.

Figure 3
Baden-Württemberg: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding



Source: Source: own data and diagram.

4.2 BAVARIA

4.2.1 INNOVATION PROFILE

As in the case of Baden-Württemberg, Bavaria belongs to the most innovative and economically robust regions of Europe. In both states this strong position is due primarily to the high level of private spending on research and development, as public spending in the field of innovation policy is below the national average, which is also apparent in the area of social innovation funding.

4.2.2 INNOVATION FUNDING PRIORITIES

Like Baden-Württemberg, Bavaria's innovation funding is focused first and foremost on digital infrastructure. Here the expansion of broadband has taken up a fast-growing proportion of expenditures since 2014. With 0.2 percent (2015) of budgetary spending, direct innovation funding in Bavaria is generally at a very low level. Despite a slightly decreasing Innovation Index score between 2010 and 2016, the state still occupies a top spot in Europe, second after Baden-Württemberg, and is ranked as a region with very high potential for innovation.

Digitalisation and digital infrastructure

In the area of digitalisation and digital infrastructure Bavaria has been intensively funding the comprehensive development of broadband access with a growing proportion of the state's innovation funds. Currently more than two thirds of all these funds go towards this sector.

Social innovation funding

Through the programme "Selbstbestimmtes Leben im Alter – SeLA" ("Self-determined living in old age"), Bavaria funds concepts for self-sufficient living for the elderly such as those involving civil engagement, assisted living at home, senior house communities and multi-generational living arrangements. Support for innovative medical care concepts stands at the centre of the funding programme. This includes innovative concepts concerning the settlement of doctors in rural areas or the cooperation between doctors, hospitals and other medical service providers.

Research and innovation funding

The central research and development priorities of Bavaria's innovation funding programmes in universities and colleges focus upon complex information technology and electronic systems, modern production technologies, electro-mobility and innovative drive technologies. The "Bavarian Technology Funding Programme" (BayTP) supports projects on the development of technologically new or significantly improved products, production processes and science-based services. Furthermore, the "BayTOU" programme fosters the foundation of technology-oriented enterprises. The "Validierungsförderung und FLÜGGGE" programme provides complementary funding for the validation of research results and inventions as well as

the subsequent transition to start-up in the area of general technological innovations. The area of bio and genetic technology is supported via the "Bio- und Gentechnologie" (BayBio) research programme, which among other things, includes bio-process technologies, biotechnological production processes and biomaterials. Medical technology and research, development and testing of modern materials and new process technologies are funded by special programmes. Moreover, funding exists for start-up centres, networking activities and enterprise foundation, for example via the Gründer 50+ initiative, as well as for information and communication technology and electronic systems (cf. Bavarian State Ministry for Economy, Media, Energy and Technology n.d.).

The comprehensive "Bayerische Energieforschungsprogramm" ("Bavarian Energy Research Programme"), which supports research and development of new energy and energy-saving technologies, comprises the lion's share of funding in the area of energy and environment.

4.2.3 EXPENDITURE DEVELOPMENTS

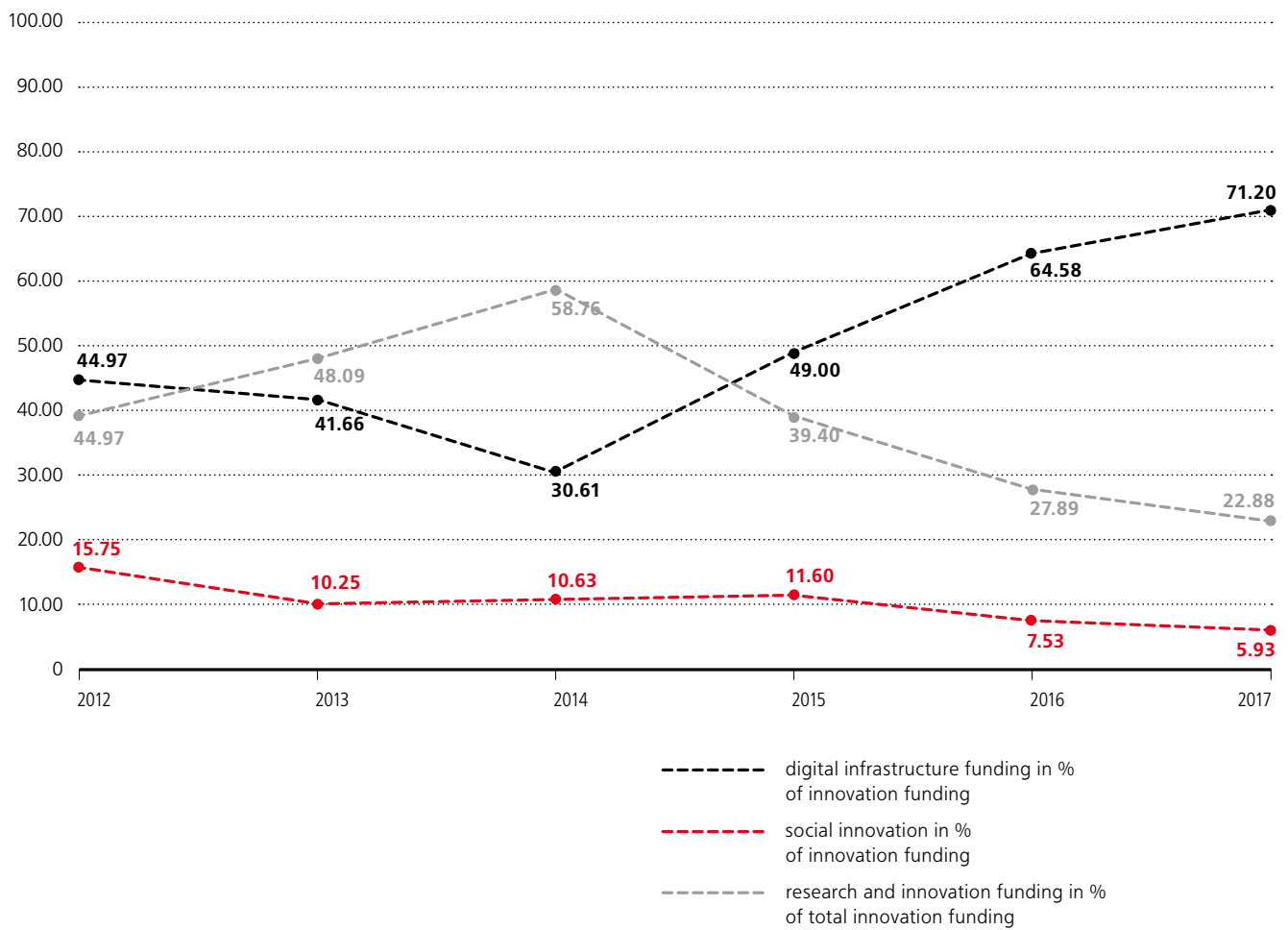
With a proportion of 49 percent of expenditures, the focus of Bavaria's innovation funding lies in digitalisation and digital infrastructure, primarily in the expansion of broadband. Through planned expenditures of 300 million euros on intensive expansion of broadband in 2017, digitalisation and digital infrastructure reached a proportion of more than 70 percent of the state's innovation funding in 2017. By comparison, spending on research and innovation funding saw a stark proportional decline in 2017, down to slightly more than 20 percent of innovation funding. The proportion of funding for social innovation has also fallen significantly since 2015 and in 2017 accounted for merely six percent of the spending on innovation funding (see Figure 4).

Table 4
The innovation profile of Bavaria

Innovation funding priorities	Digitalisation and digital infrastructure	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	0.2	
Innovation index 2010/2016 and European ranking*	2010	2016
	57,9 [2]	56.7 [2]
Gross domestic product in current prices per inhabitant in 2015	42,950 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Volkswirtschaftliche Gesamtrechnungen der Länder" working group 2017 and own calculations.

Figure 4
Bavaria: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding



Source: Source: own data and diagram.

4.3 BERLIN

4.3.1 INNOVATION PROFILE

Unsurprisingly for an urban metropolitan region, Berlin spends more than the national average on funding innovation. Since in densely populated Berlin the comprehensive expansion of fast internet access is economically viable and can therefore be realised by private providers, a relatively small proportion of the public budget goes towards the development of digital infrastructure. Instead, a higher-than-average proportion of funding is allocated towards social innovations, with the support of European subsidies.

4.3.2 INNOVATION FUNDING PRIORITIES

With a proportion of 0.63 percent of total budgetary expenditures in 2015, Berlin's funding of innovation is at a high level. The main focus lies on research and innovation funding. However, due to a rapid decline of its Innovation Index score between 2010 and 2016, Berlin now occupies the ninth place among European regions and states in terms of its estimated innovation capacity.

Digitalisation and digital infrastructure

Compared to other German states, Berlin as a city-state gets by without its own innovation funding programme in the area of digitalisation and digital infrastructure or the funding of broadband expansion.

Social innovation

Berlin takes various approaches to the promotion of social innovation in fields such as neighbourhood renewal and culture. For example, the "Zukunftsinitiative Stadtteil II" programme which is financed by ERDF funds aims to reduce inequalities in living conditions in inner-city neighbourhoods and deliberately aims to activate local potential. Complementary to this, the sub-programme "Bibliotheken im Stadtteil II" ("Libraries in the neighbourhood II") serves to improve social integration in disadvantaged neighbourhoods. With the programme "Stärkung des Innovationspotentials in der Kultur" ("Strengthening innovation potential in culture"), structural funding is provided for smaller creators, performers and providers of culture products and services as well as innovative initiatives in the areas of creative industry, cultural tourism and marketing. In recent years one has also seen programmes—often co-financed—that address, for example, digitalisation at the workplace (Work 4.0).

Research and innovation funding

The funding of research and innovation in Berlin occurs primarily through technology transfer programmes such as the "Transfer Bonus" programme. This supports the transfer of technology and science from academia to industry via the funding of small applied research and development projects. Alongside digitalisation subsidies that have been available since 2016, one focal point of the programme lies in the development of

design competency in small and medium-sized enterprises (cf. Guidelines of the State of Berlin 2016). The Berlin economy is seeing an intensification of research, development and innovation, especially within innovation clusters, and through the "Pro FIT" programme which funds innovative processes of technological development at every phase of a company history. Moreover, cooperation of universities and companies and therefore also the transfer of technology between them is strengthened by the "Innovationsassistent/-in" programme. This aims to support the hiring of qualified university and (technical) college graduates by technology-oriented SMEs.

The "Berliner Programm für Nachhaltige Entwicklung" ("Berlin programme for sustainable development", BENE) comprises the central Berlin subsidy programme in the energy and environment sector. The programme supports innovative measures, projects and initiatives that contribute to a climate-neutral and environmentally friendly city via, among other things, reduction of CO₂ emissions, resource conservation or the development of infrastructure that reduces environmental impact. Here, the funding priorities lie in energy efficiency, the use of renewable energies in companies as well as application-oriented energy research.

4.3.3. EXPENDITURE DEVELOPMENTS

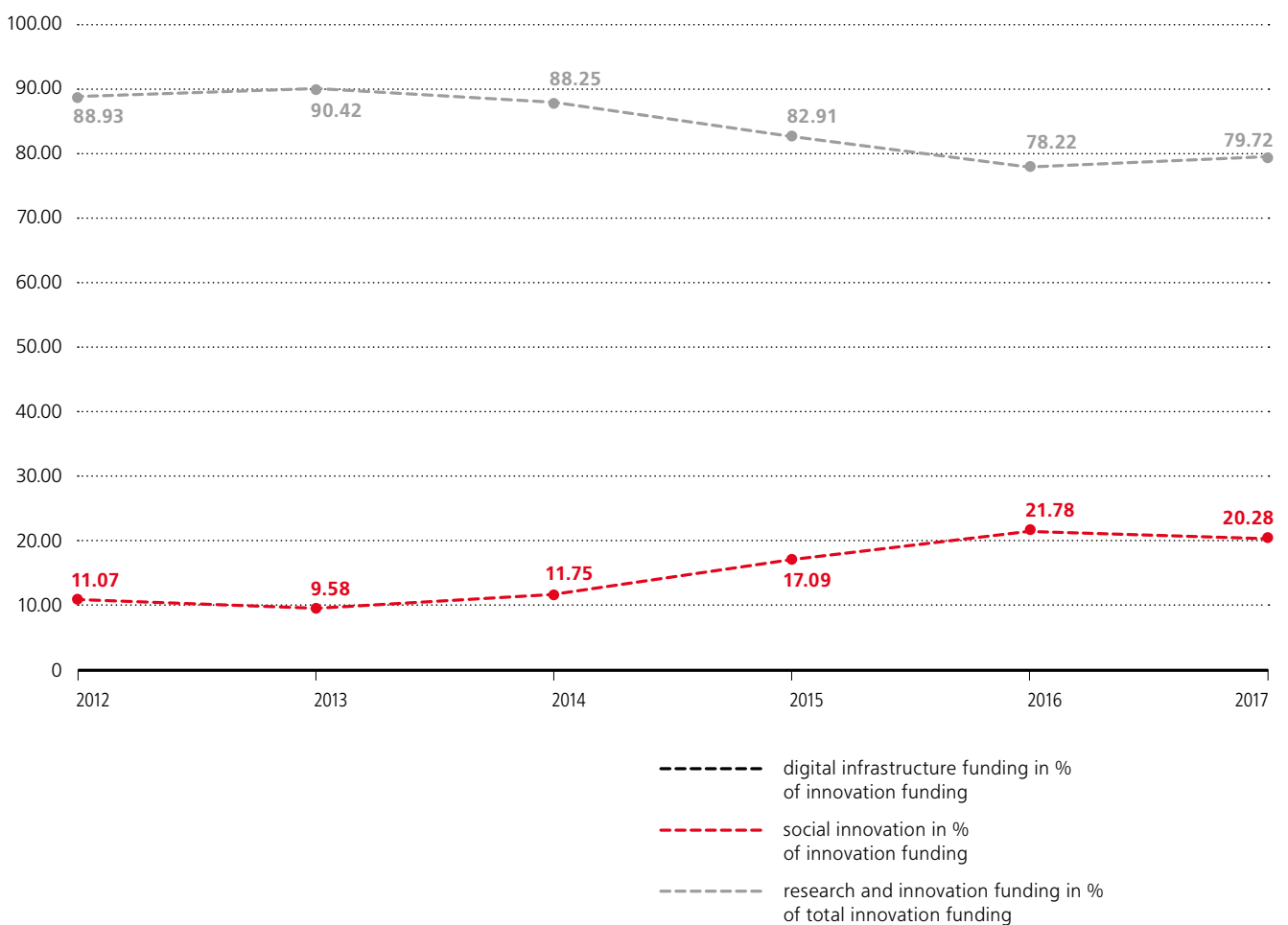
Since Berlin's funding of innovation, which is primarily financed by ERDF funds, gets by without its own funding of digitalisation and digital infrastructure i.e. broadband expansion, the area of research and innovation funding, which to a small degree also includes some digitalisation funding, comprises the main focus of innovation funding in Berlin. With a decreasing proportion in previous years, the funding of research and innovation fell to an 80 percent share of total spending of innovation funding in 2017. By comparison, the funding of social innovation is increasing and reached 20 percent of total spending in 2017 (see Figure 5). The cause for this proportional increase of expenditures for social innovation funding is, among others, the predominance of ERDF financing.

Table 5
The innovation profile of Berlin

Innovation funding priorities	Digitalisation and digital infrastructure	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	0.63	
Innovation index 2010/2016 and European ranking*	2010	2016
	55.9 [4]	50.6 [9]
Gross domestic product in current prices per inhabitant in 2015	35,428 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Volkswirtschaftliche Gesamtrechnungen der Länder" working group 2017 and own calculations.

Figure 5
Berlin: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding



4.4 NORTH RHINE-WESTPHALIA

4.4.1 INNOVATION PROFILE

The innovation expenditures of the state of North Rhine-Westphalia lie at the German national average. Proportionally, the state does not devote many funds to funding innovation, but these funds are distributed broadly across the three identified funding categories. Therefore, between 2012-2017, social innovation funding and research and innovation funding alternately comprised the main portion of North Rhine-Westphalia's innovation funding, which is financed by the European Structural Funds (ERDF and ESF). Therefore, for years, North Rhine-Westphalia has in national comparison spent the highest proportion of its budget on the funding of social innovation.

4.4.2. INNOVATION FUNDING PRIORITIES

North Rhine-Westphalia's funding of innovation, at 0.29 percent of total budget expenditures in 2015, lies at around the national average level of spending. Observed over the years, funding on social innovation and funding on research and innovation alternately play the central role in the innovation funding policy of the state. Due to a strong drop in the state's Innovation Index score between 2010 and 2016, North Rhine-Westphalia was ranked only 22nd in terms of its regional innovation capability among the European regions and states. In the "Forschungsstrategie – Fortschritt NRW" ("Research strategy – Progress NRW"), climate protection, energy supply, food supply, mobility as well as security, participation and social cohesion amidst societal change are named as the "big societal challenges" (cf. Ministry for Innovation, Science and Research of the State of North Rhine-Westphalia 2013).

Digitalisation and digital infrastructure

Comprehensive broadband access as well as broadband coordination and the funding of next-generation access development concepts comprise the main points of the state's innovation funding in the area of digitalisation and digital infrastructure. Furthermore, the establishment of regional platforms is intended to strengthen the digital economy.

Social innovation funding

On account of co-financing by the ESF and ERDF structural funds, one finds in North Rhine-Westphalia diverse and comprehensive approaches to social innovation funding in a broad range of fields and funding projects. For example: the funding of the development of family care services and pilot projects in caregiver training and in specialist healthcare professions, the general funding of the healthcare economy or, in particular, the specialist initiative in North Rhine-Westphalia (Fachkräfte.NRW). In addition, under the aegis of the Economics Ministry, one found already in the past legislative period a department named "Societal responsibility of business", which addressed topics such as "Social entrepreneurship", "Corporate social responsibility" and "Sustainable start-ups".

Research and innovation funding

In the area of research and innovation, priority is placed on funding research and development at the technical colleges in the state. Besides that, numerous programmes fund innovation in the state's business community, e.g. innovation vouchers for the craft trades and SMEs or the "Innovation-sassistenten" programme, under which the transfer of knowledge and technology between universities and companies is funded. Furthermore, creative businesses with innovation and sustainable projects are supported under the framework of lead market competitions.

4.4.3 EXPENDITURE DEVELOPMENTS

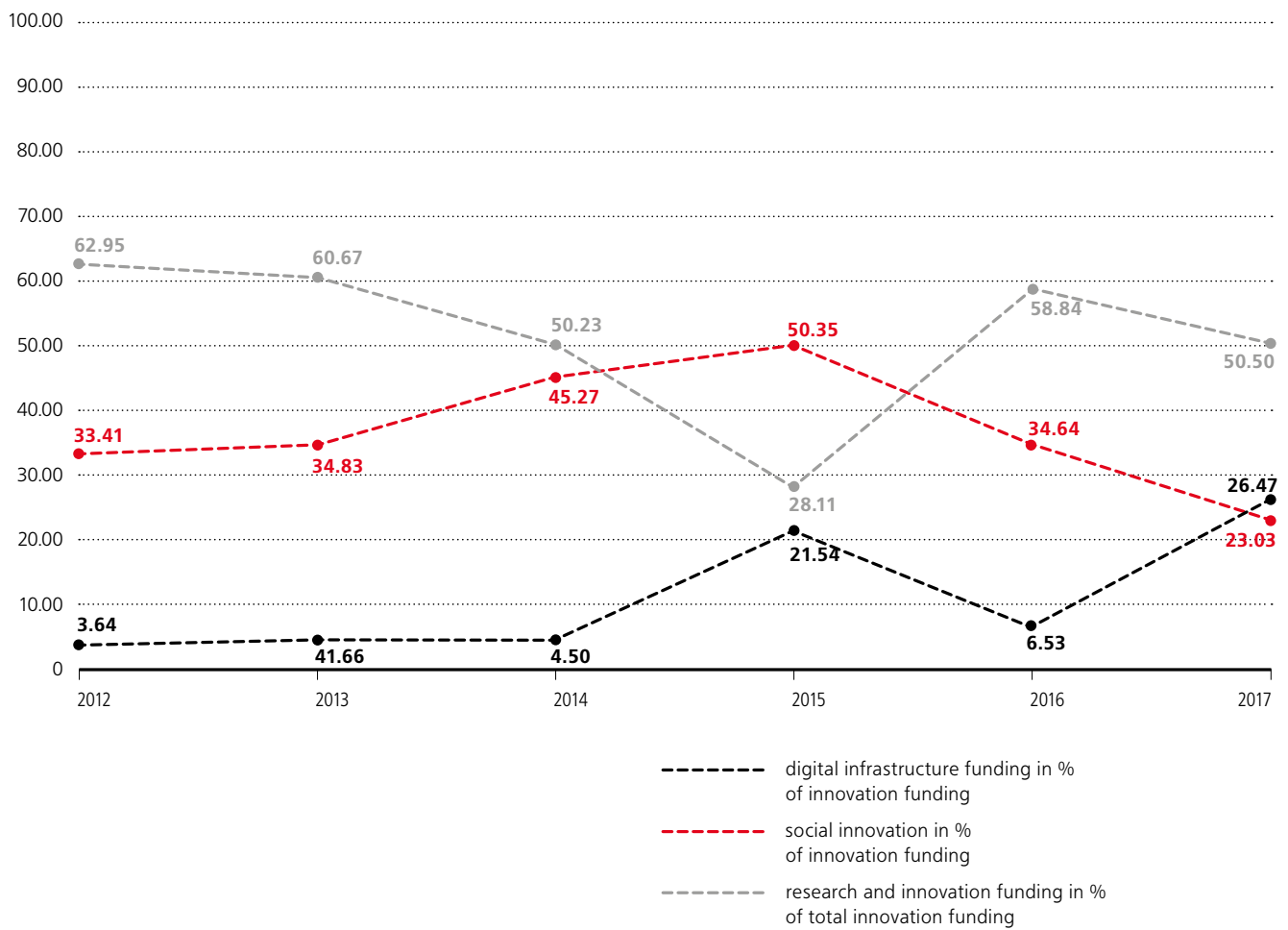
Alternating by year, social innovation funding and research and innovation funding, which are financed by means from the ERDF and ESF structural funds, comprised the largest share of North Rhine-Westphalia's spending on innovation funding in the years 2012 to 2017. While social innovation funding still played a very important role in 2015 with a proportion of around 50 percent, its share of North Rhine-Westphalia's total spending on innovation funding has since decreased significantly (see Figure 6). In 2017, its share decreased to around 23 percent. Since 2015, funding of digitalisation and digital infrastructure, primarily the expansion of broadband access has gained importance. With a share of nearly 26.5 percent of North Rhine-Westphalia's total spending on innovation funding, the funding of digitalisation and digital infrastructure reached in 2017 for the first time a significant proportion of the state's spending on innovation funding.

Table 6
Innovation profile of North Rhine-Westphalia

Innovation funding priorities	Alternation of social innovation funding and research and innovation funding	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	0.29	
Innovation index 2010/2016 and European ranking*	2010	2016
	44.9 [14]	41.1 [22]
Gross domestic product in current prices per inhabitant in 2015	36,544 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Volkswirtschaftliche Gesamtrechnungen der Länder" working group 2017 and own calculations.

Figure 6
North Rhine-Westphalia: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding



Source: Source: own data and diagram.

4.5 RHINELAND-PALATINATE

4.5.1 INNOVATION PROFILE

With a 0.04 percent share of the total budget, the state of Rhineland-Palatinate spends relatively low amounts on funding innovation. However, these funds have generally grown over the past few years, especially with regards to the expansion of digital infrastructure. In 2017 more than half of the budget for innovation funding went towards this field.

4.5.2. INNOVATION FUNDING PRIORITIES

The state of Rhineland-Palatinate's innovation funding, with a mere 0.04 percent share of the total 2015 budget, remains at a very low level. In the years 2012 to 2017, the main focus of Rhineland-Palatinate's funding of innovation alternated between research and innovation funding and digitalisation and digital infrastructure. Due to a rising Innovation Index Score between 2010 and 2016, Rhineland-Palatinate was ranked 14th in terms of innovativeness among European regions and states in the year 2016.

Digitalisation and digital infrastructure

Compared to the other states we looked at in this study, Rhineland-Palatinate spent a very low amount—around 30 million euros in 2017—on innovation funding in the area of digitalisation and digital infrastructure, which is intended to promote the expansion of high-speed broadband networks and broadband access in rural areas.

Social innovation funding

In the area of social innovation funding, one finds very few socially innovative subsidy programmes and budgetary initiatives. To these belong, for example, the “Administrative Framework Youth Promotion Law” (VV-JuFÖG), under which innovative and exemplary youth work are promoted.

Research and innovation funding

Research and innovation funding in Rhineland-Palatinate takes place via several funding programmes. These include the funding of innovation assistants with the aim of fostering the exchange of knowledge between universities and businesses, the “BITT-Technologieberatung” and “Einzelbetriebliche Innovations- und Technologieförderungsprogramm” (InnoTop), which promote technology innovations through consultations on the organisational development of company-specific quality and innovation management systems and support in the implementation of R&D activities. Furthermore, measures to strengthen research, technological development and innovation are supported through the ERDF.

4.5.3 EXPENDITURE DEVELOPMENTS

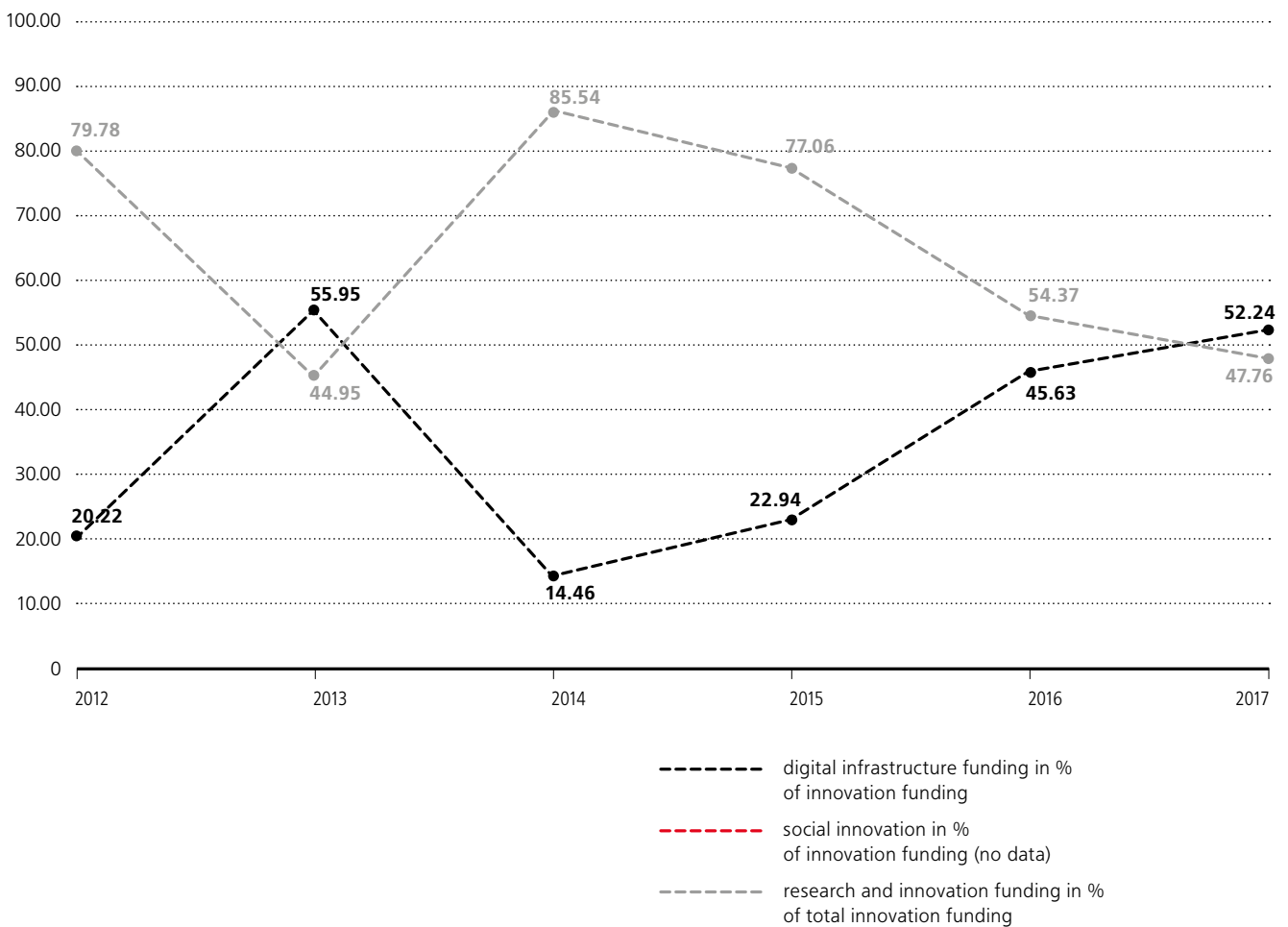
Between 2012 and 2017, the main focus of innovation funding in Rhineland-Palatinate alternated between research and innovation funding and the funding of digitalisation and digital infrastructure. With a proportion of more than 50 percent of innovation funding in 2017, digitalisation and digital infrastructure saw a proportional increase since the year 2014, making it currently the main spending focus of the state's innovation funding policy. Inversely, the value of research and innovation funding sank proportionally to around 48 percent of the state's 2017 spending on innovation funding (see Figure 7). The cause of this trend in Rhineland-Palatinate expenditures is, however, the fact that very few socially innovative funding programmes and initiatives with the corresponding expenditures could be identified.

Table 7
The innovation profile of Rhineland-Palatinate

Innovation funding priorities	Focus alternating between research and innovation funding, and digitalisation and digital infrastructure	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	0.04	
Innovation Index 2010/2016 and European ranking*	2010	2016
	41.3 [22]	45.1 [14]
Gross domestic product in current prices per inhabitant in 2015	33,589 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Volkswirtschaftliche Gesamtrechnungen der Länder" working group 2017 and own calculations.

Figure 7
Rhineland-Palatinate: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding



4.6 SAXONY

4.6.1 INNOVATION PROFILE

Compared to other federal states, Saxony spends an above-average amount of its budget on funding innovation. Most of this funding is co-financed through European programmes (ERDF and ESF) – and yet has been generally decreasing for several years. The means available for the funding of social innovation remain at a rather low level, but are seeing a slight upward trend.

4.6.2. INNOVATION PRIORITIES

With innovation funding making up 1.29 percent of total budgetary spending in 2015, Saxony exhibits a high level of spending on innovation funding. The European ESF and ERDF structural funds make a considerable contribution to the financing of this level of funding. The central focus of Saxony's support of innovation is on research and innovation funding. However, its performance has decreased for years, which is reflected in a significant decline in its Innovation Index score between 2010 and 2016. Therefore, in terms of its regional innovation capability, Saxony ranks only 24th among European regions and states.

Digitalisation and digital infrastructure

In the framework of the “Digitale Offensive Sachsen”, extensive funds from the European Union, the Federal Government and the state are put into the development and expansion of digital infrastructure and digital services. These resources are deployed via three funding guidelines (DiOs, DiOS-EFRE and LE/2014) (cf. Breitbandkompetenzzentrum Sachsen n.d.)

Social innovations

Social innovation programmes in Saxony are co-financed by the ESF and ERDF structural funds, particularly in the areas of family and health, in which topics like the compatibility of work and private life, health at the workplace, innovative approaches in the health and care sector and the improvement of childcare quality receive funding. Here, demographic developments in the state are taken into consideration. Moreover, the funding programme “Weltoffenes Sachsen für Demokratie und Toleranz” supports initiatives by state, private and social institutions to combat racism and xenophobia.

Research and innovation funding

In the framework of Saxony's research and innovation funding, support goes primarily to R&D activities that create pilot lines in the field of key technologies, for example microelectronics, ICT and nanotechnology, and towards technology transfer in companies. Furthermore, through its subsidies for SMEs, the state supports a series of additional measures such as knowledge transfer, market development and process optimisation, the market introduction of innovative products and product designs as well as new science-oriented start-ups. The “Inno-Experts”, “InnoTeam” and “Transferassistent” programmes

serve to promote cooperation between science and industry, the strengthening of innovation capability in companies as well as the improvement of employment opportunities for graduates and qualified specialists in science. Additionally, in the field of environment and energy, one finds funding programmes for increasing energy efficiency, the use of renewable energies or the development of innovative energy technologies and decentralised power storage techniques.

4.6.3 EXPENDITURE DEVELOPMENTS

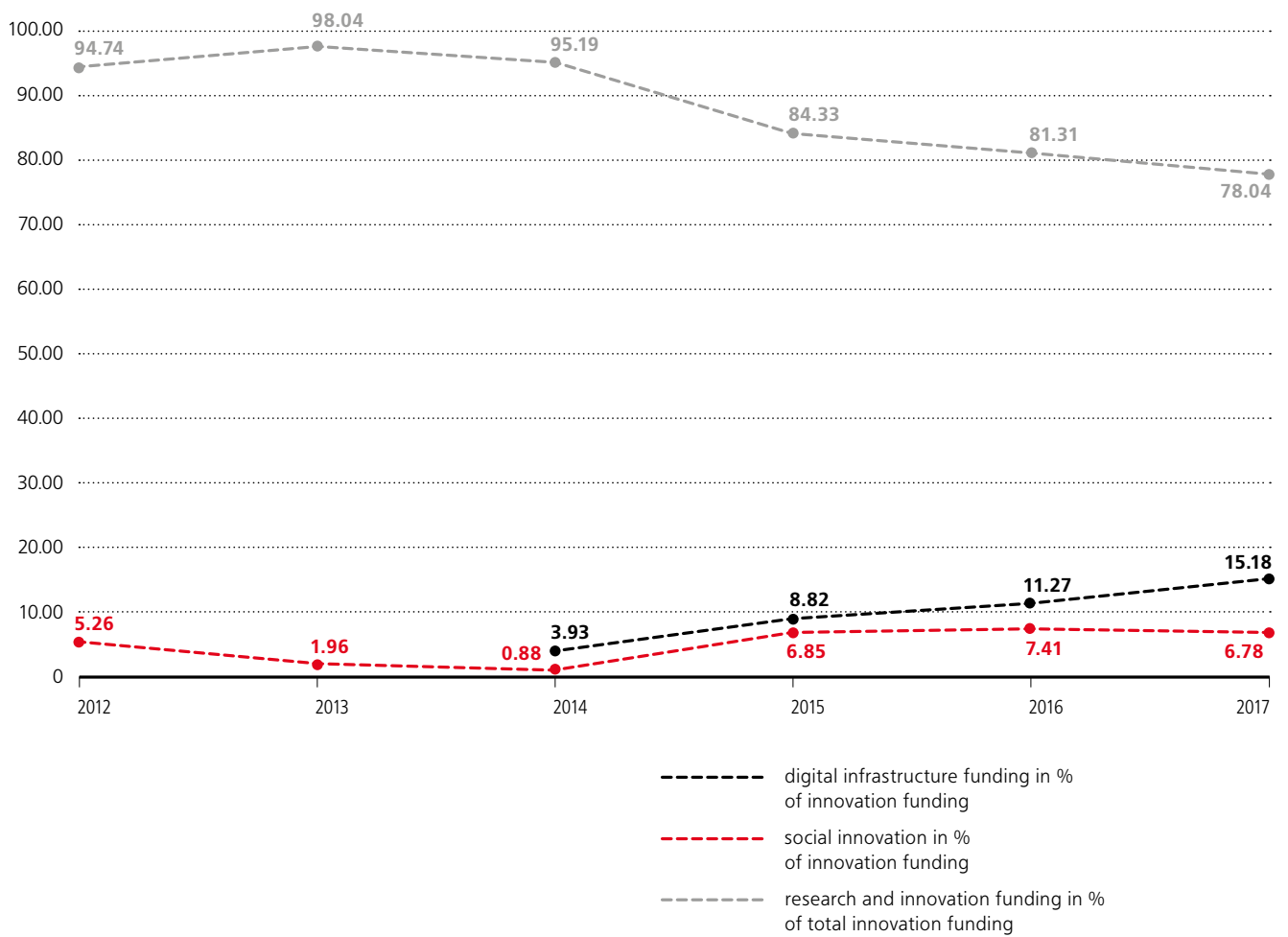
In 2017, the largest share of Saxony's innovation funding, which is financed primarily through the ESF and ERDF structural funds, comprised research and innovation funding, which made up 78 percent of total expenditures on innovation funding. With the programme “Digitale Offensive Sachsen” and a high level of spending, the funding of digitalisation and digital infrastructure has grown in importance since 2015 and currently accounts for 15 percent of the total volume. By contrast, the proportion of social innovation funding – comprising five to seven percent of innovation funding in Saxony between 2012 and 2017 – remains very low (see Figure 8).

Table 8
The innovation profile of Saxony

Innovation funding priorities	Research and innovation funding	
Proportion of expenditures for innovation funding in 2015, as % of total budgetary spending (actual)	1.29	
Innovation Index 2010/2016 and European ranking**	2010	2016
	44.4 [15]	40.4 [24]
Gross domestic product in current prices per inhabitant in 2015	27,899 Euro	

* Innovation Index = 100% (value), Baden-Württemberg Statistical Office 2016.
Source: Baden-Württemberg Statistical Office 2016, "Volkswirtschaftliche Gesamtrechnungen der Länder" working group 2017 and own calculations.

Figure 8
Saxony: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.



5

A DIFFUSE PICTURE OF INNOVATION FUNDING

It is as difficult to grasp the concept of “social innovation” as it is to search for its funding. The current study attempted to do so on the basis of the funding programmes within the respective budgets. One finds both at the federal level and in the states diverse funding programmes and funding approaches. The socially innovative programmes and (project) funding approaches are characterised by the fact that, in certain areas such as care and health, they support new activities with the aim of solving a particular problem. In the health and care sector these could be socio-technological advancements, e.g. assistance systems and AAL solutions (Ambient Assisted Living) as well as social practices or living arrangements (e.g. multi-generational housing) or development, demonstration and evaluation thereof (e.g. “Lebens-PhasenHaus” in Baden-Württemberg).

5.1 FUNDING VOLUMES AND MEANS

When it comes to volume, the Federal Government's direct funding for innovation—about two percent of its total spending in 2017—is, as expected, at a high level compared to the federal states examined in this study. In addition, since 2015, both the Federal Government and the states have exhibited a proportional increase in their spending on innovation funding. The states' varying percentage shares of total budgetary spending and within the individual fiscal years can be explained partially by co-financing by the ESF and ERDF European structural funds or by the resulting cash inflows (see Figure 9). While some states (e.g. Bavaria and Baden-Württemberg) attempt to implement their digital innovation policy primarily by expanding broadband access as comprehensively as possible, other states (e.g. NRW, Berlin, Saxony) pursue a broader approach. However, at the end of the day, one finds a convincing, systemic understanding of innovation policy with a mission-oriented coordination of the policy field neither at the federal level nor in the federal states. On the contrary: the development of expenditures points towards a trend that once again amounts to a greater focus on funding technically oriented innovations. This can be observed in both the budgets and in the funding policies. If one takes into account per-capita gross domestic product and the evaluation

of the innovation potential of the states, one can however see that innovation funding, in particular in the field of research policy, no longer takes place via budgetary funding programmes in the states Baden-Württemberg, Bavaria and Rhineland-Palatinate. These states partially fund their existent research infrastructures but also their research co-operations with industry through state agencies or state foundations. These funds are not identifiable in the state budgets and could not be considered in the current study.

5.2 FUNDING PRIORITIES: RESEARCH OR INFRASTRUCTURE

The research into budgetary resources shows not only that the states differ in terms of the amount of spending, but also in the use of budgetary resources. Expenditures on innovation funding in the states examined as well as by the Federal Government for the three defined categories – social innovation funding, digitalisation and digital infrastructure, research and innovation funding – exhibit two main trends:

1. Research and innovation funding: the Federal Government, Saxony, North Rhine-Westphalia and Berlin (cf. Table 9) pursue this approach.
2. Digitalisation and digital infrastructure funding: Bavaria, Baden-Württemberg and Rhineland-Palatinate follow this approach (cf. Table 10).

A limiting factor is that the data at our disposal did not allow us to verify all three funding categories in the examined states via the assignation of budgetary resources. The states Baden-Württemberg, Rhineland-Palatinate and Berlin only track two of the three funding categories. In Baden-Württemberg (see 4.1), for instance, one finds programmes that, with regards to their content, could very well be included in the category of social innovation funding, but reliable figures on the relevant budget allocations could not be determined.

Table 9
Priorities of expenditures on funding in the area of research and innovation funding

Examined budgets	Order of priority
Federal Government, Saxony, NRW, Berlin*	Research and innovation funding
	Digitalisation and digital infrastructure
	Social innovation funding

* Berlin had no expenditure category for digitalisation and digital infrastructure.

Table 10
Priorities of expenditures in the area of digitalisation and digital infrastructure

Examined budgets	Order of priority
Bavaria, Baden-Württemberg**, Rhineland-Palatinate**	Digitalisation and digital infrastructure
	Research and innovation funding
	Social innovation funding

** Baden-Württemberg and Rhineland-Palatinate had no expenditure category for social innovation funding.

5.3 GREAT VARIANCE IN FUNDING EXPENDITURES

In general, innovation funding expenditures paint a very diffuse picture of funding programmes and funding practices. The range of expenditures varies strongly. Generally, innovation funding expenditures have risen in the past few years. Despite the positive development of innovation funding expenditures, the states Rhineland-Palatinate (2015: 0.04 percent; 2017: 0.23 percent) and Baden-Württemberg (2015: 0.07 percent; 2017: 0.31 percent) remain with their expenditures far below the average of 0.56 percent in 2015 and 0.91 percent in 2017. Front-runners are the Federal Government (2015: 1.41 percent; 2017: 2.01 percent) and Saxony (2015: 1.29 percent and 2017: 1.31 percent).

This variance also becomes apparent when the proportion of the individual funding categories is contrasted in detail with total expenditures (cf. Table 11).

Here the proportional range among the individual categories is also very wide. In 2015, expenditure levels in the category of social innovation ranged from between 6.85 percent in Saxony and 50.35 percent in North Rhine-Westphalia. Over the entire period under review, North Rhine-Westphalia spent the highest proportion of funds on social innovation. Even if the proportion in 2017 was lower by more than half compared to 2015.

It can be observed that nearly all federal states and the Federal Government reduced their expenditures in the category of research and innovation funding during the period under review. However, all, with the exception of Berlin, increased their expenditures in the category of digitalisation and digital infrastructure. In Bavaria, Baden-Württemberg and Rhineland-Palatinate there was even a "shift in direction".

Here, expenditures in the category digitalisation and digital infrastructure rose above expenditures in the category research and innovation funding. Berlin was the only state to increase expenditures on social innovations, whereby one must bear in mind that Berlin was not recorded in the category of digitalisation and digital infrastructure.

By contrast, in NRW there was a change in the order of prioritisation of categories. In 2015, the category of social innovation funding was fore-runner in the ranking of innovation expenditures with a proportion of 50.35 percent, followed by the category of research and innovation funding and, in third place, the category of digitalisation and digital infrastructure. In 2017 the category research and innovation funding (50.5 percent) occupied first place, followed by the category digitalisation and digital infrastructure (26.47 percent) and, finally, the category social innovation funding (23.03 percent). Nonetheless, NRW and Berlin, far ahead of the others with more than 20 percent, are the leading states in expenditures on social innovation. Saxony (2017: 6.78 percent) and Bavaria (2017: 5.93 percent) lag far behind. The funding of social innovation remains a field with an enormous need for action.

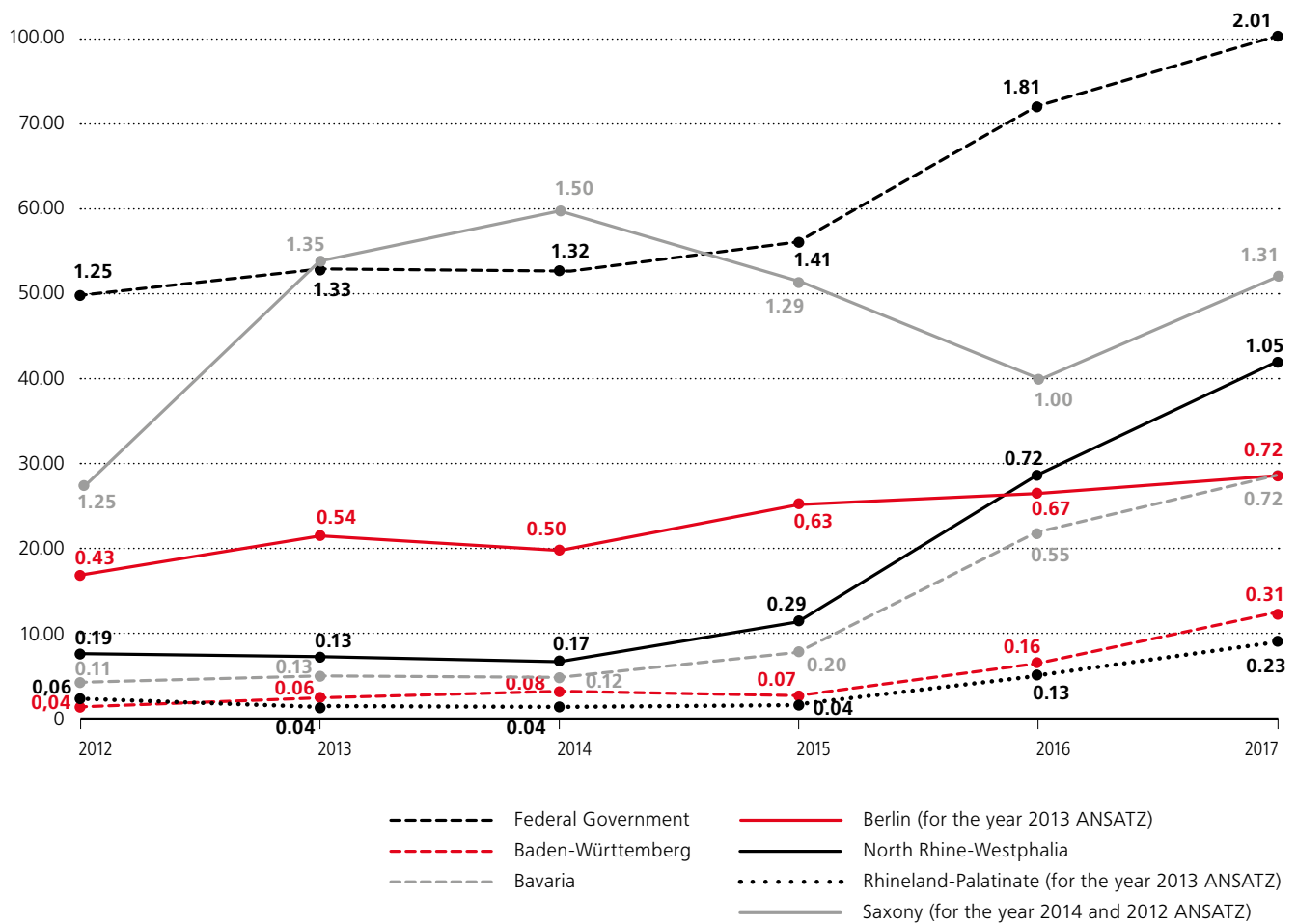
Table 11
Funding categories as a proportion of total expenditures

2015	Lowest expenditures	Highest expenditures
Social innovation funding*	6.85 % – Saxony	50.35 % – NRW
Digitalisation and digital infrastructure**	8.82 % – Saxony	49.00 % – Bavaria
Research and innovation funding	28.11 % – NRW	84.33 % – Saxony

2017	Lowest expenditures	Highest expenditures
Social innovation funding*	5.93 % – Bavaria	23.03 % – NRW
Digitalisation and digital infrastructure**	15.18 % – Sachsen	72.21 % – BW
Research and innovation funding	22.88 % – Bavaria	79.72 % – Berlin

* except Rhineland-Palatinate and Baden-Württemberg.
** except Berlin.

Figure 9
Comparison of the Federal Government, Baden-Württemberg, Bavaria, Berlin, North Rhine-Westphalia, Rhineland-Palatinate and Saxony: Innovation funding expenditures in % of total budget



Source: own survey and diagram.

6

RECOMMENDATIONS FOR INNOVATION POLICY: DIFFERENT, MORE AND BETTER

As we have been able to show, budgetary resources are still distributed unevenly in favour of an innovation policy with a strong focus on technology. The goal of devoting more funds to social innovations can be found in many programmes on both the state and federal level as well as on the part of the European Commission. However, this intention has yet to be reflected in budgets. These are currently dominated by the funding of broadband network expansion, without question a necessary condition to distribute the opportunities of digitalisation broadly in society. But this is by no means sufficient. For technical progress to be able to give birth to social progress and economic growth, far more is required than well-developed digital infrastructure – for example: qualified specialists, informed users and, last but not least, creative surroundings with a positive culture of innovation which also supports new business models, forms of organisation and (social) services. Therefore, we recommend an innovation policy that does some things differently and better, but, more than anything, innovation policy must be valued more. Because in the context of big societal challenges, innovation policy will be faced with important transformative tasks.

6.1 DIFFERENT

Enormous needs already exist today, particularly in the area of energy and mobility as well as in the health and care sector. Therefore, it seems advisable to connect innovation policy even closer with the needs of people and the requirements of the welfare state. Digitalisation could be used to modernise the welfare state, to the extent that we could, for example, answer the question: what can digitalisation provide in order to generate inclusive growth? To these ends, even closer coordination and harmonisation between the policy fields of social policy and innovation policy is essential. This is the only way to ensure that both the innovations and the (state) investments in them reach large parts of the population. This first requires, naturally, as a sufficient condition, the adequate development of digital infrastructure – especially in rural areas where, even today, it is very difficult to provide adequate health and care services, as well as educational offerings and skilled labour.

This does not go far enough. Because technology alone will not solve these challenges. It must be linked to competencies, so that people can use and develop these technologies. And they must be matched to concrete needs and requirements, with solution-based offerings and services – social innovations, in other words. Innovations can be stimulated by policy, by the supply side (e.g. through classic instruments of research policy) as well as by the demand side (e.g. through direct procurement, tax incentives, social security provisions, information campaigns, rules and prohibitions). Especially the aspect of diffusion, the spread of a new idea or new form of organisation, a new product or service broadens the focus on the demand side and the emphasis of non-technical and social innovations. Therefore, these types of innovations should also receive more attention in future budgets.

What else should receive more attention? The effects and consequences of innovations. For example, we know far too little about the effects of digitalisation on the economy and society. Therefore, it is advisable to develop large society-oriented research structures (living labs) in order to innovate and evaluate, as well as raise acceptance of advancements in the population through practical (and positive?) experiences. This also strengthens the innovation culture of a society, in which, for example, social innovations can be promoted in project competitions. The effect of “innovation through participation” only sets in once the innovation culture has been bolstered within companies. Here, the German model of capitalism, a coordinated market economy with the institution of worker participation, displays a big advantage compared to other countries: a good precondition for further strengthening of the innovation capability of a society and regional innovation systems and local networks in the sense of the Quadruple Helix.

Here is a short summary of the most important recommendations for what should be done differently in future:

- Transformation into a mission-oriented innovation policy: Use digitalisation to modernise the welfare state – innovations and investments that impact people;
- therefore: innovation policy and social policy should be intermeshed (e.g. what can digitalisation do to support inclusive growth);

- innovation processes are made up of invention and diffusion; these can be stimulated on both the supply and demand sides (e.g. through public procurement);
- pay more attention to non-technical and social innovations (financially, for example, through appropriate venture capital funds and social investment, but also through strategic consulting and the corresponding public relations work);
- develop innovation hubs and big, society-oriented research structures (living labs) in order to innovate and evaluate;
- stimulate competition: “innovation through participation”; promote with smaller, low-threshold instruments (vouchers or monetary awards), thereby “honouring” enterprise foundation and innovation.

6.2 MORE

Innovation policy must also be expanded – in terms of its content, its finances and its organisation. This already begins with funds for the expansion of digital infrastructure, which is in many regions still very far away from comprehensive broadband access with target speeds of 400 Mbit/s download and 200 Mbit/s upload. Soon, these bandwidths will be essential for medical care and industrial manufacturing. It is also important to boost the rate of entrepreneurship in Germany. This can, for example, be made possible with more venture capital, but also through measures such as the EXIST programme, which could be made much more attractive in terms of its funding conditions.

This applies generally to the funding of SMEs, which often fall behind large companies in terms of investment in research and development and which should also be supported in the development of standards. Platforms (such as Industry 4.0) should be further strengthened. SMEs should be integrated more intensively and receive tax benefits (e.g. premiums for R&D personnel costs, special tenders for investments in digital infrastructure etc.). Beyond that, funding opportunities should be created in order to develop, test and expand innovative forms of work, vocational training and continuing training, and life-phase-oriented working models (Work 4.0).

Our recommendations where more effort is required:

- Innovation policy must be expanded – with regards to content, finances and organisation;
- Facilitate start-ups (e.g. expand the EXIST programme and make it more attractive);
- Significantly expand broadband infrastructure (comprehensive access with download/upload speeds of 400/200 Mbit/s);
- Strengthen platforms, better integrate and offer tax incentives to SMEs (e.g. premiums for personnel costs in R&D, special tenders for investments in digital infrastructure);
- Expansion and support of new forms of work, vocational and continuing training and life-phase-oriented working models (Work 4.0).

6.3 BETTER

Different, more – and better. Anyone who wants to animate others to be (socially) innovative should be a good role model, especially in e-government. It is important to broaden the scope of state services in accordance with the Online Access Improvement Law. This means providing more funds for qualification and continued training of personnel, from state agencies to schools to universities.

Innovations are created in systems made up of different actors and institutions, often on the regional level, where their transformative potential can unfold very quickly. Therefore, we should pay more attention to the regional and communal level. Here, social innovations can be stimulated via co-working spaces and competitions, but also through innovative public procurement that is oriented towards social and ecological needs. The German Advisory Council on Global Change (WBGU) designates research as transformative when it concretely supports transformational processes through the development of solutions as well as technical and social innovations; this includes distribution processes in industry and society as well as the possibilities of accelerating these processes, and requires, at least in part, systemic approaches, inter- and trans-disciplinary procedures which include the participation of stakeholders. Especially in innovation processes that unfold more openly and across the economy thanks to digitalisation, the composition of (in part very established) stakeholder networks is changing. From the communal to the federal level this demands more coordination and better harmonisation of competencies and orchestration of measures. This could happen, for example, through a cabinet committee for innovation, an innovation agency (modelled after the example of the US agency DARPA) or an autonomous Future Ministry, which could be responsible for a digital strategy which keeps in mind both technical and social innovations. Sometimes it is better to do some things less, because the existing diversity of funding measures and their respective financing result in a loss of control in terms of content and administration. Better would be less yet larger funding programmes and measures, with longer durations (of five or more years) in order to really be able to develop, roll out and evaluate something better.

The two central recommendations on what could be done better in future, in summary:

- significantly expand e-government (expand service offerings in accordance with the Online Access Improvement Law, but also provide more financial means for qualification of personnel, from state agencies to schools; make Open Government Data accessible);
- better coordination and systemic innovation policy via a cabinet committee for innovation and an autonomous agency for the future.

Such a mission-oriented innovation policy would do justice to its political purpose and should be transformed into a social innovation policy that is not just an engine for innovation, but ideally also be in a position to understand the challenges facing society and to adequately address them: questions of data protection and data security, the private sphere and

rights of personality as well as general concerns of domestic and international security (cyber-attacks, drone warfare etc.); questions pertaining to the fair distribution of work and educational opportunities, access to food and medical care, digital and social infrastructure. A social innovation policy for digitalisation should therefore fulfil two tasks at once: it should guarantee the broadest possible diffusion of technical advancements (i.e. digitalisation) in society as well as the greatest possible participation and critical reflection. To this belong the creation and regulation of markets, but sometimes also intervention in market activity (Alaja et al. 2016).

In sum, it is necessary to find solutions to improve the quality of the lives of people – as patients and care-giving relatives, at the workplace, in companies or at home – and, as a result, achieve economic and social progress.

Figure 10
Recommended actions for a social innovation policy



Index of figures

- 7 Figure 1
Worlds of innovation – the world of technical innovation vs. the world of social innovation.
- 12 Figure 2
Federal Government: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding as % of innovation funding expenditures
- 15 Figure 3
Baden-Württemberg: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 17 Figure 4
Bavaria: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 19 Figure 5
Berlin: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 21 Figure 6
North Rhine-Westphalia: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 23 Figure 7
Rhineland-Palatinate: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 25 Figure 8
Saxony: Digitalisation and digital infrastructure, social innovation funding and research and innovation funding in % of total spending on innovation funding.
- 28 Figure 9
Comparison of Federal Government, Baden-Württemberg, Bavaria, Berlin, North Rhine-Westphalia, Rhineland-Palatinate and Saxony: Innovation funding expenditures in % of total budget
- 31 Figure 10
Recommended actions for a social innovation policy

Index of tables

- 7 Table 1
Four types of innovation policy
- 9 Table 2
Innovation profile of the Federal Government
- 13 Table 3
The innovation profile of Baden-Württemberg
- 17 Table 4
The innovation profile of Bavaria
- 19 Table 5
The innovation profile of Berlin
- 21 Table 6
The innovation profile of North Rhine-Westphalia
- 23 Table 7
The innovation profile of Rhineland-Palatinate
- 25 Table 8
The innovation profile of Saxony
- 27 Table 9
Priorities of expenditures in funding in the area of research and innovation funding
- 27 Table 10
Priorities of expenditures in the area of digitalisation and digital infrastructure
- 28 Table 11
Funding categories as a proportion of total expenditures

Index of abbreviations

BMAS	Federal Ministry of Labour and Social Affairs
BMBF	Federal Ministry of Education and Research
BMSFJ	Federal Ministry of Family Affairs, Senior Citizens, Women and Youth
BMVI	Federal Ministry of Transport and Infrastructure
BMWi	Federal Ministry for Economic Affairs and Energy
DARPA	Defense Advanced Research Projects Agency
EAFRD	European Agricultural Fund for Rural Development
ERDF	European Regional Development Fund
ESF	European Social Fund
HTGF	High-tech Founders Fund
ICT	Information and communications technology
IGF	Cooperative Industrial Research
R&D	Research and development
SMEs	Small and medium-sized enterprises
WBGU	German Advisory Council on Global Change

References

- Alaja, Antti; Andersson, Lars Fredrik; Buhr, Daniel; Fink, Philipp; Stöber, Niels 2016: Innovationsstrategien in Zeiten der Digitalisierung: Ein Vergleich der Innovationspolitik in Finnland, Schweden und Deutschland, Gute Gesellschaft – Soziale Demokratie #2017plus, Friedrich-Ebert-Stiftung, Bonn.
- Arbeitskreis „Volkswirtschaftliche Gesamtrechnungen der Länder“ 2017: Bruttoinlandsprodukt, Bruttowertschöpfung in den Ländern der Bundesrepublik Deutschland 1991 bis 2016 – Berechnungsstand November 2016/Februar 2017, <http://www.statistik-portal.de/Statistik-Portal/publ.asp#Gesamtrechnungen> (19.1.2018).
- Baden-Württemberg: Staatshaushaltspläne ab 2010/2011, <http://www.statistik-bw.de/shp/> (19.1.2018).
- Bayerisches Staatsministerium für Wirtschaft und Medien, Energie und Technologie o. J.: Programmübersicht, <https://www.stmwi.bayern.de/service/foerder-programme/technologiefoerderung/> (19.1.2018).
- Bayern: Haushaltspläne ab 2011/2012, <https://www.stmflh.bayern.de/haushalt/haushaltsplaene/> (19.1.2018).
- Berlin: Haushaltspläne ab 2012, <https://www.berlin.de/sen/finanzen/haushalt/haushaltsplan/artikel.5697.php> (19.1.2018).
- Breitbandkompetenzzentrum Sachsen o. J.: Digitale Offensive Sachsen, <https://www.digitale.offensive.sachsen.de/9895.html> (19.1.2018).
- Buhr, Daniel 2010: Chaos oder Kosmos?: Die Koordination der Innovationspolitik des Bundes – Probleme und Lösungsansätze, Baden-Baden.
- Bund: Haushaltspläne ab 2011 (Einzelpläne: 09/BMWi, 11/BMAS, 12/BMVI, 17/BMFSFJ und 30/BMBF), <https://www.bundeshaushalt-info.de/download.html> (19.1.2018).
- Bundesministerium für Bildung und Forschung (BMBF) 2014: Bundesbericht Forschung und Innovation 2014, Berlin, http://www.bundesbericht-forschung-innovation.de/files/BuFI_2014_barrierefrei.pdf (10.8.2017).
- Bundesministerium für Bildung und Forschung (BMBF) 2015: Technik zum Menschen bringen – Forschungsprogramm zur Mensch-Technik-Interaktion, https://www.bmbf.de/pub/Technik_zum_Menschen_bringen_Forschungsprogramm.pdf (19.1.2018).
- Bundesministerium für Bildung und Forschung (BMBF) 2016: Zukunft der Arbeit, https://www.bmbf.de/pub/Zukunft_der_Arbeit.pdf (19.1.2018).
- Hochgerner, Josef 2011: Der lange Weg von Wahrnehmung zu systemischer Forschung und Förderung sozialer Innovationen: Kommentar zum Hauptartikel „Soziale Innovation – Gesellschaftliche Herausforderungen und zukünftige Forschungsfelder“, in: Jeschke, Sabina; Isenhardt, Ingrid; Hees, Frank; Trantow, Sven (Hrsg.): Enabling Innovation: Innovationsfähigkeit – deutsche und internationale Perspektiven, 2011, p. 239 ff.
- Howaldt, Jürgen; Schwarz, Michael 2011: Soziale Innovation: Gesellschaftliche Herausforderungen und zukünftige Forschungsfelder, in: Jeschke, Sabina; Isenhardt, Ingrid; Hees, Frank; Trantow, Sven (Hrsg.): Enabling Innovation: Innovationsfähigkeit – deutsche und internationale Perspektiven, 2011, p. 217 ff.
- Howaldt, Jürgen; Schwarz, Michael 2016: Soziale Innovation verstehen: Gabriel Tardes Beitrag zur theoretischen Fundierung des Sozialen, in: Soziologie heute Juni, p. 12 ff.
- Howaldt, Jürgen; Schwarz, Michael; Kopp, Ralf 2008: Innovationen (forschend) gestalten: Zur neuen Rolle der Sozialwissenschaften, in: WSI Mitteilungen (2), p. 63 ff.

Mazzucato, Mariana 2015: The Innovative State: Governments Should Make Markets, Not Just Fix Them, in: Foreign Affairs Jan./Feb., <https://www.foreignaffairs.com/articles/americas/2014-12-15/innovative-state> (19.1.2018).

Ministerium für Innovation, Wissenschaft und Forschung des Landes Nordrhein-Westfalen 2013: Forschungsstrategie: Fortschritt NRW, Forschung und Innovation für nachhaltige Entwicklung 2013–2020, <https://www.mkw.nrw/mediathek/broschueren/2406/download/> (19.1.2018).

Ministerium für Wirtschaft und Wohnungsbau o. J.: Lernfabriken 4.0 in Baden-Württemberg, <https://wm.baden-wuerttemberg.de/de/innovation/schluesselformen/industrie-40/lernfabrik-40/> (19.1.2018).

Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg o. J.: Verwaltungsvorschrift des Ministeriums für Wissenschaft, Forschung und Kunst Baden-Württemberg für die Gewährung von Zuwendungen zur Förderung von Kulturinitiativen und soziokulturellen Zentren vom 29. Dezember 2008, <https://mwk.baden-wuerttemberg.de/fileadmin/redaktion/m-mwk/intern/dateien/pdf/Kunst/VwV-MWK-Kulturinitiativen.pdf> (19.1.2018).

Moulaert, Frank; MacCallum, Diana; Mehmood, Abid; Hamdouch, Abdelilah 2010: Social Innovation: Collective Action, Social Learning and Transdisciplinary Research, Cheltenham; Northampton, <http://cordis.europa.eu/documents/documentlibrary/124376771EN6.pdf> (19.1.2018).

Moulaert, Frank; MacCallum, Diana; Mehmood, Abid; Hamdouch, Abdelilah 2013: The International Handbook on Social innovation: Collective Action Social Learning and Transdisciplinary Research, Cheltenham; Northampton. Nebenabreden 2015: Nebenabreden zum Koalitionsvertrag zwischen Bündnis 90/Die Grünen und der CDU Baden-Württemberg für die Jahre 2016–2021, <https://www.gruene-bw.de/app/uploads/2016/07/Nebenabreden.pdf> (19.1.2018).

Nordrhein-Westfalen: Haushaltspläne ab 2011, <http://www.haushalt.fm.nrw.de/daten/html/hhp.html> (19.1.2018).

Richtlinien des Landes Berlin 2016: Richtlinien des Landes Berlin für das Programm „Transfer BONUS“ zur Förderung des Technologie- und Wissenstransfers von Wissenschaftseinrichtungen sowie des Designtransfers in KMU, http://www.transferbonus.de/fileadmin/03_TransferBONUS/Transfer_BONUS_Richtlinie_05.01.16_final.pdf (19.1.2018).

Sachsen: Haushaltspläne ab 2011/2012, <http://www.finanzen.sachsen.de/12536.html> (19.1.2018).

Schumpeter, Joseph 1939: Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process, New York; Toronto; London.

Statistisches Landesamt Baden-Württemberg, 2016: Innovationsindex seit 2004, <https://www.statistik-bw.de/GesamtwBranchen/ForschEntwicklung/Innovation-I.jsp> (19.1.2018).

Wissenschaftsrat 2015: Zum wissenschaftspolitischen Diskurs über Große gesellschaftliche Herausforderungen: Positionspapier, <https://www.wissenschaftsrat.de/download/archiv/4594-15.pdf> (19.1.2018).

Zapf, Wolfgang 1989: Über soziale Innovationen, in: Soziale Welt (40), pp. 170–183.

Zapf, Wolfgang 1994: Über soziale Innovation, in: Zapf, Wolfgang (Hrsg.): Modernisierung, Wohlfahrtsentwicklung und Transformation: Soziologische Aufsätze 1987 bis 1994, 1994, p. 23 ff.

Imprint:

© 2019

Friedrich-Ebert-Stiftung

Publisher: Division for Economic and Social Policy

Godesberger Allee 149 / D-53175 Bonn

Fax 0228 883 9205, www.fes.de/wiso

Orders/contact: wiso-news@fes.de

The views expressed in this publication are not necessarily those of the Friedrich-Ebert-Stiftung (FES). Commercial use of all media published by the FES is not permitted without the written consent of the FES.

ISBN: 978-3-96250-277-5

Cover foto: © Jan Braun/VISUM

Translation: Maurice T. Frank

Design: www.stetzer.net

Printing: www.bub-bonn.de

ADDITIONAL PUBLICATIONS FROM THE
DIVISION FOR ECONOMIC AND SOCIAL POLICY

Industry 4.0 and European Innovation Policy – Big Plans, Small Steps
WISO DISKURS – 12/2018

Digital Capitalism – How to Tame the Platform Juggernauts
WISO DIREKT – 06/2018

Digital Capitalism – How China is Challenging Silicon Valley
WISO DIREKT – 04/2018

Digital Labour Markets in the Platform Economy – Mapping the Political
Challenges of Crowd Work and Gig Work
GOOD SOCIETY – SOCIAL DEMOCRACY #2017PLUS – 2017

Digitalisation and Low-Skilled Work
WISO DISKURS – 19/2016

The Future of Low-Skilled Industrial Work
WISO DIREKT – 25/2016

The Impacts of Digitalisation on the Working Environment
WISO DIREKT – 26/2016

Policies for Innovation in Times of Digitalization – A Comparative Report
on Innovation Policies in Finland, Sweden and Germany
GOOD SOCIETY – SOCIAL DEMOCRACY #2017PLUS – 2016

Social Innovation Policy for Industry 4.0
GOOD SOCIETY – SOCIAL DEMOCRACY #2017PLUS – 2015

